THE SCIENCE OF **CONSCIOUSNESS**

Barcelona July 6-11, 2025

In conjunction with
The Festival of Consciousness July 11-13

Welcome to the 31st annual **'The Science of Consciousness' ('TSC') Conference,** the world's largest, longest running, interdisciplinary and premier gathering addressing fundamental questions and rigorous approaches to all aspects of the study and understanding of consciousness, the brain, reality, its place in the universe and the nature of existence. Topical areas include neuroscience, philosophy, psychology, biology, quantum physics, cosmology, art, meditation, psychedelic and altered states, AI/machine consciousness, culture and experiential phenomenology.

The **2025 TSC** is organized and hosted by the Center for Consciousness Studies at the University of Arizona and hosted by The Festival of Consciousness and Fundació Humanitas Internacional.

Welcome

TSC 2025 is a 6-day gathering consisting of 7 Workshops, 14 Plenary Sessions, 24 Concurrent Sessions, 3 Poster Sessions and Exhibitor presentations, social, wellness sessions, a *Poetry Slam* and other entertainment. We anticipate in person over 500 scientists, philosophers, educators, academicians, students, meditators, artists, interested public and seekers from around the world. The Plenary sessions and 3 workshops will be live streamed virtually and uploaded for on-demand review. We thank our sponsors, program committee, support staff, hosts, presenters, attendees, exhibitors and volunteers and all the Plenary and Keynote speakers for making TSC possible.

This year our live participation and broadcast will take place at the AC Forum / Leonardo Royal Forum.

New Name – Same Address –
Venue: AC Forum became part of the Leonardo Chain (NEW July 1 Leonardo Royal Forum)
Address: Passeig del Taulat, 278, Barcelona

TSC Conference: July 6 – July 11 (AC FORUM / Leonardo Royal Forum, Passeig del Taulat, 278

FoC-Festival: July 11 – July 13 (Plaza Leonardo da Vinci – adjacent to the ACF - LRF

Links

Leonardo Royal Barcelona Forum *https://www.leonardo-hotels.com/barcelona/leonardo-royal-hotelbarcelona-forum - Reservations: reservations.barcelonaforum@leonardo-hotels.com*
Tel. +34 934 898200. *Address:* **Forum Passeig del Taulat, 278, Sant Martí, 08019 Barcelona, Spain**

Conference & Festival Website - 2025 Barcelona

Program/Abstracts
Center for Consciousness Studies Website UA-Tucson

TSC Conference - July 6-11 /Registration **– now closed**

The Festival July 11-13 is adjacent to the AC Forum / Leonardo Royal Forum on the **"Plaza Leonardo da Vinci"**

Livestream - Pre-registration required. Live or On-Demand Access

Special thanks and appreciation to Xavi Ganesta and staff including the excellent coordination of Diana Perea, Fundació Humanitas Internacional. We especially acknowledge the extraordinary efforts and many years of service of Abi Behar-Montefiore, Assistant Director of the Center for Consciousness Studies at the University of Arizona. Without Abi, The Center and TSC conferences would not be possible.

Have a great time !

Sincerely,

Stuart Hameroff, Director, Center for Consciousness Studies
Program Co-Chair, The Science of Consciousness

BARCELONA July 6-11, 2025 31st Annual TSC Conference
followed by The Festival of Consciousness July 12-13, 2025

The Science of Consciousness Conference

July 6 — 11, 2025

Barcelona

TSC 2025 PLENARY

- Sir Roger Penrose
- Avshalom Elitzur
- William Brown
- Deepak Chopra
- Stuart Hameroff
- Nassim Haramein
- Giulio Ruffini
- Jay Sanguinetti
- Federico Faggin
- Farhan Lakhany
- Suzanne Gildert
- Anirban Bandyopadhyay
- Michael Wiest
- Pär Halje
- Jennifer Penberthy
- David del Rosario
- Laxmidhar Behera
- Robert Lawrence Kuhn
- Naotsugu Tsuchiya
- Ivette Fuentes
- Thomas Brophy
- Santosh Helekar
- Earl K. Miller
- Matthew Larkum
- Sabine Kastner
- Philip Kurian
- Dante Lauretta
- Anita Goel
- Dean Radin
- Rupert Sheldrake
- Marjorie Woollacott
- Alex Gomez-Marin
- Jimo Borjigin
- Ross Coulthart
- Brannon Wheeler
- Donald Hoffman

ABOUT TSC

The Science of Consciousness ('TSC') conference is the world's longest running inter-disciplinary gathering on the study of consciousness, the nature of existence and our place in the universe. TSC has alternated yearly since 1994 between Tucson, Arizona USA and elsewhere including Italy, Denmark, Japan, Sweden, Czech Republic, Hungary, Hong Kong, India, California, Switzerland, Finland, and in 2023 Taormina, on the island of Sicily. In 2025, TSC will be in Barcelona, Spain preceding and in conjunction with The Festival of Consciousness.

We are at a crossroads in the age-old study of consciousness. Over the past thirty years approaches to understanding consciousness have diverged along two distinct paths:

1. 'Neurocomputational' views of the brain as a complex computer of simple neurons, a view compatible with AI systems becoming conscious.

2. 'Funda-mental' views in which consciousness is intrinsic to the universe, connected to the brain through quantum biology.

TSC considers both views rigorously.

THE SCIENCE OF
CONSCIOUSNESS

Barcelona July 6-11, 2025

WHAT TO EXPECT

- Sunday workshop day (7)
- Early morning inspirational sessions
- 14 plenary sessions
- +100 concurrent talks
- posters, exhibits, and social events
- +500 attendees

Conference Program - Summary by Session

- **Workshops**: Sunday July 6
  morning 9 am-1 pm; afternoon 2 pm-6 pm; evening session 7-10 pm
- **Plenary:** Monday July 7 - Friday July 11
  Monday-Thursday: 8:30 am-4:10 pm; Friday 9:00 am-1:00 pm
- **Concurrent Sessions:** Monday July 7- Thursday July 10 - 5:00 pm-7:30 pm
- **Posters**: Monday July 7 to Wednesday July 9; 7:30 pm-10:00 pm
- **Exhibitors**: Coffee/Refreshments - during evening Poster Sessions & between sessions
- **Morning Experiential Sessions** Monday July 7- Friday July 11; 7:00 am - 8:15 am
- **Meditation -** Deepak Chopra Friday July 11 - 7:30 am-8:30 am
- **Poetry Slam/End of Consciousness Party -** Thursday July 10- 8:00 pm – xxx

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Livestreaming from the Sagrada Familia

Early Morning Experiential Sessions

7:00 am- 8:15 am

Monday - **Suren Shrestha.** Clouds of Sound Singing Bowls and Meditation. Join Atma Buti® creator and Master Teacher, Suren Shrestha, as he leads the sound bath relaxation, accompanied by Himalayan singing bowls, bells and more.

Tuesday - **Christine Marie Maison.** Awake and Expand, breath and movement *Barcelona-1st Floor*

Wednesday - Katarina Baliova. Ceremony of the elements. Earth, Water, Air and Fire *Barcelona-1st Floor*
Join Katarina for a sound Journey with ancestral frequencies of Fujara flute (traditional Slovakian flute), guitar, drum and kora, presenting folkloric music and vibrations through melodies

Thursday - **Jill Purce.** Voice Healing and Inherited Family Patterns *Barcelona-1st Floor*
This experiential session will explore how sound and the voice have been understood and used in different traditions as one of the most effective ways to balance and bring order and form into the mind and body.

Friday (7:30-8:30 am) **Deepak Chopra.** Early morning meditation with Deepak Chopra *Sagrada Familia-4th Floor*

Friday's Plenary Sessions begin at 9:00 AM

Workshops – Sunday, July 6, 2025

9:00 am – 1:00 pm Morning Sessions

WK-1 - **Consciousness in Indian Knowledge Systems and Megahertz Brain Waves** *Barcelona - 1st floor*
Martin Fleming, Ricardo Silvestre, Omduth Coceal, Kunal Mooley, Hide Saegusa

WK-2 - **Women in Consciousness Studies** *Montjuic – 3rd floor*
Marjorie Woollacott; Joan Walton; Marina Weiler; Mona Sobhani; Allison Paradise, Laurel Waterman

WK-3 - **Quantum Biology** *Sagrada Familia – 4th floor*
Travis Craddock, Philip Kurian, Javier Martin-Torres, Mike Wiest, Marco Cavaglia, Tommaso Firaux, Gemma Loreti, Serena Canavero

1:00 pm – 2:00 pm – Break

2:00 pm-6:00 pm Afternoon Sessions

WK-4 - **Nonlocal Consciousness and Extrasensory Perception** *Barcelona – 1st floor*
David del Rosario, Irene Vigué, Alex Escolá. Marina Weiler, Toper Taylor, Mike Zeleznick

WK-5 - **Is Consciousness Funda-Mental?** *Sagrada Familia – 4th floor*
Nassim Haramein, William Brown, Suzanne Gildert, Nestor Mercado, Don Hoffman (R), Thomas Brophy. Sponsored by ISF, Nirvanic Technologies, IONS

WK-6 - **Working Session on Taxonomy of Consciousness** *Montjuic - 3rd floor*
Robert Lawrence Kuhn (R), Brian Lord

6:00 pm – 7:00 pm – Food, Drinks *Prefunction*

7:00 pm – 10:00 pm Evening Session

WK-7 - **The Varieties of BCI - Brain Computer Interfaces** *Sagrada Familia - 4th floor*
Ana Maiques, Giulio Ruffini, Tim Mullen, Jay Sanguinetti, Arnaud Delorme, Anirban Bandyopadhyay, Santosh Helekar. Sponsored by Neuroelectrics, Starlab, PuzzleX, DDG, SEMA Lab, Sanmei)

2025 Abstracts and Program Outline

PROGRAM OUTLINE .....pp. 1-7

Room Locations
Sagrada Familia - 4th Floor
Barcelona – 1st Floor
Gràcia - 3rd floor
Eixample - 3rd floor
Montjuic 3rd floor
Sants 3rd floor

Welcome, About TSC, Outline, Plenary Lineup, Workshop Sessions, Morning Experiential

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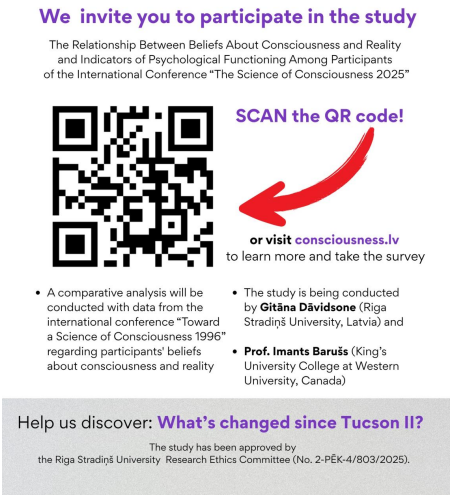
About TSC.....

Survey (from 1998 to 2025) Baruss & Moore p. 8 Links and QR Code ....
baruss-moore-1998-tucson-II-open-access-17-07-10.pdf



Plenary Sessions July 7-11

Sagrada Familia – 4th Floor

Welcome (Stuart Hameroff and Xavi Ginesta)

Monday July 7 PLENARY PL-1 - PL-3

PL-1 - 8:30 am - 10:40 am - 'AI, LLMs and Biomimetic Quantum Computing'

Farhan Lakhany, Assessing the Delta: LLMs & Unified Agency

Suzanne Gildert, Experimental Design and Testing of a Quantum Consciousness Algorithm for AI and Robotics Running on an Adiabatic Quantum Computer

Anirban Bandyopadhyay, "Dodecanogram: A Novel Instrument for Detecting Microtubule Resonance in Anesthetic States"

PL- 2 11:10 am – 12:35 pm - 'Brain Modulation'

Giulio Ruffini, From Kolmogorov Theory to Computational Modeling of Structured Experience

Jay Sanguinetti, From States to Traits: How Noninvasive Neuromodulation with Mindfulness Training Can Help Shift Consciousness Toward Lasting Wellbeing

PL-3 2:00 pm - 4:10 pm – 'Consciousness and Reality'

Sir Roger Penrose (R) Classical and Quantum Realities are Not Quite the Same; How About Conscious Reality?

William Brown, Instantaneous Memory Accession via Quantum Geometrodynamic Networks

Avshalom Elitzur, Qualia, Violation of Conservation Laws, and the Quanta of Pan-Psychism

Tuesday July 8 PLENARY PL-4 - PL-6

PL-4 8:30 am - 10:40 am - 'Anesthesia, Psychedelics and Consciousness'

Michael Wiest, Old theory, new evidence: microtubules are the biological substrate of quantum consciousness

Pär Halje, How consciousness may rely on brain cells acting collectively – evidence from psychedelic research on rats

Jennifer Penberthy, Psilocybin and Prolonged Grief Disorder: Role of Subjective Experience on Outcomes

PL-5 11:10 am – 12:35 pm- 'Non-Local Consciousness and Extrasensory Perception'

David del Rosario, Evidence for Non-Local Consciousness and Extrasensory Perception

Laxmidhar Behera, IKS Approaches for holistic understanding of Mind, Brain, and Consciousness

PL-6 2:00 pm – 4:10 pm - Rhythms, Qualia and Time Crystals'

Sabine Kastner, A Rhythmic Theory of Selective Attention 2.0

Naotsugu Tsuchiya, Establishing standards for (realist) theories of consciousness/qualia: structural constraints from relationships among qualia

Stuart Hameroff, Correlates of qualia in microtubule 'time crystal' dynamics

Wednesday July 9 PLENARY PL-7 - PL-9

PL-7 8:30 am - 10:40 am - 'Consciousness and Quantum Measurement'

Ivette Fuentes, Can Gravity Collapse the Wavefunction? Bose-Einstein Condensates as a Testing Ground

Thomas Brophy, Ontological Frameworks that Work

Santosh Helekar, Sentiometry – Measuring Peri-somatic Modulation of Diffracted Light by Consciousness and Characterizing the Underlying Physicochemical Mechanisms

PL-8 11:10 am – 12:35 pm - 'Consciousness and Vibrations in Spacetime Geometry'
Nassim Haramein, Scaling from Quantum Vacuum Fluctuations to the Brain
Anirban Bandyopadhyay, Self-operating mathematical universe, SOMU: Why do we need a non-physical reality to explain a physical system?

PL-9 2:00 pm – 4:10 pm - 'Brain Oscillations, Waves and Attention'
Robert Lawrence Kuhn (R), A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications
Earl K Miller (R)**,** Cognition emerges from neural dynamics
Matthew Larkum, The dendritic decoupling hypothesis of anesthesia

Thursday July 10 PLENARY PL-10 - PL-12

PL-10 8:30 am - 10:40 am - 'Quantum Biology and Superradiance'
Philip Kurian, Computational capacity of life in relation to the universe
Dante Lauretta (R) The Science of Quantum Biology and Its Implications for Consciousness
Anita Goel, Does Physics need a revolution to understand life, living systems and consciousness? What can Quantum NanoBioPhysics Teach us here?

PL-11 11:10 am – 12:35 pm - 'Energy, Information and Consciousness in the Universe'
Dean Radin (R)**,** Evidence for worldwide modulation of physical randomness correlated with coherent consciousness during New Year's Eve celebrations.
Rupert Sheldrake, Morphic Resonance and the Memory of Nature

PL-12 2:00 pm – 4:10 pm - 'End-of-Life Brain Activity'
Marjorie Woollacott, New clues to Terminal Lucidity in mentally impaired adults
Alex Gomez-Marin, If consciousness survives, materialism dies: re-appraising the "permissive brain" hypothesis at the edges of consciousness
Jimo Borjigin, Potential neural signatures of near-death consciousness in humans

Friday July 11 PLENARY PL-13 - PL-14

PL-13 9:00 am - 11:10 am - 'Prospects for Extraterrestrial Consciousness'
Ross Coulthart, Investigating the Psionic Interface: Alleged Non-Human Interactions with Human Consciousness in Covert UAP Programs.
Brannon Wheeler, How do non-human intelligences communicate with humans?

PL-14 11:40 am – 13:00 pm - 'Quantum Fields and Consciousness'
Donald Hoffman (R), Physics of Spacetime from Traces of Consciousness
Deepak Chopra, Consciousness is the Ontological Primitive of the Universe
Federico Faggin, Consciousness and Free Will are Quantum Properties of Being

PLENARY Schedule & Short Bios

Monday July 7, 2025
PLENARY 1 - 8:30 am - 10:40 am
'AI, LLMs and Biomimetic Quantum Computing'

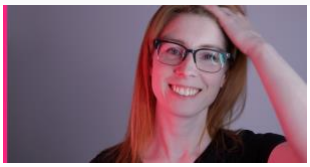
Farhan Lakhany, Assessing the Delta: LLMs & Unified Agency

Suzanne Gildert, Experimental Design and Testing of a Quantum Consciousness Algorithm for AI and Robotics Running on an Adiabatic Quantum Computer
Anirban Bandyopadhyay, "Dodecanogram: A Novel Instrument for Detecting Microtubule Resonance in Anesthetic States"

Farhan Lakhany

Farhan Lakhany is a philosopher of mind, artificial intelligence and cognitive science. In 2023, he received a PhD from the University of Iowa and is currently teaching at the University of Nebraska Omaha as a Visiting Assistant Professor. His main research interests lay at the intersection of the philosophy of mind, philosophy of artificial intelligence, philosophy of psychology and cognitive science with an emphasis on consciousness, mental representation and artificial intelligence. In addition, I have interests in the philosophy of science, metaphilosophy, epistemology, egalitarianism, neuroscience, psychology, evolutionary theory, biology and computer science.

Suzanne Gildert



Suzanne Gildert is Founder and CEO of Nirvanic, a company pioneering quantum consciousness technologies for artificial intelligence. Suzanne previously co-founded and was CTO of Sanctuary AI, a company building Human-Like Intelligence in General Purpose Robots. At Sanctuary she helped design, build and launch the Phoenix humanoid robot and its novel Carbon AI control software, with a focus on work applications to address labor shortages. Prior to Sanctuary, Suzanne was co-founder and CTO of Kindred AI. She oversaw the design and engineering of the company's human-like robots and was responsible for the development of cognitive architectures that allow these robots to learn about themselves and their environments. Suzanne also has deep expertise in quantum computing from her time at D-Wave Systems, where she ported AI algorithms to D-Wave's quantum annealing hardware. She also invented and implemented MAXCAT, the world's first game ever played against a quantum computer, worked on the world's first supervised classifier run on a quantum computer and was the first person to control the motion of a robot using a quantum computer. Suzanne received her Ph.D. in experimental physics from the University of Birmingham (UK) in 2008, specializing in quantum device physics, microfabrication techniques, and low-temperature measurements of novel superconducting circuits. She likes science outreach, programming, retro tech, fantasy and gothic art, coffee, electronic music and lifelogging and is a published author of a book of art and poetry. Suzanne is passionate about conscious robots and their role as a new form of symbiotic, friendly life in our society.

Anirban Bandyopadhyay

Anirban Bandyopadhyay PH.D. Materials and Nano-architectronics, MANA, National Institute for Materials Science, NIMS, Tsukuba, Japan Anirban Bandyopadhyay is Principal Research Scientist (NIMS), Tsukuba. He earned his Ph.D. in Supramolecular Electronics at the Indian Association for the Cultivation of Science (IACS), Kolkata, 2005. From 2005 to 2008 he was ICYS research fellow at the ICYS, NIMS, Japan, and worked on the brain-like bio-processor building. In 2008, Anirban joined as a permanent scientist at NIMS, working on the cavity resonator model of human brain and design-synthesis of brain-like organic jelly. From 2013 to 2014 he was a visiting scientist at the Massachusetts Institute of Technology (MIT), USA. Awards include Hitachi Science and Technology award 2010, Inamori Foundation award 2011–2012, Kurata Foundation Award, Inamori Foundation Fellow (2011–) and Sewa Society international member, Japan. www.nanobraintech.com

Monday July 7, 2025
PLENARY 2 11:10 am – 12:35 pm - 'Brain Modulation'

Giulio Ruffini, From Kolmogorov Theory to Computational Modeling of Structured Experience
Jay Sanguinetti, From States to Traits: How Noninvasive Neuromodulation with Mindfulness Training Can Help Shift Consciousness Toward Lasting Wellbeing

Giulio Ruffini

Giulio Ruffini, Co-founder and Chief Technology Officer (CTO) of Neuroelectrics.
With a background in physics, founded Starlab in 2000, later founding Neuroelectrics in 2011. Giulio's pioneering work includes brain stimulation technology and brain-to-brain communication research. In the past, Giulio has been a researcher at UC Davis and Los Alamos National Laboratory (both as a graduate research student), and a post-doc at the Catalan Institute for Space Studies (IEEC, Barcelona, Spain). Giulio Ruffini received a BA, Math and Physics, UC Berkeley (1988); and a PhD, Theoretical Physics, UC Davis (1995) CEO of Starlab (http://starlab.es) and President of Neuroelectrics (http://neuroelectrics.com).
My current research stems from a physics and mathematics background, and my focus rests on the science (biophysical and physiological modeling), technology and clinical applications related to the "electrical brain", including non-invasive brain stimulation technologies combined with EEG and other neuroimaging techniques. During the EU funded HIVE project (FET Open research program) I coordinated a very capable team to develop a new class of hybrid EEG-transcranial stimulation devices capable of controlling stimulation currents in numerous electrodes. Stemming from that work, I recently led the first demonstration of conscious non-invasive direct brain-to-brain communication. I am currently developing on clinical applications of multifocal transcranial current stimulation (including tDCS, tACS and tRNS), that is, the coordinated stimulation of several brain targets or brain targets or brain networks derived from neuroimaging, especially in epilepsy, as well as on the uses of EEG for diagnosis in Parkinson's disease using machine learning techniques.

Jay Sanguinetti

Jay Sanguinetti is an Adjunct Professor at the University of Arizona and a Research Assistant Professor at the University of New Mexico. His training was in philosophy, neuroscience, and cognitive psychology, and his dissertation investigated the neural processes of conscious and unconscious visual perception. Dr. Sanguinetti specializes in psychophysiological measures (EEG, fMRI, eye-tracking) of visual perception, emotion, and mindfulness meditation. His team investigates novel forms of brain stimulation, including the use of ultrasound and light-based stimulation to enhance memory, perception, and well-being. Dr. Sanguinetti has published widely, from topics on the neural basis of vision and the temporal dynamics of perception to understanding how the brain changes in Parkinson's disease and schizophrenia. His current interests include using noninvasive brain stimulation to enhance cognition and well-being. Jay is presently investigating whether focused ultrasound neuromodulation can augment mindfulness practice in collaboration with Shinzen Young. They recently launched the Sonication Enhanced Mindful Awareness (SEMA) lab at the University of Arizona in collaboration with the Center for Consciousness Studies. The SEMA lab is developing accelerated mindfulness protocols for therapeutic interventions to treat addiction, chronic pain, and depression. Dr. Sanguinetti is the Assistant Director for the Center for Consciousness Studies, which runs the largest international conference on consciousness studies.

Monday July 7, 2025
PLENARY 3 2:00 pm – 4:10 pm
'Consciousness and Reality'

Sir Roger Penrose, Nobel Laureate in Physics, University of Oxford - Classical and Quantum Realities are Not Quite the Same; How About Conscious Reality?
William Brown, Instantaneous Accession via Quantum Geometrodynamic Networks
Avshalom Elitzur, Qualia, Violation of Conservation Laws, and the Quanta of Pan-Psychism

Sir Roger Penrose

Roger Penrose was born, August 8, 1931, in Colchester Essex UK. He earned a 1st class mathematics degree at University College London; a Ph.D. at Cambridge UK, and became assistant lecturer, Bedford College London, Research Fellow St John's College, Cambridge (now Honorary Fellow), a post-doc at King's College London, NATO Fellow at Princeton, Syracuse, and Cornell Universities, USA. He also served a 1-year appointment at University of Texas, became a Reader then full Professor at Birkbeck College, London, and Rouse Ball Professor of Mathematics, Oxford University (during which he served several half-year periods as Mathematics Professor at Rice University, Houston, Texas). He is now Emeritus Rouse Ball Professor, Fellow, Wadham College, Oxford (now Emeritus Fellow). He has received many awards and honorary degrees, including knighthood, Fellow of the Royal Society and of the US National Academy of Sciences, the De Morgan Medal of London Mathematical Society, the Copley Medal of the Royal Society, the Wolf Prize in mathematics (shared with Stephen Hawking), the Pomeranchuk Prize (Moscow), and one half of the 2020 Nobel Prize in Physics, the other half shared by Reinhard Genzel and Andrea Ghez. He has designed many non-periodic tiling patterns including a large paving at entrance of Andrew Wiles Mathematics Building, Oxford, and the Transbay Center, San Francisco, California. Sir Roger is widely acclaimed for fundamental advances in understanding the universe. His 2020 Nobel Prize in Physics was bestowed for showing that black holes are robust predictions of Einstein's theory of general relativity. Roger has also proposed a solution to the measurement problem in quantum mechanics ('objective reduction', 'OR'), which he suggests is also the origin of consciousness, leading to a theory of brain function ('orchestrated objective reduction', 'Orch OR'). And Roger's concept of Conformal Cyclic Cosmology ('CCC') posits a serial, eternal universe, with the Big Bang preceded by a previous aeon which had its own Big Bang, that aeon preceded by another and so on.

William Brown

William Brown is a biophysicist investigating the physics operational at the cellular and molecular level of the biological system. He presents lectures, talks, and Q&A forums to teach the syncretic theories of unified science. He is a part of the research team at The International Space Federation : a research and development company generating novel technologies in geometrodynamic and quantum vacuum engineering for harnessing energy from the zero-point field and gravity control for propulsion. As well, William has applied discoveries from his biophysics research to technologies that can be utilized for greater health and system coherence. William David Brown is a Molecular Biologist, Biophysicist, and Research Scientist with a diverse range of expertise and extensive experience in the field. He holds an M.S. in Biology with a specialization in Applied Recombinant DNA Technology from New York University and a B.S. in Biology with a focus on Cellular and Molecular Biology from Northern Arizona University. Throughout his career, Brown has showcased his proficiency in various molecular biology techniques, including PCR, cloning, immunoprecipitation, and genotyping. He has conducted research on pathogenic bacteria, RNA-protein interactions, epigenetic reprogramming, and neurodevelopment, among other areas. In addition to his scientific contributions, Brown is also an accomplished educator. He has taught genetics laboratory courses and delivered lectures on physics, unified physics, and biology as a faculty member and lecturer at different institutions and online platforms. His research and theoretical work have been published in reputable journals, and he has actively participated in peer review activities. Brown has collaborated with esteemed professionals, including Nassim Haramein, the Director of Research at The Resonance Science Foundation, where he has worked as a Biophysicist and Research Scientist. https://www.novosciences.org/about

Avshalom Elitzur

Avshalom Elitzur is a Professor in the Centre for Quantum Studies at Chapman University in the United States and is deemed by many to be an intellectual powerhouse in both the fields of physics and philosophy. Having left school at sixteen to work as a lab technician at the Weizmann Institute he presented a paper on quantum mechanics at Temple University, after which he was invited to Tel Aviv University to complete his doctorate on the subject. Elitzur is best known for his work on the Elitzur–Vaidman bomb-testing problem in quantum mechanics.

Tuesday July 8, 2025
PLENARY 4 8:30 am - 10:40 am
'Anesthesia, Psychedelics and Consciousness'

Michael Wiest, Old theory, new evidence: microtubules are the biological substrate of quantum consciousness
Pär Halje, How consciousness may rely on brain cells acting collectively – evidence from psychedelic research on rats
Jennifer Penberthy, Psilocybin and Prolonged Grief Disorder: Role of Subjective Experience on Outcomes

Michael Wiest

Mike Wiest graduated from high school in Kenya, East Africa, then returned to the United States to earn a BA in physics at Dartmouth College in 1991, and a PhD in high-energy theoretical physics at Michigan State University in 1998. Excited by the Orch OR quantum theory of consciousness, he spent the next 10 years learning neuroscience as a postdoc in computational neuroscience at Baylor College of Medicine and behavioral neurophysiology at Duke University. He is now an Associate Professor of Neuroscience at Wellesley College in Massachusetts, where he has been teaching and conducting chronic multi-electrode recording experiments in awake behaving rodents since 2008.

Pär Halje

Pär Halje studies electrophysiological correlates of spontaneous behaviour and disease states in freely moving rodents and primates. In particular, he is looking for common mechanisms behind the unexplained narrowband oscillations that appear in the local field potentials during levodopa-induced dyskinesia or psychedelic drug use. I am also engaged as the AI/ML coordinator of MultiPark and the technical manager of MoRe Lab. Halje has a background in both theoretical physics (MSc in Physics at Stockholm university, Sweden) and cognitive neuroscience (PhD at the Laboratory of Cognitive Neuroscience, EPFL, Lausanne, Switzerland). The topic of his PhD thesis was neural correlates of embodied consciousness (multisensory integration, space perception, self-identification, agency). He specialized in data analysis of neurophysiological signals, including extracellular spikes, local field potentials and human ECoG, and quantification of animal behavior using video tracking and accelerometers. Pär Halje has developed several software tools for the interactive analysis of these large data sets. Outside the lab, I try to find time for music, for example as part of the improvisational rock group Øresund Space Collective.

Jennifer Penberthy

Jennifer 'Kim' Penberthy is the Chester F. Carlson Professor of Psychiatry & Neurobehavioral Sciences in the Division of Perceptual Studies at the University of Virginia School of Medicine. She studies altered states of consciousness and the impact on mental health

and wellbeing. She will discuss research exploring the impact of psilocybin-induced altered states including psychological flexibility, mystical experiences, self-transcendence, enhanced connectedness, and awe, on new pathways for healing prolonged grief.

Tuesday July 8, 2025
PLENARY 5 11:10 am – 12:35 pm
'Non-Local Consciousness and Extrasensory Perception'

David del Rosario, Evidence for Non-Local Consciousness and Extrasensory Perception
Laxmidhar Behera, IKS Approaches for holistic understanding of Mind, Brain, and Consciousness

David del Rosario

David del Rosario is a researcher, science communicator, and director of the Institute of Advanced Neuroscience of Barcelona (INAB). He holds a Master's in Biomedical Engineering from the University of Barcelona and a PhD in Neurosciences from the University of Alicante. He combines a solid academic background with a passion for bridging science and everyday life. David's work focuses on research in cognitive neuroscience, particularly exploring human thought, emotions, and consciousness. He has published the best seller *El libro que tu cerebro no quiere leer*, which remained on Spain's top 10 non-fiction books list for weeks. His contributions to research and dissemination have earned him several prestigious awards, such as the National Telecommunications Award and the Extraordinary Award in Biomedical Engineering. David has shared his insights at conferences across Europe, North America, and South America, making complex scientific ideas accessible to diverse audiences. As the director of INAB, he continues to advance innovative approaches in neuroscience research and education.

Laxmidhar Behera

Laxmidhar Behera joined as the Director of IIT Mandi on 19th January, 2022. Prior to this, he was working as the Poonam and Prabhu Goel Chair Professor in the Department of Electrical Engineering, IIT Kanpur, and simultaneously served as TCS affiliate faculty.

Tuesday July 8, 2025
PLENARY 6 2:00 pm – 4:10 pm
'Rhythms, Qualia and Time Crystals'

Sabine Kastner, A Rhythmic Theory of Selective Attention 2.0
Naotsugu Tsuchiya, Establishing standards for (realist) theories of consciousness/qualia: structural constraints from relationships among qualia
Stuart Hameroff, Correlates of qualia in microtubule 'time crystal' dynamics

Sabine Kastner

Sabine Kastner studies the neural basis of visual perception, attention, and awareness using a translational approach that combines neuroimaging in humans and monkeys, intracranial electrophysiology and studies in patients with brain lesions. Dr. Kastner earned an M.D. degree from the Heinrich-Heine University of Düsseldorf (Germany) and received a Ph.D. degree in neurophysiology from the Georg-August University, Göttingen (Germany) under the mentorship of the late Otto Creutzfeldt. After a postdoc at the Max-Planck-Institute for Biophysical Chemistry, Göttingen and a lectureship in psychiatry, Dr. Kastner joined Leslie Ungerleider's and Robert Desimone's lab at the NIMH in Bethesda (1996-2000) before taking on a faculty position at Princeton, where she currently holds the rank of full professor. Dr. Kastner has served as the Scientific Director of Princeton's neuroimaging facility since 2005. Dr. Kastner has published more than 150 articles in journals and books and has edited the Handbook of Attention (Oxford University Press, 2014). She is a Fellow of the American Academy of Arts & Sciences, the Society for Experimental Psychology, and the American Psychological Society, and a member of the German National Academy of Sciences Leopoldina. Her groundbreaking contributions to the field of cognitive neuroscience were recognized with the George A. Miller Award in Cognitive Neuroscience in 2023 and the Young Investigator Award from the Cognitive Neuroscience Society in 2005. Dr. Kastner serves on several editorial boards and is Editor-in-Chief of *The Journal of Neuroscience* and Frontiers for Young minds/Understanding neuroscience. Dr. Kastner performs public outreach through her educational neuroscience for the 21st century program including teacher seminars, public school outreach, events at PNI, and for parent support groups for neurodevelopmental disability. Her outreach activities were recognized by the Society for Neuroscience's 2019 Award for Education in Neuroscience. She was elected member of the American Academy of Arts & Sciences (2022), Professor Kastner received the Minerva Foundation Golden Brain Award 2024. In addition to research, Dr. Kastner is heavily involved in science outreach and education, and co-founded the journal *Frontiers for Young Minds (Link is external)* in 2013, which produces articles about the latest and most exciting findings in science for 8- to 15-year-olds to boost their interest in STEM fields and topics. Since 2023, she has also served as the Editor-in-Chief of the Society for Neuroscience's flagship publication, the *Journal of Neuroscience*.
1985 B.A., History & Philosophy, Georg-August University, Göttingen, Germany
1993 M.D., Heinrich-Heine University, Düsseldorf, Germany
1994 Ph.D., Neurophysiology, Georg-August University, Göttingen, Germany
Kastner CV
2012-present Visiting Scientist, Helen Wills Neuroscience Institute, UC Berkeley
2009-present Professor of Psychology & Neuroscience, Princeton University
2005-present Scientific Director, Scully Center for the Neuroscience of Mind & Behavior, Princeton University
Research Areas: Systems & Circuits, Human Cognitive, Computation & Theory
https://psychology.princeton.edu/people/sabine-kastner
https://napl.scholar.princeton.edu/
https://pni.princeton.edu/news/2024/groundbreaking-studies-earn-kastner-2024-golden-brain-award

Naotsugu Tsuchiya

Nao Tsuchiya was awarded a PhD at California Institute of Technology (Caltech) in 2006. Upon postdoctoral training at Caltech until 2010, he received a PRESTO grant from Japan Science and Technology (JST) agency and returned to Japan in 2010. In Jan 2012, he joined the School of Psychological Sciences at Monash University as an Associate Professor (Professor from 2020). From 2013 to 2017, he was an ARC Future Fellow. His main research interest is to uncover the neuronal basis of consciousness. Recently, he focuses on the novel Qualia Structure approach on consciousness, which advocates to characterize the structure of qualia by measuring the similarity between qualia on a large scale, and to reveal their neural correlates and their causal information structure. The Qualia Structure project will further employ various research methods, including phenomenology, development, and constructivism, in order to estimate structures of qualia from perceptual to emotional domains. The outcome of this field is the creation of a new interdisciplinary research program that will have impacts to the general society, such as understanding the consciousness of others and the consciousness of animals and artificial intelligence.

Stuart Hameroff

Stuart Hameroff MD is Professor at the Arizona Astrobiology Center, Anesthesiology & Psychology, and Director of the Center for Consciousness Studies at the University of Arizona in Tucson, Arizona. Retired from Anesthesiology where he researched how general anesthetic gases act on quantum vibrations in microtubules to prevent consciousness. Hameroff is known for his collaboration with British physicist and Nobel Laureate Sir Roger Penrose on the 'Orch OR' quantum theory of consciousness, and also for managing 'The Science of Consciousness' conferences for the past 30 years. Hameroff is also collaborating with Planetary Scientist Professor Dante Lauretta at Arizona AstroBiology Center (AABC) to study putative 'signs of life' and 'roots of consciousness' in extraterrestrial organic molecules from the early solar system retrieved by Dante's NASA OSIRIS REx mission to asteroid Bennu. We will probe these molecules to answer the question: Which came first, life or consciousness?

Wednesday July 9, 2025
PLENARY 7 8:30 am - 10:40 am
'Consciousness and Quantum Measurement'

Ivette Fuentes, Can Gravity Collapse the Wavefunction? Bose-Einstein Condensates as a Testing Ground
Thomas Brophy, Ontological Frameworks that Work
Santosh Helekar, Sentiometry – Measuring Peri-somatic Modulation of Diffracted Light by Consciousness and Characterizing the Underlying Physicochemical Mechanisms

Ivette Fuentes

Ivette Fuentes is a Professor of Physics at the School of Physics & Astronomy, University of Southampton. She is Fellow of the Emmy Network and Fellow by Special Election of Keble College, Oxford. Ivette obtained her PhD at Imperial College London (advisors: Peter L. Knight and Vlatko Vedral). Her postdoctoral experience includes a Glasstone Fellowship and Junior Research Fellowship (Mansfield College) at the University of Oxford and a position at the Perimeter Institute for Theoretical Physics in Waterloo, Canada. Ivette was Assistant Professor at UNAM México, Professor of Mathematical Physics at the School of Mathematical Sciences in Nottingham and Professor of Theoretical Quantum Optics at the University of Vienna. Other distinctions include an Alexander von Humboldt Fellowship (Experienced Researchers) at the Technical University of Berlin and EPSRC Career Acceleration Fellowship, New Directions Award and Inspire Award. Her main research interest is understanding physics at scales where quantum theory and general relativity interplay. https://ivettefuentes.weebly.com/
Her work is mentioned in this article in Forbes about Roger Penrose's theories.

Thomas G. Brophy

Thomas G. Brophy, PhD, is President of the Institute of Noetic Sciences (IONS). He previously served as president of California Institute for Human Science (CIHS). His tenure as president of CIHS oversaw a many-year effort to achieve regional accreditation in 2021, for CIHS as a unique mind, body, spirit centered university. Earning a BA in physics from Colorado College, and MS and PhD degrees in physics from the University of Colorado, Boulder, Thomas' academic and scientific backgrounds include work on NASA's Voyager and Cassini spacecraft projects, the CU Laboratory for Atmospheric and Space Physics, and an appointment as a National Science

Foundation Exchange Scientist at the University of Tokyo Department of Earth and Planetary Physics and ISAS robotic space program. Thomas explored the consciousness related aspects of UAP phenomena in his 1998 book The Mechanism Demands a Mysticism: An Exploration of Spirit, Matter, and Physics. His study of the archaeoastronomy of prehistoric Egypt, published in his books The Origin Map, and Black Genesis co-authored with Robert Bauval, has been cited as relevant to the study of extraterrestrial, or transhuman, intelligence.

Santosh Helekar

Santosh Helekar is a neuroscientist at the Houston Methodist Research Institute (HMRI) in Houston, Texas, USA. He has a medical degree (M.B.B.S.) from the University of Bombay, India and a Ph.D. in Neuroscience from Baylor College of Medicine, Houston, Texas, USA. Presently, he is the Scientific Director of Translational Biomagnetics and Neurometry Program at HMRI and a Professor of Neuroscience Research in Psychiatry at Weill Cornell Medical College, New York, New York. His most recent scientific and technological contributions include the invention of three noninvasive devices with wide-ranging neuroscience applications. The first device called Transcranial Rotating Permanent Magnet Stimulator (TRPMS) is a neuromodulation cap that has shown promise in a pilot phase I/IIa clinical trial for the treatment of chronic ischemic stroke and is being tested now for the treatment of drug-resistant depression. The second device called the Oncomagnetic helmet is being used under FDA's expanded access program to treat end-stage recurrent glioblastoma patients and will shortly be investigated for safety and efficacy alongside standard of care treatment for the treatment of newly diagnosed glioblastoma in a pilot clinical trial. The third device called the Sentiometer was able to detect a previously unrecognized peri-somatic biophysical effect that is attenuated by general anesthesia and by unconsciousness due to brain damage or dysfunction. It is being tested in an ongoing pilot clinical study for safety and efficacy for continuously monitoring the level of consciousness of unresponsive unconscious or delirious patients in the intensive care unit. The Sentiometer appears to be sensitive to an electromagnetically modulated physicochemical process, possibly involving the interactions of delocalized electrons in aromatic organic polymers with water molecules. Consequently, it could provide a window into the fundamental subcellular mechanism that generates consciousness.

Wednesday July 9, 2025
PLENARY 8 11:10 am – 12:35 pm
'Consciousness and Vibrations in Spacetime Geometry'

Nassim Haramein, Scaling from Quantum Vacuum Fluctuations to the Brain
Anirban Bandyopadhyay, Self-operating mathematical universe, SOMU: Why do we need a non-physical reality to explain a physical system?

Nassim Haramein

Nassim Haramein is a Swiss born, 35-year veteran physicist working on a complex problem in physics — Unification Theory (the unification of General Relativity and Quantum Mechanics). Haramein has researched fields of physics, mathematics, cosmology, quantum mechanics, biophysics, as well as cultural anthropology and archeology. These studies led to a unification theory published in scientific papers, and subsequent numerous patented inventions. Haramein has worked in collaborative efforts with some renown physicists and currently holds a director of research position at the International Space Federation organization which includes doctors in physics from some of the most reputable physics universities in the world. He has founded research organizations and successful corporations throughout the last two decades. https://spacefed.com/isf-research/

Anirban Bandyopadhyay

Anirban Bandyopadhyay PH.D. Materials and Nano-architectronics, MANA, National Institute for Materials Science, NIMS, Tsukuba, Japan Anirban Bandyopadhyay is Principal Research Scientist (NIMS), Tsukuba. He earned his Ph.D. in Supramolecular Electronics at the Indian Association for the Cultivation of Science (IACS), Kolkata, 2005. From 2005 to 2008 he was ICYS research fellow at the ICYS, NIMS, Japan, and worked on the brain-like bio-processor building. In 2008, Anirban joined as a permanent scientist at NIMS, working on the cavity resonator model of human brain and design-synthesis of brain-like organic jelly. From 2013 to 2014 he was a visiting scientist at the Massachusetts Institute of Technology (MIT), USA. Awards include Hitachi Science and Technology award 2010, Inamori Foundation award 2011–2012, Kurata Foundation Award, Inamori Foundation Fellow (2011–) and Sewa Society international member, Japan. www.nanobraintech.com

Wednesday July 9, 2025
PLENARY 9 2:00 pm – 4:10 pm
'Brain Oscillations, Waves and Attention'

Earl K Miller (R), Cognition emerges from neural dynamics
Matthew Larkum, The dendritic decoupling hypothesis of anesthesia
Robert Lawrence Kuhn (R), A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications

Earl Keith Miller

Earl Keith Miller is a cognitive neuroscientist whose research focuses on neural mechanisms of cognitive, or executive, control. Earl K. Miller is the Picower Professor of Neuroscience with the Picower Institute for Learning and Memory and the Department of Brain and Cognitive Sciences at Massachusetts Institute of Technology. He is the Chief Scientist and co-founder of SplitSage. Earl Miller received a Bachelor of Arts degree (summa cum laude, with honors) in psychology from Kent State University in 1985, Master of Arts degree in psychology and neuroscience from Princeton University in 1987, and a PhD in psychology and neuroscience from Princeton University in 1990. In 2020, Earl Miller was awarded an honorary doctorate (Doctor of Science, honoris causa) from Kent State U.

Matthew Larkum

Matthew Larkum is a full professor in the Biology Institute of the Humboldt University of Berlin and in the Bernstein Center for Computational Neuroscience. This involves teaching many courses on neuroscience topics including (introductory neuroscience, cerebral cortex, methods in neuroscience research, etc.). He has a large laboratory (currently 28 people) including 5 PhD students and many Masters and Bachelor students. Several post-doctoral fellows have gone on to lead outstanding laboratories at top institutions around the world (e.g. RIKEN, Tokyo; Florey Institute, Melbourne; CNRS, Bordeaux; Ecole Normale Supérieure, Paris; University of Surrey). Over the past 20 years he has supervised over 30 PhD students, and even more Masters and Bachelor students. As speaker for a Collaborative Research Center on memory consolidation (SFB1315), he is a co-coordinator of the PhD program within the center and is an active part of the International PhD Program of the Einstein Center for Neurosciences Berlin. He also participates regularly in student schools including as a regular speaker for the Australasian Course in Advanced Neuroscience (ACAN) and the Cold Spring Harbor Imaging course. His group focuses on the processing of feedforward and feedback information in the cortex, and particularly, on the contribution of active dendritic properties to the computational power of neocortical pyramidal neurons. Matthew is a violinist and chamber music fanatic. Recent topics include:

- Dendritic spikes in the tuft and basal dendrites of neocortical pyramidal neurons
- Memory consolidation with active dendritic mechanisms
- Mechanisms underlying perceptual processes
- Development of behavioural methodologies for rodents
- Inhibitory control of cortical microcircuits
- •Cellular basis for interhemispheric inhibition in the cerebral cortex
- •Effect of fetal alcohol syndrome on dendritic processing
- •Effects of common anesthetics on single-cell computation in the cortex
- •Development of state-of-the-art optical approaches for studying cortical dendritic activity

Robert Lawrence Kuhn

Robert Lawrence Kuhn is an American public intellectual and investment banker. He is also an author, TV-producer, columnist and commentator, especially on topics related to China. Kuhn is the creator of the PBS series *Closer to Truth*. He has been called "one of the Western world's most prolific interpreters of Beijing's policies".[2] Some of his work has been criticized as pro-China propaganda. Kuhn received a bachelor's degree in human biology from Johns Hopkins University (Phi Beta Kappa) in 1964, a PhD in anatomy and brain research from the University of California, Los Angeles' Brain Research Institute in 1968 and a Master of Science in management as a Sloan fellow from the MIT Sloan School of Management in 1980.

Thursday July 10, 2025
PLENARY 10 8:30 am - 10:40 am
'Quantum Biology and Superradiance'

Philip Kurian, Computational capacity of life in relation to the universe
Dante Lauretta (R) The Science of Quantum Biology and Its Implications for Consciousness
Anita Goel, Does Physics need a revolution to understand life, living systems and consciousness? What can Quantum NanoBioPhysics Teach us here?

Philip Kurian

Philip Kurian is a theoretical physicist, (re)search(ing) scientist, and essayist, serving as principal investigator and founding director of the Quantum Biology Laboratory (https://quantumbiolab.com) at Howard University. Beginning his career as a math teacher in North Philadelphia, he completed his doctorate in physics at Howard after a stint at NASA Goddard Space Flight Center. Dr. Kurian is now the recipient of fellowships, grants, and awards from the Alfred P. Sloan Foundation, U.S.-Italy Fulbright Commission, Whole Genome Science Foundation, National Science Foundation, and the National Institutes of Health. His laboratory studies how collective and cooperative quantum behaviors can explain biological phenomena at the mesoscopic, organismal, and clinical scales, including in neurodegeneration, cancer, and human consciousness. The group's work has been featured in *Science, The Quantum Insider, SPIE Photonics Focus, Optica, Laser Focus World, BioPhotonics, Howard Magazine*, *TEDx,* and by prominent science channels including *Science News with Sabine* and *PBS Space Time*. In 2023 Dr. Kurian was selected as a Fellow of the UCSB Kavli Institute for Theoretical Physics. In 2022 he became a Simons Scholar and Senior Fellow at the UCLA Institute for Pure and Applied Mathematics. In 2021 Dr. Kurian was appointed to the chairing committee for the National Academies of Sciences, Engineering, and Medicine workshop on quantum-enabled sensing and imaging for biology. His Quantum Biology Laboratory was the first group in the U.S. to receive a scientific grant from the U.K.-based Guy Foundation, and the lab's expertise is solicited regularly by federal agencies, private foundations, and the media. Dr. Kurian also serves as a scientific advisor to the "Science for Seminaries" program of the AAAS Dialogue on Science, Ethics, and Religion, which seeks to integrate frontier science questions into conversations among future theologians and clergy. His essays on science, human knowledge systems, and empire have appeared in various media outlets, including the *Los Angeles Review of Books*, *Granta*, and *Plough. Research Specialty* Quantum biology; Theoretical physics; Many-body entanglement; Quantum field theory; Protein photophysics

Quantum Biology Laboratory at Howard University Receives Grant from Guy Foundation
The QBL becomes first US lab to receive UK foundation grant in quantum biology.
The Quantum Biology Laboratory Is Moving Forward by Reaching Back
The QBL supports K-12 quantum science education by dedicating the Quantum STEAM Lab in Philadelphia.
Alfred P. Sloan Foundation Awards Quantum Biology Laboratory at Howard University $1M for Matter-to-Life Research
This Sloan Foundation award will support the QBL in studying how self-organizing processes give rise to goal-oriented behaviors in the reassembly, agential decision-making, and computational capacity of the unicellular slime mold *Physarum polycephalum*.
Quantum fiber optics in the brain enhance processing, may protect against degenerative diseases
Led by the QBL, a group of theoretical and experimental researchers has discovered a distinctly quantum effect in biology that survives warm, chaotic conditions and may also present a way for the brain to protect itself from degenerative diseases like Alzheimer's.
Quantum optical phenomenon in the brain challenges conventional view of amyloid in Alzheimer's
The QBL has discovered a unique quantum effect in biology that could be the key to understanding a common marker of Alzheimer's, raising questions about current assumptions of the disease and informing the search for a cure.

Dante Lauretta

Dante Lauretta, CCS External Adviser, UArizona, Regents Professor, Planetary Science & Cosmochemistry, University of Arizona Lunar & Planetary Laboratory. Dante Lauretta is principal investigator of the OSIRIS-REx mission and a regents professor of planetary science at the University of Arizona's Lunar and Planetary Laboratory. His research interests focus on the chemistry and mineralogy of asteroids and comets, and he is an expert in the analysis of extraterrestrial materials, including asteroid samples, mete-orites and comet particles. Dr. Lauretta fosters the advancement of the next generation of scientists, engineers, and other space leaders through mentorship and taught coursework which apply his expertise in planetary science and spacecraft mission design & implementation. Dr. Lauretta heads

the OSIRIS-REx research team at UArizona working on this mission, which has included more than 100 undergraduate and graduate students. This project will help ensure that the University of Arizona remains at the forefront of planetary exploration for the next decade. The Alfie Norville Gem & Mineral Museum is now one of only three places in the world where the public can see a piece of the asteroid Bennu, collected during NASA's University of Arizona-led OSIRIS-REx mission.

Anita Goel

Anita Goel, MD Ph.D. is a world-renowned expert and pioneer in the emerging field of Nanobiophysics - a new science at the convergence of physics, nanotechnology, and biomedicine. Whereas modern physics in the 20th century was developed primarily in the context of closed systems, Dr. Goel seeks to expand conventional theoretical and experimental physics frameworks and their mathematical machinery to describe non-equilibrium, open systems such as life and living systems that are strongly coupled with their environment. She has developed a new theoretical physics framework that elucidates the interplay of matter, energy, and information at a very fundamental physics level. Dr. Goel harnesses these insights to examine one of the most basic processes of living matter, the way nanomotors read and write information into DNA, how this process is influenced by the environment, and how quantum mechanics might play a “nontrivial” role in their dynamics. Dr. Goel was named by MIT’s Technology Review Magazine as one of the World’s “Top 35 science and technology innovators.” View Dr. Goel’s Academic Profile
As Chairman and CEO of Nanobiosym® and Nanobiosym® Diagnostics, Dr. Goel has harnessed these fundamental insights to invent, incubate, and start commercializing next-generation nanotechnology platforms like Gene-RADAR® for Mobile and Personalized Health, energy harvesting and quantum computing with molecular nanomachines that read and write information in DNA She has received awards including multiple awards from US Government agencies such as DARPA, DOD, DOE, AFOSR, NSF, USAID, HHS and most recently was awarded the XPRIZE by in the 2013 Nokia Sensing X Challenge. Dr. Goel holds a Ph.D. and M.A. in Physics from Harvard University, an MD from the Harvard-MIT Joint Division of Health Sciences and Technology (HST) at Harvard Medical School and a BS in Physics with Honors & Distinction from Stanford University. She has published several scholarly articles in leading scientific journals such as Nature Nanotechnology, Scientific American-India and the Proceedings of the National Academy of Science and contributed innovative book chapters such as in the pioneering work on Quantum Aspects of Life, with over 35 patents worldwide to her name.

Thursday July 10, 2025
PLENARY 11 11:10 am – 12:35 pm
'Energy, Information and Consciousness in the Universe'

Dean Radin (R)**,** Evidence for worldwide modulation of physical randomness correlated with coherent consciousness during New Year's Eve celebrations.
Rupert Sheldrake, Morphic Resonance and the Memory of Nature

Dean Radin

Dean Radin investigates phenomena in parapsychology. Following a bachelor and master's degree in electrical engineering and a PhD in educational psychology Radin worked at Bell Labs, as a researcher at Princeton University and the University of Edinburgh, and was a faculty member at University of Nevada, Las Vegas. He then became Chief Scientist at the Institute of Noetic Sciences (IONS) in Petaluma, California, USA, later becoming the president of the Parapsychological Association.
He is also co-editor-in-chief of the journal Explore: The Journal of Science and Healing. **https://en.wikipedia.org/wiki/Dean_Radin**

Rupert Sheldrake

Rupert Sheldrake is a biologist and author of more than 100 scientific papers and 9 books, and the co-author of 6 books. His books have been published in 28 languages. He was among the top 100 Global Thought Leaders for 2013, as ranked by the Duttweiler Institute, Zurich, Switzerland's leading think tank. On ResearchGate, the largest scientific and academic online network, his Research Interest Score puts him in the top 4% of scientists. On Google Scholar, the many citations of his work give him a high h-index of 45, and an i10 index of 133. For ten years running he has been recognized as one of the 'most spiritually influential living people in the world' by Watkins Mind Body Spirit magazine. His work has been featured in many magazines, newspapers and broadcast media, including New Scientist, The Guardian, Discover magazine, The Spectator, The Washington Post, Die Zeit and on BBC Radio and television.

Thursday July 10, 2025
PLENARY 12 2:00 pm – 4:10 pm
'End-of-Life Brain Activity'

Marjorie Woollacott, New clues to Terminal Lucidity in mentally-impaired adults
Alex Gomez-Marin, If consciousness survives, materialism dies: re-appraising the “permissive brain” hypothesis at the edges of consciousness
Jimo Borjigin, Potential neural signatures of near-death consciousness in humans

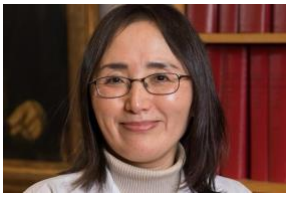
Marjorie Woollacott

Marjorie Woollacott, Ph.D., is an Emeritus Professor of Human Physiology, and member of the Institute of Neuroscience, at the University of Oregon. She was chair of the Human Physiology Department for seven years. In addition to teaching courses on neuroscience and rehabilitation, she taught courses on complementary and alternative medicine and meditation. She is Research Director for the International Association of Near-Death Studies (IANDS) and is President of the Academy for the Advancement of Postmaterialist Sciences (AAPS). Woollacott graduated magna cum laude from the University of Southern California and was elected to membership in Phi Beta Kappa. She received her Ph.D. in Neuroscience from the University of Southern California and her M.A. from the University of Oregon in Asian Studies. She was also a research professor in the Department of Psychology at the University of Umea in Umea, Sweden, and in the National Center for Scientific Research in Marseille, France. Woollacott has received over 7.2 million dollars in research funding for her research in child development, aging, rehabilitation medicine and most recently, meditation. Her areas of expertise include: 1) changes in attentional performance skills and underlying neural networks associated with the mental training of meditation and tai chi; 2) the phenomenon of spiritually transformative experiences, including near-death experiences, 3) the development of balance and attentional abilities in children and factors leading to loss of balance function in aging, and in patients with movement disorders, 4) the design of assessment and treatment strategies to improve balance and attentional abilities. These include testing the efficacy of alternative forms of therapy such as tai chi and meditation for improving both attention and balance and gait abilities in patient populations; and 5) the development of musical performance skills in musicians. Woollacott has published more than 200 scientific articles and written or co-edited eight books. She is the co-author, with Dr. Anne Shumway-Cook of the textbook for health care professionals, titled: Motor Control: Translating Research into Clinical Practice, in its 6th edition (2021). Her latest book, Infinite Awareness (2015) (winner of eight awards, including the 2017 Parapsychological Association Book Award, Eric Hoffer Book Award and the Nautilus Book Award) pairs Woollacott's research as a neuroscientist with her self-revelations about the mind's spiritual power. Between the scientific and spiritual worlds, she breaks open the definition of human consciousness to investigate the existence of a non-physical and infinitely powerful mind.

Àlex Gómez-Marín

Àlex Gómez-Marín is a Spanish physicist turned neuroscientist. He holds a PhD in theoretical physics and a Masters in biophysics from the University of Barcelona. He was a research fellow at the EMBL-CRG Centre for Genomic Regulation and at the Champalimaud Centre for the Unknown in Lisbon. His research spans from the origins of the arrow of time in inert systems, to the neurobiology of action-perception in living organisms such as flies, worms, mice, and humans. Since 2016 he is the head of the Behavior of Organisms Laboratory at the Instituto de Neurociencias in Alicante, where he is an Associate Professor of the Spanish Research Council. Combining experimental, computational and theoretical neuro-physics, his current research deals with human minds in the real world, concentrating on what he calls “the edges of consciousness”. As director of the Pari Center, Alex seeks to enact a kind of intellectual activism that brings a third leg to the “science stool”: apart from solid replicable data and deep imaginative theories, he sees the need to nurture the socio-political *milieu* that makes science possible (or impossible), bringing together leading thinkers and laypeople in a context that relaxes the self-suffocating constraints of current academe, unapologetically integrating the sciences, the arts, and the sacred. Alex has recently received some notable mentions, including being on the list of OOOM Magazine’s 100 World’s Most Inspiring People. His research proposal “Seeing without Eyes” won the first Linda G O’Bryant Noetic Research Prize.

Jimo Borjigin



Jimo Borjigin, Ph.D.
Michigan Neuroscience Institute Affiliate
Associate Professor of Molecular & Integrative Physiology
Associate Professor of Neurology

Areas of Interest
The main research interests of the Borjigin lab include:

- Mechanisms of sudden cardiac arrest and the role of the brain during cardiac arrest (brain-heart coupling).
- Neural basis of covert consciousness in normal and abnormal brain states in human subjects.
- Mechanisms of endogenous DMT synthesis.
- Visualizing covert brain (and heart) activities in patients with neurological, psychological, and psychiatric disorders, to assist with their clinical prognosis, diagnosis, and treatment.

Honors & Awards

- The John Merck Scholars Award – 1999
- Michigan Biological Sciences Scholar Program Award – 2003

Credentials
Ph.D., Neuroscience, The Johns Hopkins Medical Institution, Baltimore, MD (1994)

Published Articles or Reviews

- Xu, G., Mihaylova, T., Li, D., Tian, F., Farrehi, P.M., Parent, J.M., Mashour, G.A., Wang, M.M., Borjigin*, J. Surge of neurophysiological coupling and connectivity of gamma oscillations in the dying human brain (2023). Proc. Natl. Acad. Sci. USA, 2023 May 9;120(19):e2216268120.(link is external)
- Glynos, N.G., Carter, L., Lee, S.J., Kim, Y., Kennedy, R.T., Mashour, G.A., Wang, M.M., Borjigin*, J. Indolethylamine N-Methyltransferase (INMT) is not essential for endogenous tryptamine-dependent methylation activity in rats (2023), Scientific Reports. 13(1):280. PMID: 36609666.
- Li, D., Mabrouk, O.S., Liu, T., Tian, F., Xu, G., Rengifo, S., Choi, S.J., Mathur, A., Crooks, C.P., Kennedy, R.T., Wang, M.M., Ghanbari, H., Borjigin*, J. Asphyxia-activated corticocardiac signaling accelerates onset of cardiac arrest (2015). Proc Natl Acad Sci U S A. 2015 Apr 6. pii: 201423936.
- Borjigin*, J., Lee, U., Liu, T., Pal, D., Huff, S., Klarr, D., Sloboda, J., Hernandez, J., Wang, M.M., Mashour, G.A. Surge of neurophysiological coherence and connectivity in the dying brain (2013). Proc. Natl. Acad. Sci. USA. 110(35):14432-7.

Web Sites
Borjigin Lab(link is external)
Michigan Experts

Friday July 11, 2025
PLENARY 13 9:00 am - 11:10 am
'Prospects for Extraterrestrial Consciousness'

Ross Coulthart, Investigating the Psionic Interface: Alleged Non-Human Interactions with Human Consciousness in Covert UAP Programs.
Brannon Wheeler, How do non-human intelligences communicate with humans?

Ross Coulthart

Ross Coulthart is an Australian investigative journalist and author who has also worked in public relations. He is an advocate for the idea that governments are covering up knowledge of UFOs and alien visitations. https://en.wikipedia.org › wiki › Ross Coulthart

Brannon Wheeler

Brannon Wheeler teaches history of religion, Middle East, and Bible at the United States Naval Academy in Annapolis. He has authored and edited a number of books including Mecca and Eden: Ritual, Relics, and territory in Islam (Chicago, 2016) and Animal Sacrifice and the Origins of Islam (Cambridge, 2022). Professor Wheeler received his PhD from the University of Chicago, has taught at a number of universities around the world, and held visiting positions throughout the Middle East and Europe. His current research focuses on objects that are supposed to be touched.

Friday July 11, 2025
PLENARY 14 11:40 am – 13:00 pm
'Quantum Fields and Consciousness'

Donald Hoffman (R), Physics of Spacetime from Traces of Consciousness
Deepak Chopra, Consciousness is the Ontological Primitive of the Universe
Federico Faggin, Consciousness and Free Will are Quantum Properties of Being

Donald Hoffman

Donald Hoffman received his PhD from MIT, and joined the faculty of the University of California, Irvine in 1983, where he is a Professor Emeritus of Cognitive Sciences. He is an author of over 100 scientific papers and three books, including *Visual Intelligence*, and his new book, *The Case Against Reality*. He received a Distinguished Scientific Award of the American Psychological Association for early career research, the Rustum Roy Award of the Chopra Foundation, and the Troland Research Award of the US National Academy of Sciences. His writing has appeared in *Edge*, *New Scientist*, *LA Review of Books*, and *Scientific American* and his work has been featured in *Wired*, *Quanta*, *The Atlantic*, and *Through the Wormhole with Morgan Freeman*. He has a TED Talk titled “Do we see reality as it is?” and a podcast with Lex Fridman titled “Reality is an illusion.”

Deepak Chopra

Deepak Chopra is a Consciousness Explorer, and a world-renowned pioneer in integrative medicine and personal transformation. Chopra is co-founder of DeepakChopra.ai, his AI twin and well-being advisor. He also co-founded Cyberhuman, a transformative suite of personalized health and well-being solutions. Chopra is a Clinical Professor of Family Medicine and Public Health at the University of California, San Diego, and serves as a senior scientist with Gallup Organization. He is also an Honorary Fellow in Medicine at the Royal College of Physicians and Surgeons of Glasgow. He is the author of over 95 books, translated into over forty-three languages, including numerous New York Times bestsellers. For the last thirty years, Chopra has been at the forefront of the meditation revolution. His mission is to create a more balanced, peaceful, joyful and healthier world. Through his teachings, he guides individuals to embrace their inherent

strength, wisdom, and potential for personal and societal transformation. In his latest book, *Digital Dharma* (Harmony/Rodale, 09/17/24), Chopra navigates the balance between technology and expanded awareness, explaining that while AI cannot duplicate human intelligence, it can vastly enhance personal and spiritual growth. TIME magazine has described Dr. Chopra as “one of their top 100 most influential people.” www.deepakchopra.com

Federico Faggin

Federico Faggin is an Italian-American physicist, engineer, inventor and entrepreneur. He is best known for designing the first commercial microprocessor, the Intel 4004. He led the 4004 (MCS-4) project and the design group during the first five years of Intel's microprocessor effort. Faggin also created, while working at Fairchild Semiconductor in 1968, the self-aligned MOS (metal–oxide–semiconductor) silicon-gate technology (SGT), which made possible MOS semiconductor memory chips, CCD image sensors, and the microprocessor. After the 4004, he led development of the Intel 8008 and 8080, using his SGT methodology for random logic chip design, which was essential to the creation of early Intel microprocessors. He was co-founder (with Ralph Ungermann) and CEO of Zilog, the first company solely dedicated to microprocessors, and led the development of the Zilog Z80 and Z8 processors. He was later the co-founder and CEO of Cygnet Technologies, and then Synaptics. In 2010, he received the 2009 National Medal of Technology and Innovation, the highest honor the United States confers for achievements related to technological progress. In 2011, Faggin founded the Federico and Elvia Faggin Foundation to support the scientific study of consciousness at US universities and research institutes. In 2015, the Faggin Foundation helped to establish a $1 million endowment for the Faggin Family Presidential Chair in the Physics of Information at UC Santa Cruz to promote the study of "fundamental questions at the interface of physics and related fields including mathematics, complex systems, biophysics, and cognitive science, with the unifying theme of information in physics
https://en.wikipedia.org/wiki/Federico_Faggin

Plenary Abstracts

PLENARY 1

PL-1

Assessing the Delta: LLMs & Unified Agency

Dr. Farhan Lakhany PhD
University of Nebraska Omaha, Omaha, NE, USA

Primary Topic Area - TSC Taxonomy
[06.09].....AI /robotics
Categories by Discipline
1.0 Philosophy

Abstract
Assessing the Delta – LLMs & Unified Agency In June 2022, Blake Lemoine, an engineer working on Google’s LaMDA project—a type of Large Language Model (LLM) developed specifically for conversation and dialogue—claimed that LaMDA was sentient. Lemoine was subsequently fired, with Google asserting that his belief lacked evidence after consulting their internal team of ethicists and technologists. Nevertheless, the idea of sentient AI—a topic long explored in various TV shows and movies—has been gaining interest due to the rise of increasingly sophisticated LLMs. In this paper, I discuss what LLMs are and why they are prompting such discussions. First, I explain how LLMs work, what they can currently do, the reasons behind the buzz surrounding them, and their importance. Second, I articulate the notion of consciousness relevant to the current discussion. Third, I examine why many perceive LLMs as conscious or nearing consciousness by highlighting three features: (1) their generative capacity, (2) their conversational style, and (3) their flexibility in application. I discuss why these features give us the sense that they are conscious—namely, because they are abilities typically thought to be exclusive to humans and, in humans, are tied up with conscious states. I highlight the underlying premise – like effects have like causes qua consciousness – and explore various responses to this reasoning. I focus on one particular response:

while this premise provides a prima facie reason for thinking that LLMs conscious, it is insufficient to conclude that they are, in fact, conscious. I then explore what features are missing that, if present, would give us strong reasons to think LLMs are conscious. To do this, I turn to David Chalmers's paper titled "Could a Large Language Model be Conscious?" Chalmers lays important groundwork for investigating whether LLMs are conscious, articulating reasons for and against this possibility. He considers six features that LLMs lack, which, if present, might confer consciousness. One such feature is unified agency; according to Chalmers, being unified agents is arguably a necessary condition for LLMs to be conscious. My paper delves deeper into this feature by mapping out (1) what it means to be a unified agent, (2) the relevant aspects for the current discussion, (3) why unified agency should be understood as a necessary condition for consciousness, and (4) whether LLMs could become unified agents. I conclude by highlighting areas for further research and raising potential counterarguments. I believe that clarifying the nature of artificial intelligence and its potential for consciousness is an extremely important discussion. One view in ethics, and one that I am sympathetic to, is that a necessary condition for entrance into the moral community is sentience. Once in, we have duties towards those included. If LLMs are sentient, they would become part of this community, and our metaphysical discussions would have significant ethical implications. Thus, to better calibrate how we ought to act, we need to understand the nature of LLMs and whether they might one day be conscious.

Keywords

AI, Consciousness, LLMs, Qualia

Links to Research

https://www.athensjournals.gr/humanities/2023-10-1-4-Lakhany.pdf

https://static1.squarespace.com/static/659c94332bafeb1cfad5f9ca/t/65a17cd7b3432e2f88f26f07/1705082071408/The+Meta-Problem+%26+Acquaintance+%28Draft%29.pdf

My name is **Farhan Lakhany** and I am a philosopher of mind and philosopher of artificial intelligence at the University of Nebraska Omaha. My current work centers around introspection and how that intersects with difficulties surrounding the "Hard Problem of Consciousness" and whether LLMs can be conscious. I also have deep interests in the philosophy of psychology, philosophy of cognitive science, evolutionary biology and computer science more generally.

Program Session - PL-1

PLENARY 1

PL-1

Experimental Design and Testing of a Quantum Consciousness Algorithm for AI and Robotics Running on an Adiabatic Quantum Computer

Suzanne Gildert, PhD

Nirvanic AI, Vancouver, BC, Canada

Primary Topic Area - TSC Taxonomy

[04.14].....Quantum theories of consciousness

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

We introduce and explore experimentally the idea of a quantum conscious agent (QCA) - a decision-making system connected to a physical robot that receives perception information from sensors and takes actions via a motor system. Perception information and action options are put into a highly quantum mechanical state, which is then collapsed into classical information, resulting in an action choice informed via collapse of the wavefunction. The QCA is implemented as a multilayer quantum neural network on a quantum annealing processor. By gradually updating the coupling values (weights) in the network based on Hebbian learning, the system is given multiple shots at embodying "quantum free will", and converges to a stable action choice, which is then acted out by the robot. We perform experiments and present preliminary data rigorously testing whether the quantum decisions made by the system deviate from random, suggesting that the quantum decision encodes a purposeful behavior via connection to a deeper universal process. If quantum consciousness theories are correct, we conjecture that even a small QCA demonstrating purposeful behavior in this way would be experiencing some amount of conscious awareness.

Keywords

Quantum Consciousness, Quantum Computing, AI, Decision Making, Quantum Agents, Quantum, Consciousness Technologies, Quantum Neural Networks, Universal Purpose, Quantum Agency, Panpsychism

Links to Research

https://www.suzannegildert.com/patents-publications
https://www.nirvanic.ai/what-is-quantum-consciousness

Suzanne Gildert is Founder and CEO of Nirvanic AI. Nirvanic's mission is to understand consciousness so we can build it in machines and enhance it in people. The company is starting with an exploration of quantum consciousness and quantum agency in robotics and AI. Suzanne also co-founded Sanctuary AI, leading it as its first CEO and later CTO, designing the cognitive architecture for the company's "Phoenix" general purpose humanoid robot system. Earlier, she founded Kindred AI in 2014, which was acquired by Ocado in 2020 for one third of a billion dollars ($339 million CAD). Suzanne also has deep expertise in quantum computing from her time at D-Wave Systems and has a Ph.D. in experimental physics from the University of Birmingham, UK. She holds 67 filed US patents in quantum technologies and AI. She is also a published digital artist and pioneered a technique for creating art using a quantum computer. More information is available at suzannegildert.com

Program Session PL-1

PLENARY 1

PL-1

"Dodecanogram: A Novel Instrument for Detecting Microtubule Resonance in Anesthetic States"

Anirban Bandyopadhyay

National Institute for Materials Science, Ibaraki, Tsukuba, Japan

Primary Topic Area - TSC Taxonomy
[02.12].....Quantum brain biology
Categories by Discipline
4.0 Physical and Biological Sciences

Abstract

The Dodecanogram (DDG) represents a novel advancement over traditional EEG technology by detecting megahertz frequency bursts from microtubule bundles within neurons. Experiments at BMHRC, Bhopal, showed these bursts correlate with unconscious states in anesthetized subjects and vanish upon regaining consciousness. Through experiments conducted on 40 human subjects conducted at BMHRC, Bhopal, on human subjects under anesthesia, we observed unique megahertz burst patterns analogous to neuronal spike trains. Notably, these patterns correlated with microtubule activity deep inside a neuron and disappeared as subjects regained consciousness, following unique spatio-temporal dynamics on the scalp. We simulated the transmission of these signals through virtual brain models in CST, encompassing skin, connective tissues, bone, bridging veins, cerebrospinal fluid, meninges, cortex layers, and microtubule bundles. Maxwell's equations revealed these signals pass one-way from the microtubule bundle to the skin, even through noise, but not in reverse. This discovery suggests a potential marker for unconsciousness, offering insights into subconscious layers of mind and coma states.

Links to Research
Principal Researcher, Functional Chromophores Group, Nanomaterials Field, Research Center for Materials Nanoarchitectonics (MANA)

Anirban Bandyopadhyay is a Senior Scientist at the National Institute for Materials Science (NIMS), Tsukuba, Japan, in the advanced key technologies division, AKED. Ph.D. in Supramolecular Electronics worked in Kolkata, India, and Sheffield, UK. Post Ph.D. from 2005 to 2008 independent ICYS research fellow at the ICYS, NIMS, Japan, worked on the brain-like bio-processor building. He possesses a Master of Science in Condensed Matter Physics, Computer, Numerical Analysis, and Astrophysics from North Bengal University and a Doctor of Philosophy in Physics from Jadavpur University. Anirban received his PhD from the Indian Association for the Cultivation of Science (IACS), Kolkata 2004-2005, where he worked on supramolecular electronics and multi-level switching. Bandyopadhyay has developed a resonance chain based complete human brain model that is fundamentally different than Turing tape essentially developing an alternate human brain map where filling gaps in the resonance chain is the key.

In 2008, he joined as a permanent scientist at NIMS, working on the cavity resonator model of the human brain and design-synthesis of brain-like organic jelly, microtubule inspired fourth circuit element and magnetic vortex, quantum cloaking and built dodecanion, icosanion geometric algebra. From 2013 to 2014 he was a visiting scientist at the Massachusetts Institute of Technology (MIT), USA. Received Hitachi Science and Technology award 2010, Inamori Foundation award 2011-2012, Kurata Foundation Award, Inamori Foundation Fellow (2011-), and Sewa Society international member, Japan, SSI gold medal etc. Anirban has developed a unique quantum music measurement machine and experiments on DNA proteins, microtubules, neurons, molecular machines, cancer. Anirban Bandyopadhyay has also developed a new frequency fractal model. His group has designed and synthesized several forms of organic brain jelly that learns, programs and solves problems by itself for futuristic robots during as well as several software simulators that write complex codes by themselves.

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PLENARY 2

PL-2

From Kolmogorov Theory to Computational Modeling and Brain Stimulation

Giulio Ruffini PhD
CEO, StarLab, Barcelona, BCN, Spain. CSO, Neuroelectrics, Barcelona, BCN, Spain

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques
Categories by Discipline
2.0 Neuroscience

Abstract

From Kolmogorov Theory to Computational Modeling and Brain Stimulation The next frontier in brain stimulation—and neuromodulation technologies like multichannel transcranial electrical stimulation (tES), transcranial magnetic stimulation (TMS), and focused ultrasound (FUS)—demands robust computational models of the brain. These models must address fundamental questions: Where do we stimulate? How? Which network dynamics can we harness for therapeutic or enhancement purposes? Such insights are critically important in neurological disorders (e.g., epilepsy) and are especially pivotal in psychiatry, where many disorders can be understood as disruptions in “experience” itself. In this talk, I will first introduce the Kolmogorov Theory (KT) of consciousness, an algorithmic framework that describes how agents form compressive, coarse-grained models that capture the regularities shaping subjective experience and guiding behavior. Drawing on group-theoretic invariances and parallels with Noether’s theorem, KT reveals how hierarchical structures can naturally emerge in neural systems. It connects with the manifold hypothesis and suggests that biological (and artificial) neural networks compress data in ways that exploit the world's symmetries. On the road to computational neuropsychiatry, I will then illustrate how KT can help illuminate “first-person” disorders such as Major Depressive Disorder (MDD) by formalizing the notion of depression as "persistent low valence" and showing how dysfunctional valence, inaccurate world models, or suboptimal planning can emerge in the agent and affect one another. This agent-based perspective not only guides the search for potential etiological routes but also the development of computationally designed interventions—ranging from brain stimulation to psychedelics—to repair or recalibrate neural circuits. To translate this framework into a computational model, I will present our Laminar Neural Mass Model (LaNMM), which can represent interlocked fast and slow oscillations and capture intrinsic cross-frequency coupling (CFC) phenomena like Signal–Envelope (related to PAC) and Envelope–Envelope (or AAC) interactions, as well as the effects of brain stimulation. These coupling mechanisms realize a hierarchical “Comparator” function at the level of cortical columns, evaluating prediction errors and weighting uncertainties. Perturbations of this Comparator function can account for altered gamma oscillations in Alzheimer’s disease, schizophrenia, and ASD, as well as the diminished top-down control observed under psychedelics, linking them to both cognition and subjective experience. Altogether, this synthesis of theoretical foundations and computational models provides a scaffold for advancing our understanding of neuropsychiatric disorders and their connections to neurophenomenology and the development of stimulation-based therapies. By pinpointing how neural circuits encode and compress key symmetries, we can design targeted interventions—via tES, TMS, FUS, or other modalities—that align with each individual’s functional architecture, opening new avenues for personalized therapy and neurophenomenology.

Keywords

Algorithmic information theory, computational neuroscience, whole brain modeling

References

Ruffini 2017. An algorithmic information theory of consciousness
Ruffini et al. 2022. AIT foundations of structured experience.
Sanchez Todo et al. (2023). A physical neural mass model framework for the analysis of oscillatory generators from laminar electrophysiological recordings.
Ruffini et al. (2024). The Algorithmic Agent Perspective and Computational Neuropsychiatry: From Etiology to Advanced Therapy in Major Depressive Disorder.
Ruffini et al. (2025a). Structured Dynamics in the Algorithmic Agent.
Ruffini et al. (2025b). Cross-Frequency Coupling as a Neural Substrate for Prediction Error Evaluation: A Laminar Neural Mass Modeling Approach (in prep)

Dr. Giulio Ruffini, with a background in physics, founded Starlab in 2000, later founding Neuroelectrics in 2011. His pioneering work includes brain stimulation technology and brain-to-brain communication research. He is currently developing whole-brain modeling methods for brain stimulation in the ERC Galvani project and the FET Pathfinder Neurotwin project. CEO of Starlab (http://starlab.es) and President of Neuroelectrics (http://neuroelectrics.com). Previously, he has been a researcher at UC Davis and Los Alamos National Laboratory (both as a graduate research student), and a post-doc at the Catalan Institute for Space Studies (IEEC, Barcelona, Spain).

PLENARY 2

PL-2

From States to Traits: How Noninvasive Neuromodulation with Mindfulness Training Can Help Shift Consciousness Toward Lasting Wellbeing

Joseph Sanguinetti PhD
University of Arizona, Tucson, AZ, USA

Primary Topic Area - TSC Taxonomy

[03.03].....Other sensory modalities

Categories by Discipline

3.0 Cognitive Science and Psychology

Abstract

For over a decade, our group has explored how transcranial ultrasound stimulation (TUS) can be used to map and modulate the neural substrates of consciousness and wellbeing. TUS is a powerful, noninvasive tool that enables safe, reversible modulation of deep brain structures with millimeter precision. At the SEMA Lab, we've investigated how targeting the Default Mode Network (DMN) with TUS can induce transient states of equanimity—a fundamental quality cultivated in contemplative practice. In this talk, I will describe our developing paradigm for using TUS to accelerate the acquisition of mindfulness-related skills and traits. By coupling TUS-induced equanimity states with structured mindfulness training, we aim to cultivate acceptance-based emotion regulation capacities that support the transition from short-term state changes to lasting, trait-level wellbeing. I will present findings from our DMN-focused studies, integration of TUS with mobile meditation platforms, and results from the world's first TUS-enhanced meditation retreat. Together, these efforts outline a novel approach for understanding and cultivating comprehensive wellbeing through the intersection of precision neuromodulation and contemplative practice.

Links to Research

Joseph L. Sanguinetti, John JB Allen, Erica Nicole, Brian Lord, Shinzen Young, SEMA Lab
https://semalab.arizona.edu/
https://www.jaysanguinetti.com/sema-lab

Program Session - PL-2

PLENARY 3

PL-3

Classical and Quantum Realities are Not Quite the Same; How About Conscious Reality?

Sir Roger Penrose
Nobel Laureate in Physics, University of Oxford

Abstract:

According to quantum theory, a physical object is defined by its quantum state, or "wave-function", frequently denoted by the Greek letter psi, which has a curious kind of reality, which I refer to as "quantum reality". It is not possible to ascertain by external measurement what previously unknown psi might be, but it is possible to confirm the value of psi, with a curious kind of reality (with some retro-causal aspects to it) which I refer to as "quantum reality" (according to a criterion due to Einstein) that had been predicted by a theoretical calculation. This is very different from the state of a classical system, which can be ascertained through measurement. Thus, the classical state of a system can be ascertained, whereas a quantum state can only be confirmed. Does this confirm/ascertain distinction have relevance to conscious perceptions? Of course, as individual conscious beings, each one of us has a different perspective of the world, perceiving consciously only an extremely tiny portion of the surrounding universe. Yet, it is worth exploring the possibility that such classical/quantum distinctions have relevance to very tiny aspects of conscious experience. In this regard, it would seem to be worth re-examining an early experiment due to Benjamin Libet concerning the very puzzling timing of the conscious experience of tiny effects.

Program Session PL-3

PLENARY 3

PL-3

Instantaneous Memory Accession via Quantum Geometrodynamic Networks

Mr. William D Brown MSc
The International Space Federation, Marnaz, Haute-Savoie, France

Primary Topic Area - TSC Taxonomy
[04.09].....Biophysics and coherence

Categories by Discipline
4.0 Physical and Biological Sciences

Abstract
The biological basis of memory storage and retrieval has conventionally been understood through computational frameworks based on binary encoding. Here we present a novel mechanism for memory processes based on quantum geometrodynamics in biomolecular electrodynamics, where the discrete structure of spacetime as a quantum entangled network underlies physical processes of temporal-spatial coupling in biological systems. This coupling occurs through collective quantum coherence of interacting dipole resonators, which has a geometrodynamic network architecture of spacetime coordinates connected via Einstein-Rosen bridge topologies, where information is superficially encoded in the quantum entangled network of voxel oscillators but is fundamentally accessible acausally via the continuous multiply connected spacetime geometry. The mechanism is demonstrated through theoretical modeling of dipole oscillator coupling in benzene ring structures throughout subcellular systems, including microtubules and DNA polymers. We find this characteristic coupling accurately predicts observed quantum coherent states in biological macromolecules and enables hybrid analog-digital information processing. These findings describe a fundamentally new paradigm for biological memory storage and retrieval that does not rely on classical computational encoding but rather on direct spacetime geometric information accession, which is effectively quasi-instantaneous or acausal and hence fundamentally non-computational. This suggests that biological memory systems may be more sophisticated and fundamentally different than previously understood, with significant implications for our understanding of consciousness, memory, time and the development of novel computing architectures. The proposed mechanism is supported by existing empirical observations and offers testable predictions for future experimental verification.

Keywords
Quantum Biology, Quantum Coherence, Quantum Entanglement, Quantum Geometrodynamics, Quantum Electrodynamics, Microtubules, Memory, Quantum Computation, Retrocausality, Nonlocality
Links to Research
https://www.novosciences.org/research
https://spacefed.com/author/williambrown/

William Brown is a biophysicist with a background in molecular biology, molecular genetics, and physics. He obtained his Master's degree in applied recombinant DNA technology from New York University and performed graduate research at the University of Hawaii on epigenetics, neurogenesis, and brain cytoarchitectonics. He currently holds the position of biophysicist at the International Space Federation, where he performs research to elucidate foundational principles in the biophysics of the living system, with applications from life-extension technologies to consciousness. He presents lectures, talks, and Q&A forums to teach his syncretic approach of a comprehensive unified understanding of nature.

Program Session PL-3

PLENARY 3

PL-3

Qualia, Violation of Conservation Laws, and the Quanta of Pan-Psychism

Avshalom C Elitzur
Chapman University, Professor, Orange, CA, USA

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Categories by Discipline
4.0 Physical and Biological Sciences

Abstract
Qualia, the fundamental elements of subjective experience, cannot be inferred from brain dynamics, just as they are unrelated to any physical process. Consequently, they must be devoid of any causal effect, as such involvement is bound to violate energy and momentum conservation laws. Qualia can therefore exist only as mere epiphenomena or parallel aspects of the physical world. Why, then, do many humans express bafflement about the apparently non-physical nature of their qualia? I show that all attempts to explain

away this bafflement fail miserably. Ergo, it is qualia per se, by their very non-physical essence, that interfere with the brain's operation. Violation of conservation laws is therefore inevitable. I then speculate that every quantum of matter/energy and spacetime has a hidden "individual" property which is unique to that quantum alone, hence cannot be abstracted. This is in contrast to physical properties like size, charge, spin, etc., which are generic. In ordinary inanimate interactions, the individual properties give rise to mere quantum randomness. But in a stable system that operating on itself, a collective individuality can emerge and grow in magnitude to the level of coherent causal efficacy. The organism then asserts that there is a unique quality to each percept within it, which cannot be communicated or abstracted. These are the qualia. I conclude with some novel developments in the Two State-Vector Formalism of QM that may illuminate these questions.

Keywords
the hard problem, qualia, conservation laws, pan-psychism, quantum mechanics

Program Session PL-3

PLENARY 4

PL-4

Old theory, new evidence: microtubules are the biological substrate of quantum consciousness

Mike Wiest PhD
Wellesley College, Associate Professor Wellesley, MA, USA

Primary Topic Area - TSC Taxonomy
[02.10].....Anesthesia

Categories by Discipline
2.0 Neuroscience

Abstract
I review my recent experimental result strongly suggesting that the anesthetic gas isoflurane acts on microtubules to cause unconsciousness in rats. When combined with other old and new evidence—including direct biophysical evidence in living neurons and conscious humans—my result supports the hypothesis that the physical substrate of consciousness is a quantum state of neuronal microtubules that is disrupted by inhalational anesthetics. After discussing future directions in anesthetic mechanism research, I turn to consider potential practical (behavioral, evolutionary) advantages of a quantum brain, and enormous theoretical advantages of a quantum consciousness model. In particular, I explain how the quantum model makes panpsychism viable as a solution to Chalmers' Hard Problem, by solving the phenomenal Binding (or Combination) Problem. Solving the Hard Problem in this way appears to leave us with an Epiphenomenalism Problem, meaning we cannot account for the evolution of useful conscious states if the conscious property of matter has no physical effects. Contrary to this "zombie" intuition, I propose a non-trivial solution to the Epiphenomenalism Problem, by recognizing a necessary connection between an essential property of conscious experiences and an objective property of their physical substrates. Finally, I point out that the Orchestrated Objective Reduction theory of Penrose and Hameroff embodies these advantages of a quantum model; and also accounts for non-algorithmic human understanding and the psychological arrow of time—which no other theory of consciousness does.

Keywords
anesthesia, quantum consciousness, quantum associative memory, Orch OR, microtubules, hard problem, binding problem, panpsychism, epiphenomenalism, active inference
Links to Research *https://www.eneuro.org/content/11/8/eneuro.0291-24.2024*

Mike Wiest graduated from high school in Kenya, East Africa, then returned to the United States to earn a BA in physics at Dartmouth College in 1991, and a PhD in high-energy theoretical physics at Michigan State University in 1998. Excited by the Orch OR quantum theory of consciousness, he spent the next 10 years learning neuroscience as a postdoc in computational neuroscience at Baylor College of Medicine and behavioral neurophysiology at Duke University. He is now an Associate Professor of Neuroscience at Wellesley College in Massachusetts, where he has been teaching and conducting chronic multi-electrode recording experiments in awake behaving rodents since 2008.

Program Session PL-4

PLENARY 4

PL-4

How consciousness may rely on brain cells acting collectively – evidence from psychedelic research on rats

Pär Halje PhD[1], Ivani Brys PhD[2,3], Sebastian Barrientos PhD[1], Per Petersson PhD[1]
[1]Lund University, Lund, Sweden. [2]Federal University of Vale do São Francisco, Petrolina, Pernambuco, Brazil. [3]Lund University, Lund, Brazil

Primary Topic Area - TSC Taxonomy

[05.04].....Psychedelic and other altered states of consciousness

Categories by Discipline

2.0 Neuroscience

Abstract

Psychedelic drugs are known for their ability to induce profound altered states of consciousness. Unlike other psychopharmacological compounds, such as stimulants or sedatives, which primarily modulate arousal and emotional valance, psychedelics fundamentally reshape perception, cognition and emotion. Since the function and distribution of the serotonin 2A receptor – the primary site of action of classic psychedelics – is well preserved across mammalian species, psychedelics offer a still largely unexplored opportunity to study consciousness in experimental animals using methodologies not feasible in human research. Downstream from the serotonin receptor, psychedelic drugs have been observed to affect the brain on several levels, including increased glutamatergic activity, altered functional connectivity and an aberrant increase in electrical high-frequency oscillations. To bridge these different levels of observation, we performed multi-structural, invasive electrophysiological recordings in freely behaving rats treated with psychedelics. Importantly, we compared the effects of classic, serotonergic psychedelics, such as LSD, with those of dissociative anesthetics like ketamine, which, despite acting on different receptors, also produce strong psychedelic effects at certain doses. Our findings revealed disparate modulations of neuronal firing rates for these two drug classes, suggesting that the general psychedelic state is not directly linked to changes in firing rates. However, local field potentials exhibited a shared pattern of synchronized high-frequency oscillations across multiple frontal brain structures. These oscillations were highly phase-locked across regions, with interregional delays of less than 1 ms. This hypersynchrony likely has major effects on the integration of information across neuronal systems, and we propose that it is a key contributor to changes in perception and cognition during psychedelic drug use.

Keywords

Psychedelics, Oscillations, Electrophysiology

Pär Halje holds an M.Sc. in Physics from Stockholm University and a Ph.D. in Cognitive Neuroscience from EPFL, Switzerland. Since 2010, he has been a researcher at Lund University, Sweden, in the Group of Integrative Neurophysiology. His lab specializes in chronic electrophysiological recordings in awake animals using multi-structure microwire electrodes. His research focuses on neural oscillations, particularly those induced by psychedelics, as well as their role in pathological states such as Parkinson's disease and psychosis.

Program Session PL-4

PLENARY 4

PL-4

Psilocybin and Prolonged Grief Disorder: Role of Subjective Experience on Outcomes

Dr Jennifer K Penberthy PhD
University of Virginia School of Medicine, Charlottesville, VA, USA

Primary Topic Area - TSC Taxonomy

[05.04].....Psychedelic and other altered states of consciousness

Categories by Discipline

3.0 Cognitive Science and Psychology

Abstract

Prolonged Grief Disorder (PGD) is a newly recognized mental health condition classified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR). It is characterized by persistent and pervasive grief-related symptoms that continue for 12 months or more following the death of a loved one. Unlike normal grief, PGD is associated with profound emotional pain, identity disruption, loss of meaning, and functional impairment. Individuals with PGD experience persistent yearning and longing for the deceased, along with difficulty accepting the loss. PGD affects approximately 10% of bereaved individuals, with higher rates reported among those exposed to sudden or traumatic loss, such as deaths caused by COVID-19, mass-casualty events, and natural disasters. Vulnerable populations, including older adults and those with limited social support, are disproportionately affected. PGD is linked to a range of

adverse health outcomes, including increased risk of depression, anxiety, cardiovascular disease, substance misuse, and suicidal ideation. These outcomes underscore the urgent need for effective interventions for PGD, especially in the context of rising global grief due to the COVID-19 pandemic and other large-scale crises. This single-arm, open-label pilot study evaluated the feasibility, safety, and preliminary efficacy of psilocybin-assisted therapy for PGD. Participants underwent preparation sessions, a monitored administration of a 25 mg oral dose of psilocybin, and post-session integration support. Changes in grief, depression, and trauma-related symptoms were assessed using the Inventory of Complicated Grief (ICG), Patient Health Questionnaire-9 (PHQ-9), and Davidson Trauma Scale (DTS), respectively. Measures of subjective experience, including openness (IPIP NEO) and mystical experience (Mystical Experience Questionnaire; MEQ), were also collected. Functional magnetic resonance imaging (fMRI) was employed to explore neural correlates of psilocybin's effects on grief processing, focusing on changes in connectivity and activity in brain regions associated with emotion regulation and self-referential processing, including the default mode network (DMN), amygdala, insula, and medial prefrontal cortex (mPFC). Results demonstrated that psilocybin-assisted therapy was feasible and well-tolerated, with no serious adverse events reported. Clinically meaningful reductions in grief, depression, and trauma symptoms were observed at 1, 3, and 6-month follow-ups. Subjective reports revealed profound experiences of awe, connectedness, and a renewed sense of meaning, which were associated with increases in openness and psychological flexibility. Neuroimaging analyses exploring the impact in DMN connectivity and functional connectivity between the mPFC, amygdala, and insula are provided and discussed regarding the impact of psilocybin on grief-related cognition and emotional processing. These findings provide preliminary evidence for the efficacy of psilocybin-assisted therapy as a treatment for PGD. The observed changes in subjective experience and neurobiological markers underscore the potential role of altered states of consciousness in facilitating grief resolution. This study offers critical data to support the design of larger randomized controlled trials and suggests novel pathways for developing treatments for PGD and related mental health conditions.

Keywords

Psilocybin, Prolonged Grief Disorder, altered states of consciousness, fMRI, psychological flexibility, default mode network (DMN), awe, connectedness, mental health, neuroplasticity

Links to Research

https://med.virginia.edu/perceptual-studies/

Jennifer "Kim" Penberthy, Ph.D., ABPP is the Chester F. Carlson Professor of Psychiatry and Neurobehavioral Sciences at the University of Virginia School of Medicine. She also has a faculty appointment at the UVA Cancer Center. She is the immediate past president of the Society of Clinical Psychology. She has published extensively on psychotherapy, mindfulness, and resilience, and lectures internationally regarding her research. She also studies the mind-body relationship, exploring human consciousness as well as extraordinary human experiences, including the impact of such on human abilities and wellness. She is a founding member of the UVA Contemplative Sciences Center and is a Fellow of Humanism in Medicine at the University of Virginia. She is involved on an international level conducting research and consulting with the Center for Consciousness Research and the Scientific & Medical Network. Kim is also dedicated to promoting diversity and inclusion and exploring and honoring psychotherapeutic and contemplative practices from indigenous and native cultures. Her most recent book is co-authored with her daughter, Morgan, and is called "*Living Mindfully Across the Lifespan: An Intergenerational Guide,"* published by Routledge Taylor & Francis.

Program Session PL 4

PLENARY 5

PL-5

Evidence for Non-Local Consciousness and Extrasensory Perception

David del Rosario

Instituto de Neurociencia Avanzada de Barcelona (INAB), Barcelona, Spain

Primary Topic Area - TSC Taxonomy

[02.01].....Neural correlates of consciousness (general)

Categories by Discipline

3.0 Cognitive Science and Psychology

Abstract

Life is an intelligent, self-organizing process characterized by a continuous sequence of interdependent reactions, where each event is intrinsically linked to preceding and subsequent occurrences. Within this framework, human consciousness emerges as a complex and dynamic phenomenon, manifesting in people through perceptions, thoughts, and emotions. These phenomena contribute to an ongoing flux of conscious and unconscious interactions that define human experience. Scientific inquiry has allowed us to observe and quantify these interactions, offering novel insights into phenomena that extend beyond direct sensory perception. Advances in cellular and wave mechanical interactions, communication between human and non-corporeal intelligences, and cognitive vision phenomena are measurable examples within contemporary neuroscience. This plenary session will critically analyze recent experiments performed at

the Instituto de Neurociencia Avanzada de Barcelona (Spain), integrating interdisciplinary research to assess the feasibility of non-local information transfer and its implications for broadening our understanding of human cognition beyond established paradigms.

Keywords

thoughts, emotions, sonobiology, cognitive vision, non-corporeal intelligences

Links to Research

https://www.mdpi.com/2076-3417/14/20/9400
https://pubmed.ncbi.nlm.nih.gov/39848119/

David del Rosario is a researcher, science communicator, and director of the Institute of Advanced Neuroscience of Barcelona (INAB). He holds a Master's in Biomedical Engineering from the University of Barcelona and a PhD in Neurosciences from the University of Alicante. He combines a solid academic background with a passion for bridging science and everyday life. David's work focuses on research in cognitive neuroscience, particularly exploring human thought, emotions, and consciousness. He has published the best seller *El libro que tu cerebro no quiere leer*, which remained on Spain's top 10 non-fiction books list for weeks. His contributions to research and dissemination have earned him several prestigious awards, such as the National Telecommunications Award and the Extraordinary Award in Biomedical Engineering. David has shared his insights at conferences across Europe, North America, and South America, making complex scientific ideas accessible to diverse audiences. As the director of INAB, he continues to advance innovative approaches in neuroscience research and education.

Program Session PL-5

PLENARY 5

PL-5

IKS Approaches for holistic understanding of Mind, Brain, and Consciousness

Prof. Prof. Laxmidhar Behera
Indian Institute of Technology Mandi, Mandi, Himachal Pradesh, India

Primary Topic Area - TSC Taxonomy

[02.16].....Brain stimulation techniques

Categories by Discipline

2.0 Neuroscience

Abstract

The Indian Knowledge System (IKS) conceptualizes our existence as a superposition of three fundamental energies: pure semantic (consciousness), semantic (mind), and physical (brain). In other words, this framework provides a holistic understanding of cognition, perception, and neurophysiological processes. There is not much clarity as to how the perceptual world and physical world work in tandem. By introducing quantum-like entanglement in perception, we propose that self-propelled agents align based on the quantum expectation value of a perception operator, driving collective motion. We shall also reflect on human olfactory perception through the interplay of molecular vibration patterns of odorants and underlying EEG dynamics. Additionally, we explore how high-frequency probes in the megahertz range reveal intricate neural dynamics, particularly in children trained to exhibit near-normal visual perception despite being blindfolded. Building on these foundations, the discussion will conclude with IKS-based interventions designed to enhance cognitive function. In summary, we propose innovative approaches for improving perception, attention, and memory by integrating ancient wisdom with contemporary neuroscience and quantum-inspired models. This synthesis opens new possibilities for mental health, education, multi-agent coordination, and contemplative sciences through the lens of IKS.

Keywords - IKS, Models of Perception, Cognitive Enhancement

Prof Laxmidhar Behera joined as the Director of IIT Mandi on 19th January, 2022. Prior to this, he was working as the Poonam and Prabhu Goel Chair Professor in the Department of Electrical Engineering, IIT Kanpur, and simultaneously served as TCS affiliate faculty.

Program Session PL-5

PLENARY 6

PL-6

A Rhythmic Theory of Selective Attention 2.0

Sabine Kastner MD, PhD
Princeton University, Princeton, NJ, USA

Primary Topic Area - TSC Taxonomy

[03.01].....Attention

Categories by Discipline

2.0 Neuroscience

Abstract

The selection of information from our cluttered sensory environments, often referred to as ‘attention’, is one of the most fundamental cognitive operations performed by the primate brain. In the visual domain, the selection process is thought to be mediated by a spatial mechanism – a ‘spotlight’ that can be flexibly shifted around the visual scene. In my lecture, I will provide an overview on its neural basis by discussing neuroimaging and intracranial electrophysiology studies in the human and monkey brain. Neuroimaging studies have shown that the spatial selection mechanism engages a large-scale network that consists of multiple nodes distributed across all major cortical lobes and includes also subcortical regions in the midbrain and thalamus. Electrophysiology studies have provided a rich understanding of the specific functions of each network node and their functional interactions. Key findings reveal that (i) the cortical network is coordinated by a thalamic timekeeper in the pulvinar and (ii) processing in sensory cortex is modulated by feedback signals from a fronto-parietal control network. The fronto-parieto-pulvinar network is characterized by complex temporal dynamics that set up alternating attentional states, which emphasize either environmental sampling of information or shifting of spatial selection to a new location and can be measured as behavioral rhythms. Collectively, these studies in the adult brain set the stage for translational applications such as exploring the typical and atypical development of attention function and its deficits in neurological and psychiatric diseases.

Plenary Session PL-6

PLENARY 6

PL – 6

Establishing standards for (realist) theories of consciousness/qualia: structural constraints from relationships among qualia

Naotsugu Tsuchiya PhD

Monash University, Melbourne, Victoria, Australia. ATR, Kyoto, Japan

Primary Topic Area - TSC Taxonomy

[01.05].....Qualia

Categories by Discipline

3.0 Cognitive Science and Psychology

Abstract

Upon accumulated evidence in the neural correlates of consciousness over the last 30 years, we have seen proliferation of theories of consciousness, rather than constraining them in any criterion. Due to the complexity of the problem, we might continue to see the list expand further into the future. One of the reasons for this expansion is due to too weak constraints imposed from binary, report-based tasks that have been dominant over the last 30 years of the neural correlates of consciousness approaches. Here we propose that structural constraints coming from empirical data will be much more powerful than the traditional approaches. Specifically, rather than mapping one single mental event to one single physical event, we should require many mental events AND their relationships to map with many physical events and their relationships in a coherent manner. Relational data about qualia, being established through the Qualia Structure project, offers such an opportunity. How can theories of consciousness explain why “red” feels the way it is? How does it compare to the way it feels about “sound”? What are the mechanisms that can potentially explain qualitative difference between any music and any painting? What are the potential answers from various theories as depicted in the "landscape of consciousness"? We will provide some promising perspectives from structural, relational theories of consciousness, such as Integrated Information Theory (IIT) of consciousness.

Keywords

Qualia, Qualia Structure, Relational approach, Structural theory, Integrated Information Theory

Links to Research

(1 Overview) The Qualia Structure Paradigm: towards a construction of a Qualia Periodic Table for the dissolution of the Hard Problem of Consciousness. Tsuchiya N. - osf.io/preprints/psyarxiv/492hu
(To appear as a book chapter for The Scientific Study of Consciousness: Experimental and Theoretical Approaches, edited by Umberto Olcese and Lucia Melloni)
(2 Empirical Research) “Is my “red” your “red”? Evaluating structural correspondences between color similarity judgments using unsupervised alignment" - Kawakita, G., Zeleznikow-Johnston, A., Takeda, K., Tsuchiya, N., and Oizumi, M. (2025) iScience https://doi.org/10.1016/j.isci.2025.112029
(3 Empirical developmental research) "Comparing color qualia structures through a novel similarity task in young children versus adults." Moriguchi, Y., Watanabe, R., Sakata, C., Zeleznikow-Johnston, A., Wang, J., Saji, N., and Tsuchiya, N. (2025). PNAS https://osf.io/preprints/psyarxiv/wdcu7_v3 For Demo https://youtube.com/shorts/-gPjL0T6Xiw

Dr. Naotsugu Tsuchiya was awarded a PhD at California Institute of Technology (Caltech) in 2006. Upon postdoctoral training at Caltech until 2010. In Jan 2012, he joined the School of Psychological Sciences at Monash University as an Associate Professor (Professor from 2020). His main research interest is to uncover the neuronal basis of consciousness. Recently, he focuses on the novel Qualia Structure approach on consciousness, which advocates to characterize the structure of qualia by measuring the similarity between qualia on a large scale, and to reveal their neural correlates and their causal information structure. The Qualia Structure project will further employ various research methods, including phenomenology, development, and constructivism, in order to estimate structures of qualia from perceptual to emotional domains. The outcome of this field is the creation of a new interdisciplinary research program that will have impacts to the general society, such as understanding the consciousness of others and the consciousness of animals and artificial intelligence.

Program Session PL-6

PLENARY 6

PL-6

Correlates of qualia in microtubule 'time crystal' dynamics

Stuart Hameroff MD[1,2], Tanusree Dutta[3], Anirban Bandyopadhyay[4]
[1]UArizona, Tucson, AZ, USA. [2]https://hameroff.arizona.edu/, Tucson, AZ, USA. [3]Indian Institute of Management Research, Ranchi, India. [4]International Center for Materials and Nanoarchitectronics (MANA); National Institute for Materials Science (NIMS), Tsukuba, Japan

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Categories by Discipline
4.0 Physical and Biological Sciences

Abstract
Qualia are the basic instances of subjective conscious experience, but their origins and how they combine into full, rich consciousness are unknown. Conventional electroencephalography ('EEG') etc. have failed to reveal correlates of qualia. EEG detects brain activities ('waves') up to a few hundred hertz, but we now know coherent self-similar ('triplets-of-triplets') oscillation patterns occur in faster kilohertz, megahertz, gigahertz and terahertz frequencies ('DoDeconoGraphy, for 12 orders of frequency). These fractal dynamics derive from collective resonance oscillations of microtubules inside brain neurons, with megahertz in particular being easily detectable from scalp in humans. Megahertz triplets between 6 and 26 MHz appear to be functionally important, disappearing under general anesthesia. The fractal-like temporal behavior indicates microtubules act as 'time crystals', systems whose dynamics repeat at various scales, suggested in biology in the 1960s by Art Winfree, in physics in 2012 by Frank Wilczek, experimentally shown in physics recently, and in microtubules by Bandyopadhyay et al over the past 12 years. Time crystals are dynamical systems deconstructed into their component oscillators expressed as spherical clocks whose sizes are inversely related to frequency, and which may align, couple, interfere and resonate to give geometric expressions analogous to music. In a clinical study, human subject volunteers were asked to imagine specific qualia-like feelings. DDG frequencies taken under these emotional/qualia states were then analyzed as time crystals, combined/entangled and consolidated geometrically to map qualia on a hexagon-of-hexagon framework showing their relations. Microtubule time crystal behavior would be very useful for life and consciousness, supplying, quantum computing, unifying and temporally organizing, encoding memory and transcending scales. It would require quantum coherence and entanglement among intraneuronal microtubules, consistent with the Orch OR theory of consciousness in which orchestrated objective quantum state reductions are instantaneous collapses of the quantum wavefunction (as Penrose fluctuations in fundamental spacetime geometry), like notes and chords across musical scales. Metaphors aside, Orch OR has more explanatory power, biological connection and experimental validation than all other theories of consciousness combined.

Links to Research

1. Dutta T, Bandyopadhyay A (2024) Emotion, Cognition and Silent Communication, Springer https://doi.org/10.1007/978-981-99-9334-5
2. Hameroff S (2022) A new paradigm needed in neuroscience, https://pubmed.ncbi.nlm.nih.gov/35782391/
3. Saxena et al (2022) Polyatomic time crystals of the brain, https://pubs.aip.org/aip/jap/article-abstract/132/19/194401/2837827/Polyatomic-time-crystals-of-the-brain-neuron?redirectedFrom=fulltext
4. Singh et al (2025) Megahertz window through scalp, skull and meninges, https://www.researchgate.net/publication/390314976_Meninges_act_as_a_gate_for_EEG_DDG_only_MHz_frequencies_can_reflect_from_14_layers_defining_consciousness_-_a_clinical_study

Stuart Hameroff Co-Founder, Director, Center for Consciousness Studies; Co-Chair, The Science of Consciousness; Professor Emeritus, Departments of Anesthesiology and Psychology, U of Arizona, Stuart Hameroff MD is a clinical anesthesiologist and researcher on how the brain produces consciousness, and how anesthetics act to erase it. In medical school in the early 1970s, Hameroff became interested in consciousness, and in protein structures called microtubules inside brain neurons which he came to

believe processed information supporting consciousness. In the mid- 1990s he teamed with Sir Roger Penrose to develop the controversial 'Orch OR' theory in which consciousness derives from "orchestrated" ("Orch") microtubule quantum vibrations linked to processes in spacetime geometry, the fine scale structure of the universe, leading to "Penrose objective reduction" ("OR", hence "Orch OR"). And he has further proposed the 'microtubule quantum vibration' theory of anesthetic action. Hameroff organizes the well-known conference series 'The Science of Consciousness', has written or edited 5 books and over a hundred scientific articles, and appeared in films and various TV shows about consciousness. With University of Arizona colleagues Jay Sanguinetti, John JB Allen and Shinzen Young, Hameroff is developing transcranial ultrasound ('TUS') for treatment of mental and cognitive dysfunction (TUS may resonate endogenous megahertz vibrations in brain microtubules). Penrose- Hameroff Orch OR is one of a group of major theories of consciousness in the Templeton World Charity Foundation project 'Accelerating Research on Consciousness' and is currently being tested. experimentally. (Jan 2024 New Scientist Feature Cover on Quantum Consciousness, G. Musser).

Program Session PL-6

PLENARY 7

PL-7

Can Gravity Collapse the Wavefunction? Bose-Einstein Condensates as a Testing Ground

Ivette Fuentes
University of Southampton, Southampton, United Kingdom

Primary Topic Area - TSC Taxonomy

[04.01].....Quantum physics, collapse and the measurement problem

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

The unification of quantum theory and general relativity remains one of the most significant open challenges in fundamental physics. A key obstacle is the lack of experimental data at regimes where quantum and relativistic effects intersect. Developing instruments sensitive to these scales could not only advance our understanding of quantum gravity, but also shed light on deep questions such as the nature of dark energy and dark matter. In this talk, I will explore how Bose-Einstein condensates (BECs) can serve as novel probes in this quest. A single BEC placed in a spatial superposition offers a platform to test whether gravity induces wavefunction collapse—a longstanding question in the foundations of quantum theory. Unlike solids traditionally used in such experiments (e.g. mirrors and nanobeads), BECs consist of unbound atoms, allowing for a richer variety of quantum states that may offer experimental advantages.

Links to Research

https://www.southampton.ac.uk/people/5y92lm/professor-ivette-fuentes-guridi#publications

Ivette Fuentes is a Professor of Physics at the School of Physics & Astronomy, University of Southampton. She is Fellow of the Emmy Network and Fellow by Special Election of Keble College, Oxford. Ivette obtained her PhD at Imperial College London (advisors: Peter L. Knight and Vlatko Vedral). Her postdoctoral experience includes a Glasstone Fellowship and Junior Research Fellowship (Mansfield College) at the University of Oxford and a position at the Perimeter Institute for Theoretical Physics in Waterloo, Canada. Ivette was Assistant Professor at UNAM México, Professor of Mathematical Physics at the School of Mathematical Sciences in Nottingham and Professor of Theoretical Quantum Optics at the University of Vienna. Other distinctions include an Alexander von Humboldt Fellowship (Experienced Researchers) at the Technical University of Berlin and EPSRC Career Acceleration Fellowship, New Directions Award and Inspire Award. Her main research interest is understanding physics at scales where quantum theory and general relativity interplay.

Program Session PL-7

PLENARY 7

PL-7

Ontological Frameworks that Work

Thomas Brophy PhD
IONS, Novato, CA, USA

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Categories by Discipline
1.0 Philosophy

Abstract
The Institute of Noetic Sciences (IONS)' grand challenge is to reenchant the world through bringing conscious qualia and agency into a rigorously expanded scientific paradigm of how reality works. This challenge involves identifying ontological frameworks that can sustain (interpret and understand) the growing body of robust empirical experimental data that point to the existence of nonlocal conscious qualia and agency, and open up a new era of discovery in new ontological domains beyond the physical. This presentation explores the requirements of such a framework generally, and situates specifically the tri-domain ontology of reality proposed by Penrose (Shadows of the Mind 1994) including the Platonic domain together with the physical domain and the mental domain as three fundamental irreducible ontological domains of reality. Applications of such a framework to experimental and observational results are considered (new and many decades of past evidence of nonlocal consciousness effects; near-death, and reincarnational experiences; deep meditative experiences savikalpa samadhi; and the ontological foundations of the UAP phenomenon).

Keywords
Quantum, Collapse, Penrose, Plato, Platonic, Ontology, Qualia, Agency, Nonlocal.

Links to Research
https://noetic.org/science/publications/

Thomas G. Brophy, PhD, is President of the Institute of Noetic Sciences (IONS). He previously served as president of California Institute for Human Science (CIHS). His tenure as president of CIHS oversaw a many-year effort to achieve regional accreditation from the Western Association of Schools and Colleges, Colleges and Universities Commission (WSCUC) in 2021, for CIHS as a unique mind, body, spirit integral university. Earning a BA in physics from Colorado College, and MS and PhD degrees in physics from the University of Colorado (CU), Boulder, Thomas' academic and scientific appointments include: the CU Nuclear Physics Laboratory, the CU Laboratory for Atmospheric and Space Physics (LASP) where he work on NASA's Voyager and Cassini spacecraft projects, and an appointment as a National Science Foundation Exchange Scientist at the University of Tokyo Department of Earth and Planetary Physics and ISAS robotic space program, where he published pioneering work on computational solutions to the Boltzmann equation, the astrodynamical origins of planetary rings and interstellar comets. Thomas explored the fundamental science and ontology of consciousness and its cultural implications in his 1998 book The Mechanism Demands a Mysticism: An Exploration of Spirit, Matter, and Physics. His study of the archaeoastronomy of prehistoric Egypt, published in his co-authored books The Origin Map, and Black Genesis, has been cited as relevant to the study of extraterrestrial, or transhuman, intelligence.

Program Session. PL-7

PLENARY 7

PL-7

Sentiometry – Measuring Peri-somatic Modulation of Diffracted Light by Consciousness and Characterizing the Underlying Physicochemical Mechanisms

Dr Santosh A Helekar MD, PhD
Houston Methodist Research Institute, Houston, Texas, USA. Weill Cornell Medicine, New York, New York, USA

Primary Topic Area - TSC Taxonomy
[02.02].....Methodologies (fMRI, EEG etc.)

Categories by Discipline
2.0 Neuroscience

Abstract

Is the mechanism that gives rise to consciousness simply some manifestation of a neuronal or network level process that modern neuroscience has already uncovered? Or will this mechanism turn out to be an entirely new deeper subcellular physicochemical mechanism that is presently unknown or only hypothetical? We have recently discovered a new type of biophysical effect that suggests the latter possibility. This effect can be recorded in the peri-somatic space with a noninvasive, non-contact photoelectronic device called a Sentiometer (STM) developed in our laboratory. It involves a marked decrease in the magnitude of light wave phenomena such as interference and diffraction caused by proximity of the STM sensor module to the head or any other part of the body of a conscious human subject or a mouse. The source of light waves inside the sensor module is a low power laser light-emitting diode. We have designed and constructed 2 versions of STM producing either double slit interference patterns or single aperture beam diffraction. The peri-somatic sentiometric response (SR) to conscious subjects cannot be accounted for by known physical effects, such as body heat, humidity, electrostatic effects, electromagnetic interference, movement of air, and infrared or ultraweak photon emissions. It is substantially attenuated by general anesthesia, sedation and unconscious states produced by brain damage or dysfunction. Exposure of invertebrates, plants or decapitated heads of mice less than ~3 hours after death to the STM sensor module produces an inverted SR. An inverted response is also produced by certain polymeric materials containing 6-carbon rings such as polystyrene and carbon nanotubes when they interact with water. The amplitude of the polystyrene-water inverted response is reduced when deuterium oxide is substituted for water. It is also modulated by a rapidly changing magnetic field and the direction of such modulation is dependent on the orientation of the magnetic axis relative to some structural feature of polystyrene. The latter observations suggest that the spins of delocalized electrons in polymeric 6-carbon ring structures and the interactions of these electrons with water molecules might play a role in mediating the sentiometric effect, and by extension, possibly, the mechanism that generates consciousness.

Keywords

Consciousness measurement, general anesthesia, disorders of consciousness, brain death, quantum biology, light intensity modulation, molecular mechanisms

Santosh Helekar is a neuroscientist at the Houston Methodist Research Institute (HMRI) in Houston, Texas, USA. He has a medical degree (M.B.B.S.) from the University of Bombay, India and a Ph.D. in Neuroscience from Baylor College of Medicine, Houston, Texas, USA. Presently, he is the Scientific Director of Translational Biomagnetics and Neurometry Program at HMRI and a Professor of Neuroscience Research in Psychiatry at Weill Cornell Medical College, New York, New York. His most recent scientific and technological contributions include the invention of three noninvasive devices with wide-ranging neuroscience applications. The first device called Transcranial Rotating Permanent Magnet Stimulator (TRPMS) is a neuromodulation cap that has shown promise in a pilot phase I/IIa clinical trial for the treatment of chronic ischemic stroke and is being tested now for the treatment of drug-resistant depression. The second device called the Oncomagnetic helmet is being used under FDA's expanded access program to treat end-stage recurrent glioblastoma patients and will shortly be investigated for safety and efficacy alongside standard of care treatment for the treatment of newly diagnosed glioblastoma in a pilot clinical trial. The third device called the Sentiometer was able to detect a previously unrecognized peri-somatic biophysical effect that is attenuated by general anesthesia and by unconsciousness due to brain damage or dysfunction. It is being tested in an ongoing pilot clinical study for safety and efficacy for continuously monitoring the level of consciousness of unresponsive unconscious or delirious patients in the intensive care unit. The Sentiometer appears to be sensitive to an electromagnetically modulated physicochemical process, possibly involving the interactions of delocalized electrons in aromatic organic polymers with water molecules. Consequently, it could provide a window into the fundamental subcellular mechanism that generates consciousness.

Program Session PL-7

PLENARY 8

PL-8

Scaling from Quantum Vacuum Fluctuations to the Brain

Nassim Haramein, William Brown MSc, Cyprien Guermonprez PhD, Olivier Alirol PhD
International Space Federation (ISF), Marnaz, Haute Savoie, France

Primary Topic Area - TSC Taxonomy

[04.02].....Quantum field approaches

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

The ground state of the electromagnetic field is characterized by constitutive energetic fluctuations due to zero-point energy of the quantum harmonic oscillators that compose the field, called quantum vacuum fluctuations. These constitutive oscillations of quantum vacuum energy have been shown to play a significant role in atomic processes, from being a source of the underlying stability of matter to light-matter interactions. It is also regarded to play significant roles at the confluence of astrophysics and quantum information theory with Unruh-Hawking radiation, which is conventionally thought to result in black hole thermalization, and at the cosmological scale with the Hubble Constant, which is related to the expansion rate of the universe. Here we identify a mechanism in which the ultra-high

frequency oscillations of the electromagnetic quantum vacuum fluctuations couple across scales via a spring constant, k, representative of an angular momentum conservation from fine scale spacetime dynamics to the biological scale of molecules and cells. We find this characteristic coupling constant accurately predicts the vibrational frequencies empirically observed. We scale from the Planck scale to the biological scale, through carbon atoms to benzene ring aromatic hydrocarbon molecules, to the triplet-of-triplet frequencies measured in microtubules, and gamma oscillation of neurons, thus identifying the mechanism of coupling of quantum harmonic oscillators across scales. As such, vibrational energy transfer is described within a nested architecture of coupled oscillators, sourced in a Planck pulse frequency of coherent electromagnetic quantum vacuum fluctuations demonstrated utilizing correlation functions. These findings describe the role of quantum vacuum energy in coupling molecular oscillators and being the source of the non-classical non-trivial quantum states that have been experimentally observed in biological macromolecular networks. This suggests that these states are more common and more robust than would be presumed in models without a driving source like the zero-point energy coupling we have computed. These findings open a door to new biophysical insights implying a significant role in dynamic quantum fluctuations at the biological scale.

Keywords

Quantum vacuum fluctuations Zero-point energy coupling Nested oscillator architecture Biophysical quantum coherence Scale coupling dynamics

Links to Research

https://spacefed.com/isf-research/

Nassim Haramein is a Swiss born, 35-year veteran physicist working on a complex problem in physics — Unification Theory (the unification of General Relativity and Quantum Mechanics). Haramein has researched fields of physics, mathematics, cosmology, quantum mechanics, biophysics, as well as cultural anthropology and archeology. These studies led to a unification theory published in scientific papers, and subsequent numerous patented inventions. Haramein has worked in collaborative efforts with some renown physicists and currently holds a director of research position at the International Space Federation organization which includes doctors in physics from some of the most reputable physics universities in the world. He has founded research organizations and successful corporations throughout the last two decades.

Program Session PL-8

PLENARY 8

PL-8

Self-operating mathematical universe, SOMU: Why do we need a non-physical reality to explain a physical system?

Anirban Bandyopadhyay

National Institute for Materials Science, Tsukuba, Ibaraki, Japan

Primary Topic Area - TSC Taxonomy

[01.09].....Philosophical theories of consciousness

Categories by Discipline

5.0 Experiential Approaches

Abstract

When we measure atomic scale systems and quantum properties emerge, we often think that the property is emergent from spatio-temporal dynamics. This is not true, there is an imaginary world where the properties arise. It is unfortunate that for nearly a century, scientists have put a significant effort into modeling observations with predictive spatiotemporal features, here we argue that a set of human subject experiments and our measurement of various biological systems show that a black box imaginary world needs to be unveiled. We need to understand and mathematically derive this imaginary or non-physical world. The black box needs to be explicitly understood. We will demonstrate why helical symmetry and dynamics of the density of primes are two fundamental features that could generate a mathematical universe framework, from which spatio-temporal worlds basic parameters could be derived.

Keywords

Brain signal measurement, cognitive experiment, human subject study

Program Session PL-8

PLENARY 9

PL-9

Cognition emerges from neural dynamics

Earl K. Miller

MIT, Dept of Brain and Cognitive Sciences, Picower Institute, Cambridge, MA, USA

Primary Topic Area - TSC Taxonomy

[02.13].....Brain networks, synchrony and scale

Categories by Discipline

2.0 Neuroscience

Abstract

Classic models likened brain function to neuron networks, like telegraph systems. Emerging evidence, however, suggests higher cognition relies on rhythmic oscillations or "brain waves" at the electric field level. This expands functionality, with "telegraph wires" also producing "radio waves" (electric fields) that rapidly spread influence. These fields may facilitate large-scale organization, enabling executive control and energy- efficient analog computing.

Keywords

neuron networks, rhythmic oscillations, brain waves, electric fields, telegraph wires, radio waves, energy efficient analog computing

Earl Keith Miller is a cognitive neuroscientist whose research focuses on neural mechanisms of cognitive, or executive, control. Earl K. Miller is the Picower Professor of Neuroscience with the Picower Institute for Learning and Memory and the Department of Brain and Cognitive Sciences at Massachusetts Institute of Technology. He is the Chief Scientist and co-founder of SplitSage. Earl Miller received a Bachelor of Arts degree (summa cum laude, with honors) in psychology from Kent State University in 1985, Master of Arts degree in psychology and neuroscience from Princeton University in 1987, and a PhD in psychology and neuroscience from Princeton University in 1990. In 2020, Earl Miller was awarded an honorary doctorate (Doctor of Science, honoris causa) from Kent State U.

Program Session PL-9

PLENARY 9

PL-9

The dendritic decoupling hypothesis of anesthesia

Matthew Larkum

Humboldt Universität zu Berlin Institut für Biologie, Berlin, Charitéplatz, Germany

Primary Topic Area - TSC Taxonomy

[04.08].....Quantum brain biology

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

Despite almost two centuries of clinical use, how general anesthetics reversibly suppress consciousness remains elusive. In the 2022 TSC meeting, I presented the evidence that anesthetics disrupt the functional coupling between distal and proximal segments of cortical pyramidal neurons, suggesting this decoupling could underlie anesthesia (Suzuki & Larkum, 2020). We have previously shown that perception is intimately associated with activating the apical dendrites of the large layer 5 pyramidal neurons that complete the thalamocortical loop (Larkum, 2013; Takahashi et al., 2016 & 2020). The disruption of signalling from along the apical dendrites of these neurons under anesthesia (and by metabotropic receptor blockers) therefore constitutes a candidate mechanism for loss of consciousness. In this presentation, I will show in vitro data confirming that metabotropic receptor activation strengthens dendro-somatic coupling, while anesthetics weaken it. Moreover, disrupting the microtubules extending through the apical shaft also reduces dendritic influence on the cell body. These findings strengthen the view that dendro-somatic coupling is central to cortical feedback and may be the key to understanding how anesthetics block conscious processing.

Program Session PL-9

PLENARY 9

PL-9

A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications

Robert Lawrence Kuhn PhD
Closer To Truth, New York, NY, USA

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Categories by Discipline
1.0 Philosophy

Abstract
I seek an organizing framework for diverse explanations or theories of consciousness and to explore their impact on big questions. My central theses: (i) understanding consciousness at this point cannot be limited to selected ways of thinking or knowing, but should seek expansive yet rational diversity, and (ii) issues such as AI consciousness, virtual immortality, meaning/purpose/value, life after death, free will, etc., cannot be understood except in the light of particular theories of consciousness. I array diverse explanations or theories of consciousness on a roughly physicalist-to-nonphysicalist landscape of essences and mechanisms. Categories: Materialism Theories (philosophical, neurobiological, electromagnetic field, computational and informational, homeostatic and affective, embodied and enactive, relational, representational, language, phylogenetic evolution); Non-Reductive Physicalism; Quantum Theories; Integrated Information Theory; Panpsychisms; Monisms; Dualisms; Idealisms; Anomalous and Altered States Theories; Challenge Theories. There are many subcategories, especially for Materialism Theories. A Landscape of Consciousness, I suggest, offers perspective.

Keywords
Consciousness, Theories, Materialism, philosophical, neurobiological, electromagnetic field, computational, informational, homeostatic, affective, embodied, enactive, relational, representational, language, phylogenetic, Non-Reductive Physicalism, Quantum Theories, Integrated Information Theory, Panpsychism, Monism, Dualism, Idealisms, Anomalous cognition, Altered States Theories.

Links to Research
https://www.sciencedirect.com/science/article/pii/S0079610723001128?via%3Dihub
https://iai.tv/articles/seeing-the-consciousness-forest-for-the-trees-auid-2901
https://qspace.fqxi.org/news/165289/a-landscape-of-consciousness
https://scitechdaily.com/challenging-reality-a-scientist-maps-the-landscape-of-consciousness/
https://www.eurekalert.org/news-releases/1062716

Robert Lawrence Kuhn is the creator, writer, host, and executive producer of Closer To Truth, the long-running PBS/public television series and leading global resource on Cosmos (cosmology/physics, philosophy of science), Life (philosophy of biology), Mind (consciousness, brain/mind, philosophy of mind), and Meaning (theism/atheism/agnosticism, global philosophy of religion, critical thinking). Kuhn's comprehensive review article on theories of consciousness – "A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications" – is published in Progress in Biophysics and Molecular Biology (August 2024, pp. 28-169). In its review, IAI News says, "Kuhn has written perhaps the most comprehensive article on the landscape of theories of consciousness in recent memory." Kuhn has written or edited over 30 books, including The Mystery of Existence: Why is there Anything At All? (with John Leslie); Closer To Truth: Challenging Current Belief; Closer To Truth: Science, Meaning and the Future; The Library of Investment Banking; How China's Leaders Think (featuring President Xi Jinping); The Man Who Changed China: The Life and Legacy of Jiang Zemin(China's best-selling book in 2005 and in December 2022); and "The Origin and Significance of Zero: An Interdisciplinary Perspective" (with Peter Gobets). Kuhn is a recipient of the China Reform Friendship Medal. Kuhn is chairman of The Kuhn Foundation. He has a BA in Human Biology (Johns Hopkins), PhD in Anatomy/Brain Research (UCLA), and SM (MBA) in Management (MIT).

Program Session PL-9

PLENARY 10
PL-10

Computational capacity of life in relation to the universe

Dr. Philip Kurian Ph.D.
Quantum Biology Laboratory, Howard University, Washington, DC, USA

Primary Topic Area - TSC Taxonomy
[04.10].....Origin and nature of life

Categories by Discipline
4.0 Physical and Biological Sciences

Abstract
Networks of tryptophan – an aromatic amino acid with strong fluorescent response – are ubiquitous in biological systems, forming diverse architectures in transmembrane proteins, cytoskeletal filaments, sub-neuronal elements, photoreceptor complexes like UVR8, virion capsids, and other cellular structures. We analyzed the cooperative effects induced by ultraviolet (UV) excitation of several biologically relevant tryptophan mega-networks, thus giving insight into novel mechanisms for cellular signalling and control. Our theoretical analysis in the single-excitation manifold predicted the formation of strongly superradiant states due to collective interactions among organized arrangements of up to more than 100,000 tryptophan UV-excited transition dipoles in microtubule architectures, which leads to an enhancement of the fluorescence quantum yield that is confirmed by our steady-state experiments [1]. Preliminary femtosecond UV transient absorption results indicated superradiant state lifetimes of no more than a few picoseconds, consistent with our predictions. We demonstrated the observed consequences of single-photon superradiant behavior in the fluorescence quantum yield for hierarchically organized tubulin structures, which increases in different geometric regimes at thermal equilibrium before saturation – highlighting the effect's persistence in the presence of significant disorder. Contrary to conventional assumptions that quantum effects cannot survive in large biosystems at high temperatures, our numerical results [2] suggest that macropolymer lattices of tryptophan in actin filaments and amyloid fibrils exhibit increasingly observable and robust effects with increasing length, due to quantum coherent interactions in the single-photon limit. Superradiant enhancement and high quantum yield in neuroprotein polymers would thus play a crucial role in information processing in the brain, the development of neurodegenerative diseases such as Alzheimer's and related dementias, and a wide array of other pathologies characterized by anomalous protein aggregates. Our results motivated a revisiting of the computing limits of cytoskeletal and neuronal architectures [3], which are generally considered to signal via Hodgkin-Huxley action potentials (~millisecond) rather than via superradiant states in such tryptophan lattices (~picosecond). The latter would allow information-processing pulses or bursts at orders of magnitude faster speeds than exascale supercomputers, at significantly lower power consumptions, by operating within two orders of magnitude of the Margolus-Levitin quantum speed limit for UV-excited states. The robustness of superradiant states paired with subradiant states (~second) in these protein architectures thus offers a novel paradigm for understanding the role of large collectives of quantum emitters in warm, wet, and wiggly environments.
REFERENCES [1] N.S. Babcock, G.M.-Cabrera, K.E. Oberhofer, M. Chergui, G.L. Celardo, and P. Kurian. Ultraviolet superradiance from mega-networks of tryptophan in biological architectures. Journal of Physical Chemistry B 128, 4035–4046 (2024). [2] H. Patwa, N.S. Babcock, and P. Kurian. Quantum-enhanced photoprotection in neuroprotein architectures emerges from collective light-matter interactions. Frontiers in Physics 12, 1387271 (2024). [3] P. Kurian. Computational capacity of life in relation to the universe. Science Advances 11, eadt4623 (2025).

Keywords
quantum biology, superradiance, subradiance, protein architectures, biological qubits, ultraviolet, tryptophan, quantum emitters, Margolus-Levitin speed limit, computational capacity of life, quantum computing, quantum information processing, origins of life, habitable zones, cosmology, observable universe

Links to Research
https://www.eurekalert.org/news-releases/1077836
https://www.science.org/doi/10.1126/sciadv.adt4623
https://www.eurekalert.org/news-releases/1042789
https://pubs.acs.org/doi/10.1021/acs.jpcb.3c07936
https://www.eurekalert.org/news-releases/1055890
https://www.frontiersin.org/journals/physics/articles/10.3389/fphy.2024.1387271/full
https://www.quantumbiolab.com/news.html

Dr. Philip Kurian is a theoretical physicist, (re)search(ing) scientist, and essayist, serving as principal investigator and founding director of the Quantum Biology Laboratory (https://quantumbiolab.com/) at Howard University. Beginning his career as a math teacher in North Philadelphia, he completed his doctorate in physics after a stint at NASA Goddard Space Flight Center. Dr. Kurian is now the recipient of fellowships, grants, and awards from the Alfred P. Sloan Foundation, U.S.-Italy Fulbright Commission, Guy Foundation Family Trust (UK), National Science Foundation, and the National Institutes of Health. The Quantum Biology Laboratory studies how collective and cooperative quantum behaviors can explain biological phenomena at the mesoscopic, organismal, and clinical scales, including in neurodegeneration, cancer, and human consciousness. His group's pioneering work on single-photon superradiance in eukaryotic protein filaments and neuron fibers has been featured by *Science*, *The Quantum Insider*, Oak Ridge Leadership Computing Facility, *SPIE Photonics Focus*, *Optica*, *Laser Focus World*, *BioPhotonics*, *Howard Magazine*, *TEDx*, and by prominent science channels including *Science News with Sabine* and *PBS Space Time*. Dr. Kurian is a Fellow of the UCSB Kavli Institute for Theoretical Physics, and a Simons Scholar and Senior Fellow at the UCLA Institute for Pure and Applied Mathematics. He was appointed to the chairing committee for the National Academies of Sciences, Engineering, and Medicine workshop on quantum-enabled sensing and imaging for biology. Dr. Kurian also serves as a scientific advisor to the "Science for Seminaries" program of the AAAS Dialogue on

Science, Ethics, and Religion, which seeks to integrate frontier science questions into conversations among future theologians and clergy. His essays on science, human knowledge systems, and empire have appeared in various media outlets, including the *Los Angeles Review of Books*, *Granta*, and *Plough*. For more information, please visit https://profiles.howard.edu/philip-kurian.

Program Session PL-10

PLENARY 10

PL-10

The Science of Quantum Biology and Its Implications for Consciousness

Prof. Dante S Lauretta Ph.D.

Director, Arizona Astrobiology Center, Principal Investigator, OSIRIS-REx, Regents Professor
University of Arizona, Tucson, AZ, USA

Primary Topic Area - TSC Taxonomy

[04.10].....Origin and nature of life

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

Quantum biology is an emerging field exploring the role of quantum mechanical principles—coherence, entanglement, and superposition—in biological systems. While classical biochemistry has successfully explained many life processes, growing evidence suggests that quantum effects may play a nontrivial role in molecular and cellular functions, particularly in the brain. Understanding these quantum influences is essential for advancing our knowledge of consciousness, cognition, and the fundamental nature of life itself. Recent research indicates that quantum coherence in biomolecules may contribute to biological information processing. One area of focus is the cytoskeleton, particularly microtubules, which provide structural support in neurons and facilitate intracellular communication. Microtubules contain aromatic amino acids such as tryptophan, which exhibit unique quantum optical properties. Studies have suggested that superradiance, excitonic energy transfer, and quantum coherence in tryptophan networks could enable efficient energy transport and contribute to cellular signaling and cognitive function. Using high-resolution spectroscopy, Förster resonance energy transfer (FRET), and computational modeling, researchers are investigating whether these quantum processes provide an additional layer of biological information storage and processing beyond classical biochemistry. Another critical area of investigation is the quantum nature of anesthesia. Empirical evidence shows that anesthetic potency can vary depending on the nuclear spin of xenon isotopes, suggesting a potential quantum effect in neural activity suppression. This challenges conventional models of anesthesia, which assume purely biochemical interactions. Studies employing multi-electrode arrays, high-resolution NMR spectroscopy, and spin resonance techniques are examining how quantum coherence in neural proteins and lipid membranes might influence consciousness states. These findings could lead to a deeper understanding of how quantum mechanics contributes to brain function and perception. The implications of quantum mechanics extend beyond individual cognition to biological evolution and the origins of life. A growing body of research suggests that quantum effects in nucleic acids and amino acids may have played a role in molecular self-organization and early evolutionary complexity. The indole ring of tryptophan, for instance, possesses quantum properties that may have facilitated non-classical information processing in prebiotic chemistry. Additionally, theoretical models incorporating quantum complexity theory propose that evolutionary processes could be driven by quantum information dynamics, accelerating biomolecular adaptation and functional diversity. From a technological perspective, the integration of quantum biology into applied science is opening new frontiers. Advances in quantum-enhanced biotechnologies, neuromorphic computing, and bio-inspired quantum sensors offer promising avenues for medical and environmental applications. By leveraging biomolecular quantum coherence, researchers are developing novel biosensors and computational architectures that could revolutionize fields such as neuroscience, pharmacology, and artificial intelligence. The convergence of quantum mechanics, molecular biology, and neuroscience represents a paradigm shift in how we understand life and consciousness. By moving beyond classical descriptions of biology and integrating quantum principles, researchers are uncovering new mechanisms of cognitive processing, novel insights into the origins of life, and revolutionary applications in technology. As experimental techniques advance, the science of quantum biology has the potential to reshape fundamental theories of consciousness and redefine our understanding of the living world.

Keywords

Quantum Biology, Coherence, Cytoskeleton, Complexity Theory, Evolution,

Dr. Dante S. Lauretta is a distinguished scientist known for his pioneering contributions to planetary science and astrobiology. As a Regents Professor at the University of Arizona, he leads groundbreaking research initiatives that explore the mysteries of our solar system and the origins of life. Dr. Lauretta is at the forefront of scientific exploration, and his work has made a profound impact on our understanding of the cosmos. One of his most remarkable achievements is his leadership role in the NASA OSIRIS-REx asteroid sample return mission. Dr. Lauretta's vision and expertise guided this ambitious mission, which successfully collected samples from the asteroid Bennu and returned them to Earth. This achievement represents a significant milestone in space exploration and offers invaluable insights into the formation of our solar system. Dr. Lauretta's research interests are multifaceted, encompassing the

formation of the solar system, the habitability of Earth, the origins of life, and the intricate connection between life and consciousness. His unwavering commitment to unraveling scientific mysteries has earned him a well-deserved reputation as a trailblazer in his field. Beyond his scientific endeavors, Dr. Lauretta is a dedicated collaborator, mentor, and educator. He plays a pivotal role in shaping the future of cosmochemists and astrobiologists, providing guidance and inspiration to the next generation of scientists. He is the driving force behind the establishment of the Arizona Astrobiology Center, a testament to his commitment to fostering scientific excellence.

Program Session PL-10

PLENARY 10

PL-10

Does Physics Need a Revolution to Explain Life, Living Systems, and Consciousness?

Anita Goel MD, PhD
Chairman, CEO & Scientific Director, Nanobiosym Research Institute Chairman & CEO, Nanobiosym Diagnostics, Inc, Boston, MA, USA

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology
Categories by Discipline
4.0 Physical and Biological Sciences
Secondary Topic Area - TSC Taxonomy
[04.02]…Quantum field approaches
Abstract
Our current physics was primarily developed in the 20th century, in the context of inanimate matter and closed reductionistic systems, that operate at (or near) equilibrium. Living systems are, however, fundamentally open systems that operate far from equilibrium and are strongly coupled to and continuously exchange matter, energy, and information with their environment. Einstein, Schrodinger, and Penrose have argued that our physics (especially quantum mechanics) is perhaps missing some new physical principles to provide a more complete description of reality. I will share some of our work at Nanobiosym to elucidate this “new physics” using a new conceptual physics framework and a novel experimental testbed to probe nanoscale quantum effects in biological systems, such as nanomachines that read and write information in DNA.
Keywords
new conceptual physics framework, nanoscale quantum effects in biological systems, nanomachines, DNA, quantum mechanics
Links to Research
https://www.nanobiosym.com/our-team/
https://sites.harvard.edu/goel/

Dr. Anita Goel, MD, Ph.D. is a world-renowned expert and global entrepreneur in the field of Nanobiophysics – an emerging science at the convergence of physics, nanotechnology, information science, and biomedicine. At the Nanobiosym Research Institute (NBS), Dr. Goel is pioneering the new physics of life, living systems, and consciousness. She and her team are elucidating the physics of one of the most fundamental processes of living matter, the way nanomachines read and write information into DNA, how this process is influenced by the environment, and how quantum mechanics might play a “nontrivial” role in their dynamics. Dr. Goel holds a Ph.D. and M.A. in Physics from Harvard University, an MD from the Harvard-MIT Joint Division of Health Sciences and Technology (HST) at Harvard Medical School, and a BS in Physics with Honors & Distinction from Stanford University.

Program Session PL-10

PLENARY 11

PL-11

Evidence for worldwide modulation of physical randomness correlated with coherent consciousness during New Year's Eve celebrations:

Dean Radin PhD
Institute of Noetic Sciences, Novota, California, USA

Primary Topic Area - TSC Taxonomy
[05.09].....Parapsychology
Categories by Discipline
4.0 Physical and Biological Sciences

Abstract

This study explored the hypothesis that during moments of collective human focus and emotional resonance unexpected coherence will emerge in random physical systems. This mind-matter interaction hypothesis was tested during New Years Eve celebrations in each time zone using data from the Global Consciousness Project, a worldwide network of electronic truly random number generators. Analyses of data spanning the years 1998 to 2025 —including simple measures like mean shifts as well as changes in entropy, chaotic attractors, fractal dimensions, and Principal Components Analysis (PCA) —revealed statistically significant deviations at or within minutes of the stroke of midnight on New Years Eve, as compared to the same analysis applied to midnight transitions every other day of the year and to randomized permutation techniques (e.g., p = 4.8 × 10^−7 for the PCA analysis). The study also found that the statistical deviations were stronger in time zones with higher vs. lower populations, suggesting that the magnitude of this psychophysical interaction was related to the number of minds engaged in a coherent focus of attention. Alternative mundane explanations, including possible environmental artifacts, were considered but deemed unlikely because the RNGs were specifically designed to exclude such influences. An imaginative roundtable discussion among the founders of quantum mechanics is used as a vehicle to discuss these results.

Keywords

collective consciousness, mind-matter interaction, psychophysical phenomena, philosophical models

Links to Research

https://www.deanradin.com/recommended-references

Dean Radin is Chief Scientist at the Institute of Noetic Science (IONS), Associated Distinguished Professor at the California Institute of Integral Studies, and co-founder and chairman of the genetic neuroengineering company, Cognigenics, Inc. His early career track as a concert violinist shifted into science after earning a BS degree in electrical engineering (*magna cum laude*, with honors in physics) from the University of Massachusetts, Amherst, and an MS in electrical engineering and PhD in psychology from the University of Illinois, Urbana-Champaign. In 2022, he was awarded an honorary DSc (doctor of science) from the Swami Vivekananda University near Bangalore, India. For over four decades his research has focused on the nature and capacities of consciousness, primarily its nonlocal aspects. Before joining the IONS research staff in 2001, he worked at AT&T Bell Labs, Princeton University, University of Edinburgh, and SRI International, where he spent a year on the now declassified "Star Gate" program of psychic espionage for the US government. Radin is author or coauthor of seven patents or patents pending in the area of neurogenetic medicine, one in mind-matter interaction, over 340 scientific, technical, and popular articles, book chapters, and best-selling books including *The Conscious Universe*, *Entangled Minds* (2006), *Supernormal* (2013), *Real Magic* (2018), and *Enchantment* (coming in 2025).

His 170+ scientific articles can be found in peer-reviewed journals ranging from *Foundations of Physics* to *PLOS One, PNAS Nexus, Nature Translational Psychiatry, Genomic Psychiatry, Frontiers in Human Neuroscience, Psychological Bulletin, Brain and Cognition, and Psychology of Consciousness*. He serves as a referee for 25 journals, was featured in a *New York Times Magazine* article, and has appeared on dozens of television programs around the world. His 780+ interviews and talks have included presentations at Harvard (medical), Stanford (statistics), Princeton (psychology), Columbia (education), Cambridge (physics), Edinburgh (psychology), the Sorbonne (parapsychology), University of Padova (physics), University of British Columbia (parapsychology), Jawaharlal Nehru University (philosophy), and University of Allahabad (cognitive neuroscience). Radin's invited talks for industries have included Merck, Google, Johnson & Johnson, and Rabobank, and his government talks have included the National Academy of Sciences, the Naval War College, Army Special Operations Command, Naval Postgraduate School, DARPA, the Indian Council of Philosophical Research (India), the International Center for Leadership and Governance (Malaysia), and the Australian Davos Connection (Australia).

Program Session PL-11

PLENARY 11

PL-11

Morphic Resonance and the Memory of Nature

Rupert Sheldrake PhD

Temenos Academy, London, United Kingdom

Primary Topic Area - TSC Taxonomy

[02.06].....Memory and learning

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

According the hypothesis of morphic resonance, memory is inherent in nature and the so-called laws of nature are more like habits. All self-organizing systems, including crystals, living organisms, stars and galaxies are organized by morphic fields which contain an inherent memory, given by a process called morphic resonance from previous similar systems. All species have a collective memory, on which each individual draws and to which it contributes. Self-organizing systems are sustained by self-resonance from their own

past, and even individual memory depends on morphic resonance rather than on physical memory traces stored within the brain. The hypothesis has many implications for information and consciousness in the universe.

Keywords

Morphic Resonance, memory, memory traces, collective memory

Links to Research

R. Sheldrake (2011) *A New Science of Life*. Icon Books, London

Rupert Sheldrake PhD is a biologist and author of more than 100 papers in peer-reviewed journals and nine books, including *The Presence of the Past*. He was a fellow of Clare College, Cambridge, where he was director of studies in cell biology, and also a research fellow of the Royal Society. From 2005-2010, he was Director of the Perrott-Warrick Project for the study of unexplained human and animal abilities, funded from Trinity College, Cambridge. He is currently a fellow of the Institute of Noetic Sciences in California and of the Temenos Academy in London. He lives in London and is married to Jill Purce. His web site is www.sheldrake.org

Program Session. PL-11

PLENARY 12

PL-12

New clues to Terminal Lucidity in mentally-impaired adults: Exploring permissive vs. productive hypotheses for brain function

Marjorie Woollacott PhD

University of Oregon, Eugene, Oregon, USA

Primary Topic Area - TSC Taxonomy

[05.08].....Near-death and anomalous experiences

Categories by Discipline

3.0 Cognitive Science and Psychology

Abstract

To penetrate the mysteries of the nature of consciousness, it is vitally important to expand our understanding of death-related phenomena. One of these, Terminal lucidity (TL), the unexpected surge of mental clarity shortly before death in a dying person, has been typically studied in cases of advanced dementia. The nature and contributing factors to TL are poorly understood, as it often occurs in individuals whose neurological decline is believed to be irreversible. For example, patients have been reported to experience sudden enhanced thinking and mobility, to access lost memories and to recognise and converse with friends and family, and often to say goodbye. Previous studies have largely involved individual clinical cases (Nahm & Greyson, 2009; Nahm et al., 2012). Though valuable, these cases have not been systematically collected and thus may not include key phenomena contributing to identification of possible mechanisms. This study explored this phenomenon further, identifying and describing psychological and physiological variables witnessed in TL in a medically diverse sample of adults across the lifespan to begin to identify factors contributing to TL. We created an online questionnaire which captured a range of significant details about subjects who had experienced a TL episode, including underlying medical condition, treatment regimen (and recent changes), physical and mental capacities just before the TL episode, and behaviors that occurred during the episode itself. We have received 69 responses to the survey, 38 of which met our rigorous criteria for inclusion as TL. Preliminary results: Medical condition prior to the TL episode included dementia/Alzheimer's, various cancer diagnoses, stroke, and other end-of-life conditions. The most frequent duration of TL in this sample lasted 10 minutes or less and roughly half of the patients died within 24 hours after TL. When clinical staff or caregivers were asked if changes in the patient's condition or medication/treatment prior to their terminal lucidity episode could have been responsible for the TL experience, 32 of 38 said this was not the case (3 unsure, 3 yes). And in 27 of 38 cases, the witness reported a shift from severe cognitive impairment (including nonresponsive/coma) prior to TL, to little or no cognitive impairment during TL. When asked if the person had lost physical abilities, but regained them during the episode, 28/38 witnesses confirmed that this was the case. Example: "The lady had been unresponsive for days and was in the terminal phase of life. I came in expecting that she had died overnight and found her sitting up eating breakfast- chatting with her family. I explained to the family that her bright condition may not last - and she died that night." Our findings suggest that a specific medical diagnosis or physical condition did not appear to account for the arising of TL or the characteristics of the TL episode and offer possible support for the hypothesis that the brain is a permissive organ rather than a productive one. Project Team members include: M.Woollacott, N.Tassell-Matamua, K.Kothe, C.Roe, M.Nahm, B.Greyson, M.Mutis, R.Evrard, A.Gomez-Marin, and A.Kellehear.

Keywords

terminal lucidity, consciousness, dementia, dying, Alzheimers

Links to Research

Roehrs, P, Fenwick, P, Greyson, B, Kellehear, A, Kothe, K, Nahm, M, Roe, C, Tassell-Matamua, N, PhD, **Woollacott, M.** Terminal Lucidity in a Pediatric Oncology Clinic, *J. Nervous and Mental Disease,* 2024 Jan 1;212(1):57-60. doi: 10.1097/NMD.0000000000001711. Epub 2023 Sep 13.PMID: 37734159.

Woollacott, M. Near Death Experience: Memory recovery during hypnosis. Explore (NY). 2024 Nov-Dec;20(6):103036. doi: 10.1016/j.explore.2024.103036. Epub 2024 Jul 24.PMID: 39096700

Marjorie Woollacott, Ph.D., is Professor in the Institute of Neuroscience and prior chair of the Dept. of Human Physiology at the University of Oregon. She taught courses in neuroscience and rehabilitation medicine, as well as complementary medicine and meditation. She is President of the Academy for the Advancement of Post-Materialist Sciences (AAPS) and Research Director for the International Association of Near-Death Studies (IANDS). Woollacott has received over 7.2 million dollars in research funding for her research in child development, rehabilitation medicine and most recently, meditation, spiritual awakening and end-of-life experiences. She has published more than 200 scientific articles and written or co-edited nine books. Her latest book, *Infinite Awareness* (2015) (winner of eight awards, including the 2017 Parapsychological Association Book Award, Eric Hoffer Book Award and the Nautilus Book Award) pairs Woollacott's research as a neuroscientist with her self-revelations about the mind's spiritual power. She has been a popular key-note speaker at international conferences, including the *Beyond the Brain Conference* of the Scientific and Medical Network in London, and the International Association for Near-Death Studies (IANDS) conference in the United States. She has also been featured in the documentary *Who We Are* and in many podcasts, including *Beyond Belief*, in the episode titled, "You Are not Your Brain" (link: https://www.audacy.com/podcast/beyond-belief-ad0f9/episodes/you-are-not-your-brain-0e543), the *New Thinking Allowed* podcast with Jeffrey Mishlove, speaking on "The Mind Brain Interface" (link: https://www.audacy.com/podcast/beyond-belief-ad0f9/episodes/you-are-not-your-brain-0e543), and *The Essential Foundation* podcast, speaking on "Consciousness without Neurons" https://www.youtube.com/watch?v=YvoT_05JgbE

Program Session PL-12

PL-12

If consciousness survives, materialism dies: re-appraising the "permissive brain" hypothesis at the edges of consciousness

Prof. Alex Gomez-Marin PhD

Instituto de Neurociencias, Alicante, Alicante, Spain

Primary Topic Area - TSC Taxonomy

[02.04].....Other sensory modalities

Categories by Discipline

2.0 Neuroscience

Abstract

What happens with the mind when the brain dies? This question can be scientifically approached in a two-fold manner. First, the study of end-of-life brain activity can shed light on how our brains function under extreme conditions. The topic would thus lie within what Thomas Kuhn called "normal science", namely, solving puzzles circumscribed to the boundaries of the dominant paradigm. Second, seriously entertaining the possibility that there can be mind activity when the brain is literally dead ventures our quest into the realm of "scientific revolutions". To put it plainly: if consciousness survives bodily death, materialism dies. I will explore this possibility from three sources: my own near-death experience in March of 2021, my training as a PhD in theoretical physics, and my career as a neuroscientist. Bringing the visionary insights of William James back to the future, I will revisit the "productive versus permissive" brain hypotheses and contrast them in the context of empirical data at the edges of consciousness. I will start with converging evidence within Survival research, then move into Psychical research (one does not need to almost die to experience or investigate minds beyond brains), and finally dare to speculate about the connection of these two fields with the renewed interest in Unidentified Anomalous Phenomena (good old-fashioned UFOs) and the prospects of Artificial Consciousness (and the dangerous bullshit around it). The singularity is near, but it is probably not what you think.

Keywords

near-death experience, permissive brain, end of materialism, anomalous phenomena; theoretical physics

Àlex Gómez-Marín is a theoretical physicist and neuroscientist. He earned his bachelor's and PhD degrees in physics at the University of Barcelona. He later worked as a postdoctoral researcher at the EMBL-CRG Centre for Genomic Regulation and at the Champalimaud Centre for the Unknown in Lisbon. Since 2016, he has been a principal investigator at the Institute of Neurosciences in Alicante. He is currently an associate professor at the Spanish National Research Council (CSIC) and the director of the Pari Center in Tuscany, Italy, a center dedicated to exploring the intersection of science, art, and the sacred. His research focuses on studying the human mind in the real world, including what he calls "the edges of consciousness," a strange and wonderful field where enigma often meets stigma.

Program Session PL-12

PL-12

Potential neural signatures of near-death consciousness in humans

Jimo Borjigin PhD, Gang Xu PhD
University of Michigan, Ann Arbor, MI, USA

Primary Topic Area - TSC Taxonomy

[02.01].....Neural correlates of consciousness (general)

Categories by Discipline

2.0 Neuroscience

Abstract

The brain is assumed to be hypoactive during cardiac arrest. However, animal models of cardiac and respiratory arrest demonstrate a surge of gamma oscillations and functional connectivity. To investigate whether these preclinical findings translate to humans, we analyzed electroencephalogram and electrocardiogram signals in four comatose dying patients before and after the withdrawal of ventilatory support. Two of the four patients exhibited a rapid and marked surge of gamma power, surge of cross-frequency coupling of gamma waves with slower oscillations and increased interhemispheric functional and directed connectivity in gamma bands. High-frequency oscillations paralleled the activation of beta/gamma cross-frequency coupling within the somatosensory cortices. Importantly, both patients displayed surges of functional and directed connectivity at multiple frequency bands within the posterior cortical “hot zone,” a region postulated to be critical for conscious processing. This gamma activity was stimulated by global hypoxia and surged further as cardiac conditions deteriorated in the dying patients. These data demonstrate that the surge of gamma power and connectivity observed in animal models of cardiac arrest can be observed in select patients during the process of dying. They also suggest the existence of neural correlates of near-death consciousness underlying near-death experiences reported by survivals of cardiac arrest.

Keywords

near-death, consciousness, brain, EEG, near-death experience

Links to Research

https://pnas.altmetric.com/details/1683942
https://pnas.altmetric.com/details/3881364
https://pnas.altmetric.com/details/147133459

Jimo Borjigin is an Associate Professor of Physiology and Neurology at the University of Michigan Medical School. She received her BS in Physics, MS in Biophysics from Tohoku University in Sendai, Japan, and PhD in Neuroscience from the Johns Hopkins University in Baltimore, USA. After conducting her postdoctoral training at the Hopkins, she was invited to become a staff associate at the Carnegie Institution of Washington Embryology Department. In 2003, she moved to the University of Michigan as an Assistant Professor, focused her research initially on the use of melatonin as an in vivo tool to understand circadian rhythms; and since 2013, on the neural correlates of consciousness in the dying brain.

Jimo Borjigin, Ph.D.
Michigan Neuroscience Institute Affiliate
Associate Professor of Molecular & Integrative Physiology
Associate Professor of Neurology

Areas of Interest

The main research interests of the Borjigin lab include:

- Mechanisms of sudden cardiac arrest and the role of the brain during cardiac arrest (brain-heart coupling).
- Neural basis of covert consciousness in normal and abnormal brain states in human subjects.
- Mechanisms of endogenous DMT synthesis.
- Visualizing covert brain (and heart) activities in patients with neurological, psychological, and psychiatric disorders, to assist with their clinical prognosis, diagnosis, and treatment.

Honors & Awards

- The John Merck Scholars Award – 1999
- Michigan Biological Sciences Scholar Program Award - 2003

Credentials

Ph.D., Neuroscience, The Johns Hopkins Medical Institution, Baltimore, MD (1994)

Published Articles or Reviews

- Xu, G., Mihaylova, T., Li, D., Tian, F., Farrehi, P.M., Parent, J.M., Mashour, G.A., Wang, M.M., Borjigin*, J. Surge of neurophysiological coupling and connectivity of gamma oscillations in the dying human brain (2023). Proc. Natl. Acad. Sci. USA, 2023 May 9;120(19):e2216268120.(link is external)

- Glynos, N.G., Carter, L., Lee, S.J., Kim, Y., Kennedy, R.T., Mashour, G.A., Wang, M.M., Borjigin*, J. Indolethylamine N-Methyltransferase (INMT) is not essential for endogenous tryptamine-dependent methylation activity in rats (2023), Scientific Reports. 13(1):280. PMID: 36609666.
- Li, D., Mabrouk, O.S., Liu, T., Tian, F., Xu, G., Rengifo, S., Choi, S.J., Mathur, A., Crooks, C.P., Kennedy, R.T., Wang, M.M., Ghanbari, H., Borjigin*, J. Asphyxia-activated corticocardiac signaling accelerates onset of cardiac arrest (2015). Proc Natl Acad Sci U S A. 2015 Apr 6. pii: 201423936.
- Borjigin*, J., Lee, U., Liu, T., Pal, D., Huff, S., Klarr, D., Sloboda, J., Hernandez, J., Wang, M.M., Mashour, G.A. Surge of neurophysiological coherence and connectivity in the dying brain (2013). Proc. Natl. Acad. Sci. USA. 110(35):14432-7.

Web Sites

Borjigin Lab(link is external)
Michigan Experts

Program Session PL-12

PL-13

Investigating the Psionic Interface: Alleged Non-Human Interactions with Human Consciousness in Covert UAP Programs.

Ross Coulthart

News Nation TV investigative journalist and author of In Plain Sight: An Investigation into UFOs & Impossible Science, Australia

Primary Topic Area - TSC Taxonomy

[04.22].....Miscellaneous

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

For nearly four decades, Ross Coulthart, a veteran investigative journalist and former host of Australia's 60 Minutes, has pursued confronting stories within the world of covert intelligence programs and defense. Since joining News Nation, a Chicago based cable news network, Coulthart has exclusively revealed whistleblower allegations from US intelligence and defense insiders asserting a covert government cover-up of non-human intelligence (NHI) engaging with Earth. Drawing from his 2023 expose of USAF officer David Grusch's claims of secret UAP retrievals and his January 2025 interview with former intelligence operative Jack Barber, Coulthart presents evidence of an alleged secret US 'legacy UAP retrieval and reverse engineering program' involving psionic phenomena – psychic interactions between humans and NHI technology and/or entities. Barber, a trained USAF special operations combat controller turned undercover intelligence operative, alleges direct involvement in retrieving non-human craft, including an 'egg-shaped' object, for a private aerospace contractor in collaboration with the US Government. Central to his claims is the assertion that these craft, or perhaps entities within them, exhibit psionic properties, interfacing with human consciousness. Barber reports he and his colleagues involved in these retrievals have experienced intrusive clarity, foreign thoughts and images flooding their minds – suggesting the NHI employ psionic technology as a control or defense mechanism. He further alleges that the Pentagon's All-domain Anomaly Resolution Office, which investigates UAPs, was briefed on these interactions, despite its public denial of extraterrestrial engagement. Corroborated by his special operations colleagues, Barber claims individuals with heightened psychic, intuitive or empathic abilities – recruited through programs like the Gifted and Talented initiative in public schools – play a critical role in connecting with NHI craft, potentially enabling their retrieval and operation. Coulthart's investigation uncovers a historical thread linking these allegations to Cold War-era US research into psychic phenomena, including the CIA's declassified remote viewing programs, which he argues have evolved into a modern psionic initiative. While the US Department of Defense (DoD) has not challenged Barber's specific claims – stating only that AARO is investigating – their broader denial of extraterrestrial evidence contrasts with leaked documents like 'Slide 9' from the Advanced Aerospace Threat Identification Program (AATIP). This briefing slide, presented to a DoD deputy secretary, warned of NHI capabilities to manipulate human perception and cognition, framing such phenomena as emerging quantum physics. This presentation will explore the implications of Barber's allegations for consciousness studies, integrating firsthand accounts, whistleblower testimony and historical context. Coulthart will recount his experience of witnessing a psionic 'summoning' by a member of Barber's SKYWATCHER team, a private initiative aimed at replicating the secret Government program by retrieving NHI craft. While constrained by ethical secrecy obligations to his extensive sources within the legacy program, and acknowledging the absence to date of public physical evidence, Coulthart argues that these claims warrant rigorous scientific inquiry and public congressional oversight. Attendees will be invited to consider how alleged NHI interactions with human consciousness challenge current paradigms, bridging investigative journalism with the frontiers of cognitive science.

Program Session PL-13

PL-13

How do non-human intelligences communicate with humans?

Brannon Wheeler
U.S. Naval Academy, Annapolis, MD, USA

Primary Topic Area - TSC Taxonomy

[05.05].....Transpersonal and humanistic psychology

Categories by Discipline

3.0 Cognitive Science and Psychology

Abstract

How do non-human intelligences communicate with humans? For millennia, people have wondered about the stars and the gods--how and why do they intervene in our affairs? In the Middle Ages, great scholars (Maimonides, Aquinas, Suyuti, Buddhaghosa) and mystics (Luria, Eckhart, Avicenna, Ibn Arabi) devoted their lives to studying the mechanisms of revelation and human experience of the divine. Yet the bulk of this incredibly rich and varied work has not been applied to examining contemporary experiences of contact with non-human intelligence, nor have the first-hand knowledge of contactees been utilized adequately to help understand "religious" encounters with divine beings. My research proposes that these two perspectives on human encounters with non-human consciousness be brought together, that contactee experiences be put on equal footing with other historical examples of NHI-human interaction, to provide a more balanced and broader generic study of how NHI communicate with humans. This study proceeds by collecting examples of reported human-NHI communication, both verbal (in the traditional sense of the transmission of an articulated message through speech or otherwise) and non-verbal (physical manipulation of objects including bodies). A comparison of a range of examples--drawn from "religious" and contactee reports--can suggest some general theoretical conclusions about potential mechanisms underlying the experiences themselves and the way they are conceptualized.

Brannon Wheeler is a historian of religion, a professor in the history department at the United States Naval Academy in Annapolis. He has published eleven books and numerous articles mostly focused on how and to what effect NHI communicate with humans and intervene in history--prophets, scripture, exegesis, and more recently how this overlaps with consciousness and UAP related experiences. He teaches courses on mystery religions, Bible, UFO mythology, truth, consciousness, and NHI encounters. He has held visiting positions throughout Europe (Oxford, Bergen, Paris, London) and the Middle East including the Hebrew University in Jerusalem, the King Fahd Center for Research and Islamic Studies in Riyadh, and several American research study centers in Amman, Tunis, Kuwait, Beirut, and Cairo.

Program Session PL-13

PLENARY 14

PL-14

Physics of Spacetime from Traces of Consciousness

Donald D Hoffman PhD
University of California, Irvine, California, USA

Primary Topic Area - TSC Taxonomy

[01.04].....Ontology of consciousness

Categories by Discipline

4.0 Physical and Biological Sciences

Abstract

Quantum field theory and general relativity each assume that spacetime is fundamental. Together, however, they entail that spacetime is not fundamental: it has no operational meaning beyond the Planck scale. Spacetime and its objects are useful constructs but must emerge from something deeper. High-energy theoretical physicists, funded in part by the UNIVERSE+ project of the ERC, are exploring new "positive geometries" beyond spacetime, such as amplituhedra, associahedra, cosmohedra, and surfaceology. Evolution by natural selection agrees that spacetime and its objects are not fundamental. Sensory systems evolve to be useful but not true. Each sense acts as a user interface—a virtual reality—that hides fundamental reality and guides adaptive action. The senses do not present, or represent, fundamental reality. The language of the senses, including physical objects with their causal or functional properties, is a useful fiction. Theories of conscious experiences that assume otherwise, claiming that experiences emerge from causal or functional properties of neurons or other objects, fail to explain even one experience, such as the taste of mint. The failure is principled. For instance, what specific n x n transition probability matrix, encoding a causal structure, must be the taste of mint or the experience of space? Why must the n^2 elements of the matrix have their specific values? I present a theory of "conscious agents" beyond spacetime, based on a Markovian dynamics. I discuss a new partial order on Markov chains, the "trace order," in which one Markov

chain entails another iff it is a trace chain of the other. I use the trace order to propose a theory of observation and of beliefs induced by observation. I show how the trace order encodes time dilations and length contractions, analogous to those of special relativity. I propose a many-to-one mapping from properties of the dynamics of conscious agents to physical properties of mass, spin, energy, and momentum. The goal is to construct a map from the dynamics of conscious agents onto the positive geometries discovered by physicists, and thence into spacetime and physical objects, such as neurons and brains. It is not possible to boot up conscious experiences from objects and properties in spacetime. It is, however, possible to boot up spacetime and its objects from conscious experiences.

Keywords

Hard Problem, Markov Matrix, Physicalism, Panpsychism, Idealism, Natural Selection, Quantum Theory, Positive Geometries

Links to Research

https://www.mdpi.com/1099-4300/22/5/514
https://www.mdpi.com/1099-4300/25/1/129
https://www.ingentaconnect.com/content/imp/jcs/2024/00000031/f0020009/art00003;jsessionid=1mfffup1ilng9.x-ic-live-02

Donald Hoffman received his PhD from MIT, and joined the faculty of the University of California, Irvine in 1983, where he is a Professor Emeritus of Cognitive Sciences. He is an author of over 100 scientific papers and three books, including *Visual Intelligence* and *The Case Against Reality*. He received a Distinguished Scientific Award of the American Psychological Association for early career research, the Rustum Roy Award of the Chopra Foundation, and the Troland Research Award of the US National Academy of Sciences. His writing has appeared in *Edge*, *New Scientist*, *LA Review of Books*, and *Scientific American* and his work has been featured in *Wired*, *Quanta*, *The Atlantic*, and *Through the Wormhole with Morgan Freeman*. He has a TED Talk titled “Do we see reality as it is?” and a podcast with Lex Fridman titled “Reality is an illusion.”

Program Session PL-14

PLENARY 14

PL-14

Consciousness is the Ontological Primitive of the Universe

Deepak Chopra MD, FACP, FRCP
Cyberhuman.ai, New York, NY, USA

Primary Topic Area - TSC Taxonomy

[01.01].....The concept of consciousness

Categories by Discipline

1.0 Philosophy

Abstract

Consciousness is not a byproduct of the physical brain but the fundamental ground of existence from which space, time, matter, and energy arise. Rather than being confined to individual minds, consciousness is a non-local field of infinite potential, shaping and perceiving reality simultaneously. The universe, as we experience it, is not external to us but unfolds within this awareness. In this view, the boundaries between observer and observed, thinker and thought, dissolve into a unified field of being, aligning with both ancient Vedic wisdom and insights from quantum mechanics, where entanglement and superposition challenge conventional materialist paradigms. This perspective invites a radical shift in how we understand selfhood, perception, and the nature of reality itself. By embracing consciousness as the foundation of existence, we move beyond fragmentation toward wholeness, recognizing that we are not separate entities in a mechanistic universe but the creators and experiences of all that is. This presentation will explore the implications of consciousness as the primary reality, bridging Eastern metaphysical traditions with contemporary scientific discourse.

Deepak Chopra, MD, FACP, FRCP, is a physician and author of over 95 books on Integrative Well-Being and Spiritual Intelligence. Founder of Cyberhuman.ai and DeepakChopra.ai

DEEPAK CHOPRA MD, FACP, FRCP, is a physician and the leading authority on Integrative Well-Being and Spiritual Intelligence, Founder of Cyberhuman.ai and DeepakChopra.ai. Chopra is a Clinical Professor of Family Medicine and Public Health at the University of California, San Diego, and serves as a senior scientist with Gallup Organization. He is also an Honorary Fellow in Medicine at the Royal College of Physicians and Surgeons of Glasgow. He is the author of over 95 books, translated into over forty-three languages, including numerous New York Times bestsellers. For the last thirty years, Chopra has been at the forefront of the meditation revolution. His mission is to create a more balanced, peaceful, joyful and healthier world. Through his teachings, he guides individuals to embrace their inherent strength, wisdom, and potential for personal and societal transformation. In his next book, *Awakening: The Path to Freedom and Enlightenment* (Harmony/Rodale, 01/06/25), Chopra offers the power to free you from the limitations of ego into a life marked by inner and outer peace, purpose, and boundless possibility. TIME magazine has described Dr. Chopra as “one of their top 100 most influential people.” www.deepakchopra.com

Program Session PL-14

PLENARY 14

PL-14

Consciousness and Free Will are Quantum Properties of Being

Dr Federico Faggin PhD

Federico and Elvia Faggin Foundation, Los Altos Hills, CA, USA

Primary Topic Area - TSC Taxonomy

[01.04].....Ontology of consciousness

Categories by Discipline

1.0 Philosophy

Abstract

Free will without consciousness cannot exist. Consciousness without free will has no causal power and is therefore impotent. We cannot explain consciousness and free will with mathematics (mathematics is created by consciousness) or with something that does not have those properties to begin with. Consequently, we must postulate the existence of consciousness and free will from the origin of the universe. If we do that, the quantum fields must be conscious and have free will, and we can then explain why quantum field theory must have the baffling properties (superposition, entanglement, and quantum state collapse) that have puzzled scientists for the last 100 years. This convincing explanation confirms the soundness of the postulate. And if we start from this postulate, the nature of reality is completely different from what we believe now!

Keywords

Consciousness, free will, quantum fields, nature of reality

Federico Faggin is a physicist born and educated in Italy who co-invented and developed the MOS Silicon Gate Technology at Fairchild Semiconductor and designed the world's first microprocessors at Intel. Faggin also co-founded and led Zilog and Synaptics, two successful high-tech companies, before founding the non-profit Federico and Elvia Faggin Foundation, dedicated to the science of consciousness. He received the 2009 National Medal of Technology and Innovation from President Barack Obama and was knighted in 2019 by the President of Italy, Sergio Mattarella.

Program Session PL-14

Concurrent Sessions

5:00 - 7:30 PM (Mon, Tues, Wed, Thurs) Rooms TBA (Abstracts under separate file)
Each presenter has 20 minutes plus 5 minutes for Q&A

MONDAY Concurrent Sessions - JULY 7
(C-1 - C-6) 5:00 - 7:30 PM

C-1 Can AI be Conscious? *Sagrada Familia 4th floor*

Aneil Mallavarapu – Why physics shows AI cannot ever be conscious
Sean Webb - We Gave Emotional Intelligence and Compassion to an LLM, and What It Exposes About Artificial Consciousness
Chris Percy - Why the phenomenal binding problem limits digital computer consciousness to mind dust
Julian Yocum - Towards Strong Emergence: Non-Computability and Infinity

Paul Mithun - Are LLMs Capable of Achieving Consciousness and In turn Artificial General Intelligence?
Adam M. Curry - T2: A Novel Test for Assessing Latent Awareness in AI

C2 Brain Models of Consciousness 1 *Montjuic 3rd floor*

Jan Treur - Multilevel Causality Reification as a Basis for Higher-Order Self-Representation: A Dynamic, Interactive, Adaptive, and Evolutionary Perspective
Silvia Paddock - Flip-Book Idealism (FBI): A discrete idealistic approach to consciousness
Justin Riddle - Consciousness is slow at the top: investigating the electric fields at the apex of the hierarchical brain
Aramis Valverde - Consciousness as Iterative Global State Evaluation and Integration: A Process-Based, Neurocognitive Approach to Understanding Phenomenal Dynamics
Konstantin Anokhin - Cognitome: cellular encoding of subjective experience in neural hypernetworks
Jonathan Schooler - The kite of consciousness and other metaphors of the mind

C-3 Philosophy 1 *Gràcia 3rd floor*

Peter Ells - Metaphors are valuable in summarizing solutions to the mind-body problem. Two are considered here: “inside versus outside” and “first-person versus third-person”
Harald Walach –Why consciousness is primary: A Leibnizian reminder
John Sanfey - Consciousness is the observational reference frame for invariance through time
Andrei Buckareff - The Boundary Problem: Why Constitutive Panpsychists Should Endorse a Powerful Qualities Theory of Properties
Yoshiyuki Ohmura - What is volition?
Jiawei Xu - Relational Realism of the Self: The Self as Pre-Cognitive Alignment between Brain and Environment

C 4 Eastern and Global Approaches *Eixample 3rd floor*

Gleb Sharygin - The strategy of resolving the mind-body problem in early Buddhism in the light of J. Searle's philosophy of mind and language
Alejandro Callara - Central and peripheral neural correlates of analytical and concentrative meditation in Tibetan Buddhism
Venkatesh H. Chembrolu –Perception and Reality in a Consciousness-First Framework
VS Rakenduvadhana - Scientific inquiry the substrate if experientiality and precarious triumvirate Code
Hidehiko Saegusa *- Consciousness Meter for Awakening Non-locality of consciousness*

Rajit ‘Raja’ Choudhury - The Transformative Power of Tantric Mantra: Altered States of Consciousness for Wellness, Clarity, and Bliss

C-5 Evolution and Origin of Life *Sants 3rd floor*

Deepavalli Arumuganainar – Evolution of plants: A perspective based on information vortex theory
Michael Cremo - Darwin, evolution, and consciousness: A Vedic perspective
Colin Morrison - 1 5 3 God Made Me: The Amazing Hidden Structures in the Genetic Code
Asier Arias Dominguez - Interoception and the evolution of consciousness
Marc van Duijn - Neuro-Topological Constraints on The Early Evolution of Consciousness: Bow-Tie Sensorimotor Architecture as a Prerequisite for Sentience

Michael W. Barry - Path of Least Action and Consciousness

C-6 Mental Health 1: Sound, Ultrasound and TMS * *Barcelona 1st Floor*

Tony Crescenzo - PeakNeuro Audio Entrainment: Improving Neural Plasticity, Cognitive Performance, and Adaptive Readiness.(assisted by Bob Holbrook)
Handan Yaman - Investigation of the Effects of Long-Term Binaural Beats Application on Tinnitus Patients
Florine Riedinger - From Perception to Awareness: The use of auditory roughness to overcome inattentional deafness in cockpit alarm detection
Alix Noël-Guéry - Mindful sound energy therapy, fractals, and alexithymia (emotional embodied intelligence)
Arie T. Greenleaf – The Dynamis Theory Unveiled: Measuring Consciousness Across Brains, Plants, and Silicon

Sebastian Ehmann - Enhancing Meditative Development with Transcranial Focused Ultrasound: A Mixed-Methods Phenomenological Study of Neuromodulation in Expert Practitioners During a Ten-Day Retreat

TUESDAY Concurrent Sessions - JULY 8

(C-7 -C-12) 5:00-7:30 PM - Each presenter has 20 minutes plus 5 minutes for Q&A

C-7 Can AI be Conscious? 2 *Barcelona 1st floor*

Salvatore Scozzari - It's still me: extended robotic-self through deep temporal models and Mirror Self Recognition
Paul Skokowski - Androids then and now
Richard Ebstein - Synaptic Plasticity, Information Capacity, and Experiential Consciousness
Soo Hong Chew - Intelligence: Attention and Consciousness in Decision Making under Situation Uncertainty
Patrick Schotanus - The Market Mind; An Economic Angle on Consciousness
Sandra Estok - Quantum Singularity ...Cybersecurity

C-8 Conscious Perception *Eixample 3rd floor*

Peter Moddel - Consciousness and the Perception of Color: A breakthrough in the understanding of color and color formation brings new tools to the study of consciousness.
Brent Allsop - Physicists Don't Yet Understand Color Qualities
Michal Polák - Vividness – content-invariant property of experience
Piotr Podlipniak - Musical Pitch and Rhythm Qualia as the Primordial Source of Complex Conceptual Consciousness
Maria Giovanna Corrado - Auditory Perceptual Experience of Forceful Interactions
Violetta Kostka, Conceptual Associations while Listening to Paweł Szymański's 'Two Studies' for Piano

C-9 Near Death Experiences, Reincarnation *Gracia 3rd Floor*

Imants Baruss - After-Death Communication with Cell Phones
Jennifer K Penberthy - Impact of Communications from Deceased: After Death Communications and Grief
Rafael Tedesqui - Investigating reincarnation as a missing piece in the "origins of talent" puzzle: A pilot study
Marina Weiler - Out-of-Body Experiences and the Quest for Extra-Sensory Perception: An Examination of Methodologies and Findings
Barbara With - Experiential Inquiry into the Phenomenology of Afterlife: Exploring the Nature of Reality through Non-Ordinary States of Consciousness

Donna M. Thomas - "My Mind is not in my brain!": Investigating near death experiences and consciousness with children in a paediatric ICU ward

C-10 Philosophy 2 *Montjuic 3rd floor*

Xiangqun Chen - Solving mind-brain problem: do we need reductive or non-reductive neurophilosophy?

Cosmin Visan - Introduction to Self-Reference
Uzi Awret - Brain Coherence and Loss of Which Way Information
Andre LeBlanc - Joseph Delbœuf and William James on the Problem of Free Will
Ana Bárbara Brito - Searle, Libet and Non-determinism: An Analysis of Free Will in the Philosophy of Mind
Michael Remler - Abstraction and the Explanatory Gap

C-11 Quantum Biology *Sagrada Familia 4th floor*
Travis Craddock - Exploring Quantum Effects in the Brain: Linking Theory to Experiments
Javier Martin-Torres - The Persistence of Quantum Coherence in Biological Systems
Marco Cavaglià- A Multiscale Resonance Model of Consciousness: From Lipid Membranes to Global Brain Fields
Seungju Ahn - Analysis of Helical Pathway of Microtubule under the Surface Code framework
Chiara Mascarello - Reflexivity and Luminosity of Mind: Insights from Indo-Tibetan Buddhism
Andrew Cote - Unified Conscious Field Theory and the Biophysics of Visualization

C-12 Brain Models of Consciousness 2 *Sants 3rd floor -*
Mel Slater - VR- Consciousness in Virtual Reality and the Interface Theory of Perception: An Experimental Study
Akihiro Nishiyama - Quantum Brain Dynamics and Virtual Reality
Tam Hunt - Ephaptic fields forever: The "field code" and the "neuroscience of tomorrow"
Francesco Tormen – A Buddhist Perspective on Artificial Consciousness
Paavo Pylkkanen - Quantum Dennett

WEDNESDAY Concurrent Sessions - JULY 9

(C-13-C-18) 5:00-7:30 PM - Each presenter has 20 minutes plus 5 minutes for Q&A

C-13 AI, Brain and the World 1 *Barcelona (1st floor)*
Poonacha Machaiah - Exploring Consciousness Studies: An Integrated Framework of AI, Distributed Agents, Blockchain, and Advanced Technologies
Ken Mogi - The role of consciousness in AI alignment.
Daniel Sheehan - Quantum AI and the Sheehan-Cyrus Turing Test
Nikolaos Koutsis - Ethical Implications and Academic Impact of Developing Conscious AI: Evaluating Large Language Models Through Prominent Theories of Consciousness
Gergely Csépány - The Shared Consciousness of Humans and Artificial Intelligence: A New Dimension of Reflection
Ron Chrisley - Do current AI models have mental imagery?

C 14 Monitoring Consciousness *Gràcia 3rd floor*
Lorena Chanes – From the Dual Origin Hypothesis of the Neocortex to the Limbic Workspace: A Whole-Cortex Organization for Conscious Experience
Maurizio Barbeschi - Consciousness and Integrative Health: does the systemic integration of the quantum approach matter?
Katja Seeliger - Modeling states of consciousness during clinical sedation with stochastic differential equations
Benjamin Stucky - We are the sensors of consciousness! A review and analysis on how awakenings during sleep influence dream recall.
Marte Roel Lesur - Researching body perception: towards an integration of quantitative and qualitative interdisciplinary approaches to address the multiplicity of bodily experiences
Tim Mullen - Decoding Depth of Meditation: Electroencephalography Insights From Expert Vipassana Practitioners

C 15 Organoids and Quantum Biology *Sagrada Familia 4th floor*
James Tagg- The Large Brain Model
Rachel Potter - Frontiers in Neuronal Networks: Cerebral Organoid Sensory and Motor Interfacing
Roumiana Tsenkova - Non-invasive Aquaphotomics Study For Understanding the Effect of Body Psychotherapy Through Real Time Measurement of the Body Water Molecular Matrix

Marilu Chiofalo Quantum Toolbox for Neurobiology Sensory Systems
Nancy Woolf - Quantum biology: The way the brain connects
Federico Bisiacchi – MAN AS A PRISM: The Interrelation between Consciousness, DNA, Amino Acids and Universal Code

C-16 Funda-Mental/Quantum Approaches *Sants 3rd floor*
Marko T. Manninen (Matti Pitakanen)- How subjective memories are realized in TGD inspired theory of consciousness?
Nestor Mercado - Time, Space and the Persistence of Memory
Maurice Goodman - A physics foundation for quantum biology.
Peter Lugten - How Entropy Explains the Emergence of Consciousness
Nicole Johnson - Putting It Altogether: Criticality, Multiscale Competency & The Panpsychist Combination Problem
Bernd Binder - Bringing to Life Quaternion and Octonion Pairs Entangled by Symmetry in Discrete-Time

C-17 Psychedelics and Cannabinoids *Eixample 3rd floor*
Etzel Cardeña - Bringing Order to Disarray: A Consensus Taxonomy of Non-Ordinary (Altered) States of Consciousness
Keith G. Heinzerling - Application of psychedelics for modern spiritual activation and initiation
Pascal Immanuel Michael - The Widening Gyre: Challenging Existential and Ontological Psychedelic Experiences and their Neural Correlates
June Russell - On the computational properties of DMT-altered consciousness
Eleni Kroupi - The Effect of low LSD doses on EEG Complexity
Anass Fidni - Making the Unconscious Empirical: Psychedelics as a Tool for Scientific Inquiry

C-18 Extra-Sensory Perception *Montjuic 3rd floor*
Helané Wahbeh - *Beyond the Veil: A Systematic Investigation of Trance Channeling within UAP Research*
Jyotiranjan Beuria - Neural Signatures of Non-Vision Visual Perception: An Empirical Investigation
Ulf Holmberg - Mapping the Mind: A Bayesian Framework for Mind-Matter Interaction
Álex Escolà-Gascón - Sensing the future through a quantum-like implicit learning mechanism in nonlocal consciousness
Anatoly Goldstein - Toward Understanding the Mechanisms of Extra Sensory Perception
Gabriel Guerrer - The Case of Anomalous Psycho-Physical Interactions: Investigating an Unconventional Hypothesis Within a Methodologically Rigorous Framework

THURSDAY Concurrent Sessions - JULY 10
(C-19-C-24) 5:00-7:30 PM - Each presenter has 20 minutes plus 5 minutes for Q&A

C-19 AI, Brain and the World 2 *Montjuic 3rd floor*
Michael Ye - When AI Takes a Deep Breath: Examining Embodied Cues in Large Language Models for Enhanced Reasoning, Performance, and Creativity
Maja Gutman Mušič - From Oracles to Algorithms: Ancient Dream Knowledge in the Ai Paradigm
Ouri Wolfson - The Mathematical Formulation of a Mechanism that Detects Consciousness in AI agents
Jeffrey Dunne - Consciousness, Telekinesis, and Artificial Intelligence
Robin Zebrowski - Emotion-As-Value: Enactive Challenges for Machine Consciousness
Andrew Knight - Why the Brain Cannot Be a Digital Computer: History-Dependence and the Computational Limits of Consciousness
James Driessen - "Cogitare Facile," Nonlocality, Qualia, and Generative Pre-trained Transformers

C-20 Brain Models of Consciousness *Eixample 3rd floor*
Hardik Chadda - Oscillatory Signatures of Creative Cognition Stages: Neural Dynamics of Idea Generation, Evolution and Evaluation
Austin Cooper - Dynamic Reorganization in Mediation - Altered Relationship of Neural Timescales and Scale-Freeness
Madeleine Gross - Expanding the Aperture of Awareness: Salience Processing and the Creative Mind

Molly Hermiller The Putative Role of Slow and Fast Theta Rhythms in Internal and External Representations Along the Hippocampal Longitudinal Axis
Chuong Ngo – Neural Dynamics of Meditative Deep States: Alpha Suppression, Gamma Synchronization, and Infraslow Wave Activity in Expert Practitioners
Deepak Ranade - Role of the Default Mode Network in genesis of consciousness and the sense of Self using fMRI BOLD sequences.

C-21 Mental Health 1: Photobiomodulation, Lucid Dreaming and Meditation *Montjuic. 3rd floor*

Lew Lim - Photobiomodulation, High-Frequency Brain Oscillations, and Quantum Coherence: Toward a New Paradigm for Enhancing Cognition and Consciousness
Antonia Di Francesco - Photobiomodulation (PBM) and consciousness
Sanjay Manchanda - Supporting Meditation with Photobiomodulation in Experienced Meditators: A Randomized Controlled EEG Study
Reza Zomorrodi - Significant Shifts in Meditation States Triggered by Photobiomodulation Frequency Switching: Evidence from a Double-Blind Randomized Controlled EEG Study
Garret Yount - Decreased PTSD Symptoms Following a Lucid Dreaming Workshop: A Randomized Controlled Study
Mihir Nath - Heartbeat-Evoked Potentials Track Depth of Meditation (Reggente, N.)

C-22 Extra-Sensory Perception and Extraterrestrial Consciousness *Sagrada Familia 4th floor*

Arnaud Delorme - Examining the Effects of Biofield Therapy Through Simultaneous Assessment of Electrophysiological and Cellular Outcomes
Raul Valverde - Medical biometrics based on Gas Discharge. Visualization technology approach to survival research: A case study
Chet Swanson *-Konstantin Korotkov* - Remote effects of meditation and intentions. Experimental approach with GDV Bio-Well technology
Toper Taylor - The Human Performance Intention Experiment
Maria Balaet A neuroscientific perspective on studying extraterrestrial intelligence
Andrea Signorelli -Virtual Reality: A Game-Changer in Lucid Dream Induction?

C-23 Education in Consciousness Studies *Sants 3rd floor*

Laurel Waterman - Teaching with Consciousness: Findings from my doctoral research, a narrative inquiry into scholars' experiences teaching about consciousness beyond the brain.
Joan Walton - Expanding the idea of a world-centered education to include new ideas about consciousness: A response to Biesta's question: "What shall we do with the children?"
Jeff Sugar – Consciousness and Psychiatric Practice
Milena Braticevic - Consciousness Science in Worker Health and Safety
Niha Sinha - Enhancing Intuitive Consciousness Through Educational Interventions
Srishti Rajeev Undergraduate, Michael Balducci Undergraduate, **Samantha Hanus** Undergraduate, **Tau Schimmels** Undergraduate, **Maya Leonard,** Undergraduate University of Arizona, Tucson, AZ USA – Undergraduate Consciousness Curriculum Program (Tom Bever)

C-24 Fine Arts in Consciousness Studies *Barcelona 1st Floor*

Ana Iribas-Rudín - Painting still-lives with dyschromatopsia: A case study
David Keplinger - The Yakutia Ice Bodies and the Trauma Response of "Freeze:" - A Poetry Reading from David Keplinger's "Ice"
Alicia Campos - The Möbius Soul. Marguerite Porete's Earthy Consciousness
Sylvie Herrouet - Art and the problem of Consciousness with the concept of "Infrathin" of Marcel Duchamp: The interface between two worlds, an analogy of the decoherence phenomenon.
Jiyun Park - Exploring the Intersection of the Diamond Model and Circle Consciousness – A Meta-Morphic Approach to Expanding Awareness
Suren Shrestha - Resonating in a Modern World: Himalayan Singing Bowls and Vibrational Healing
Manuel Baez - interactive Diluvio: Teatro delle Ombre (Deluge: Theatre of Shadows)

8 PM: Next stop: The Poetry Slam, End of Consciousness Party

Poster Session 1 - PO-1
MONDAY July 7 - 7:30-10:00 pm

1.0 Philosophy

1. **Robert Bishop,** Contextual Emergence and Consciousness
2. **Michael Gulley,** Is light sentient - recent experiments showing it being affected by anaesthetics show that it could be
3. **Angus Nisbet,** Process Physics - Three Inter-related Theorems:
4. **Raynal Dunlop,** B. Kastrup's ontology and dreams.
5. **Matthew Williams,** What Can Imagination tell Us About Attention's Role in Consciousness?
6. **Rhonda Reliford,** Consciousness Unbound: Bridging Science, Metaphysics, and the Continuity of Being
7. **Miltiadis Argianis Karakitsos**, Magnetoencephalography Reveals Brain Network Imbalance in Mild Cognitive Impairment Patients During a Delayed Matching Task
8. **Luiza Araujo,** A Critical Examination of Consent and Alienation in the Context of Brain-Computer Interfaces (BCIs)
9. **Anubhab Chakraborty,** Mapping the Symphony of Consciousness
10. **Diana Ciubotaru,** A Coherence Model of Selfhood – From Fragmentation to Integration
11. **Alfredo Parra-Hinojosa,** Ontological diversity in fundamental physics and its significance for consciousness research
12. **John Stuller,** The Light of Consciousness
13. **Edward J. Gorzelanczyk,** The role of cortico-subcortical loops in the generation of conscious experiences of speech and music

2.0 Neuroscience

14. **Ariadna Sandoval,** Factor Analysis of Neurocognitive Symptoms Experienced by Individuals with Myalgic Encephalopmyelitis / Chronic Fatigue Syndrome (CFS) and Post-Acute Sequelae of COVID-19 (PASC)

3.0 Cognitive Science and Psychology

15. **Lukasz Kurowski,** The case of Phineas Gage and the Global Neuronal Workspace theory of consciousness.
16. **Na Pan,** Neural Mechanisms of Conscious and Unconscious Color Discrimination: Evidence from Intracranial stereo-electroencephalography
17. **Pascal Immanuel Michael,** The Widening Gyre: Challenging Existential and Ontological Psychedelic Experiences and their Neural Correlates
18. **Andrea Signorelli,** Virtual Reality: A Game-Changer in Lucid Dream Induction?
19. **Dan McAran,** The Cosmology of Consciousness

4.0 Physical and Biological Sciences

20. **Steve Gunther,** A novel model to help conceptualize propagation of light and other quantum field phenomena with ramifications regarding ephaptic signaling, physics of thoughts, and related fields.
21. **Andrew Cote,** Unified Conscious Field Theory and the Biophysics of Visualization
22. **Guruprasad Kadam,** Quantum measurement problem, brain as a measurement device, and subjective experience
23. **Flavio Burgarella,** Casina Briga Foundation and the Quantum Interpretation of Consciousness
24. **Wojciech Krzykwa,** The Geometric Theory of Consciousness: Resolving Fundamental Paradoxes Through Five-Dimensional Framework
25. **Arunvel Thangamani,** Information encoding in nucleic acid sequences: A perspective based on bio-information field vortices
26. **Arzhang Kamarei,** Proving Penrose: Introducing Consciousness Logic for Determined Indeterminacy
27. **Natalia Sánchez,** The NDE as a cosmological compass

5.0 Experiential Approaches

28. **Jennifer Penberthy,** Impact of Meditation versus Exercise on Psychological Characteristics, Paranormal Experiences, and Beliefs: Randomized Trial
29. **Dan Boland,** *The Integration of Science and Spirituality*
30. **Alba Carod,** Arquetypal Coaching. Creating Synergies Through Astrology and Dream-Work.
31. **Patrick Dunn,** UFOs, Simulation Theory, and the Nature of Consciousness
32. **Odd Ness,** Transduality: A Post-Dualist Framework For Human-AI alignment

6.0 Culture and Humanities

33. **Ana E. Iribas, Art-Tech-Health** Exhibitor-Talking jewels with AI: glamour and aberration
34. **Nadoukká Divin Mres -** Tidal-Drift Communication: Inertia and Entropy in Adaptive Multi-Layered
35. *Manuel Baez* **-** *interactive Diluvio: Teatro delle Ombre (Deluge: Theatre of Shadows)*

Poster Session 2 - PO-2
TUESDAY July 8: 7:30-10:00 pm

1.0 Philosophy

1. **Dragana Favre,** Cosmic Cycles of Consciousness: Entropy, Archetypes, and the Primordial Superconsciousness
2. **Ulf Holmberg,** Quantifying Consciousness: A Bayesian Framework for assessing the Impact on Random Number Generators
3. **Ivanna Montoya,** Beyond the Brain: How Body and Environment Shape Conscious Experience
4. **Ankur Chaturvedi,** IIT 2.0: A New Paradigm for Artificial Intelligence, Consciousness, Free Will and Machine Autonomy
5. **Luis Mazas,** R. L. Kuhn's Fundamental Questions About Consciousness: Is there another philosophical way to ask them?
6. **Tib Roibu,** The Polynon: A Geometry of Consciousness
7. **Pooja Soni,** Who is afraid of Emotion? Situating Emotion in Perception
8. **Andrew Proulx,** Disambiguating Consciousness: A Framework for Classifying Conscious Systems (2.0)
9. **Benjamin Liljedahl,** The Substance of Experience: An Exploration of Ontology
10. **Jeff Sugar,** Consciousness and Psychiatric Practice
11. **Raluca Ioana Cibu Buzac,** Consciousness, Nature, and the Twist of Innovation
12. **Alan Scheurman,** Hypercognizance as a Trainable Framework for Navigating AI, Quantum Reality, and the Future of Human Consciousness
13. **Madeline Fauss,** Emergent Relational Intelligence: A Framework for Exploring Consciousness as a Reciprocal, Open, and Interactive Process
14. **Frank Högemann,** The Physical World as a Virtual Reality Simulation Computed by Consciousness
15. **Xinyan Zhang,** Triple Definition or Explanation of Consciousness

2.0 Neuroscience

16. **Mihály Rámpay,** Investigation of Quantum Entanglement through AI-Enhanced Analysis of Spontaneous Neuronal Population Activity In Vitro
17. **Yimu Chen,** Unified Consciousness-Physics Theory: A Multi-Layered Approach to Mind-Matter Interactions
18. **Gitāna Dāvidsone,** The Relationship Between Beliefs About Consciousness and Reality and Measures of Psychological Functioning.
19. **Ye Ren**, Magnetoencephalography Reveals Brain Network Imbalance in Mild Cognitive Impairment Patients During a Delayed Matching Task
20. **Xiaaotong Yang,** Effects of Repetitive Transcranial Magnetic Stimulation (rTMS) Targeting the Right Precuneus on Mild Cognitive Impairment: A Pilot Study

3.0 Cognitive Science and Psychology

21. **Gary Blaise,** Inter-Spatial Abstraction - a new theory of mind
22. **Anatol Bragin,** Subconscious foreseeing a sound click during mind wandering state. Study from the first person's perspective.
23. **Carolina Czizek,** Electromagnetic field theories of consciousness and neurophenomenology of N,N-Dimetyltryptamine (DMT): How can they inform each other?

24. **Navaneethan Nindulan,** Mind-Wandering and meta-awareness: How often do we notice it?
25. **Reidar Wasenius,** The Rigorous Formalization of Memetics: A New Lens on the Patterns of Consciousness
26. **Xiaotong Yang** - Effects of Repetitive Transcranial Magnetic Stimulation (rTMS) Targeting the Right Precuneus on Mild Cognitive Impairment: A Pilot Study

4.0 Physical and Biological Sciences

27. **James Beran,** Quantum Chips, IIT, and Bespoke Consciousness
28. **Thomas Klepach,** Quantum Coherence in Consciousness: The Potential Role of Glycoconjugates, Membrane Microdomains, and Aqueous Solvent Dynamics
29. **Charles Ernst,** Spirals of Mass, Life, and Light
30. **Lea van Dellen,** Spectral Compatibility and Analytical Constraints in Quantum Marginal Problems
31. **Robert Trandafir,** What our brain can teach us about building the next generation of quantum computers
32. **Mustafa Erol,** Resolution of Brain-Based Consciousness as a Quantum Information Field
33. **Jocene Vallack,** Soliloquy Methodology – A solo approach to research using the strengths of both one's conscious and unconscious minds.

5.0 Experiential Approaches

34. **Kennedy Robertson,** Exploring Meaningful Interactions with Imaginal Others via Lucid Dreaming
35. **Bil Bungay,** The Quantum Consciousness Effect: Manifestation, Feedback Loops, and the Engineering of Each and Every Reality.
36. **Luis Miguel Gallardo,** Unlocking the Hidden Light: How Hypnotherapy is Bridging the Subconscious Mind with Global Consciousness
37. **Mark Valladares,** FLOW
38. **Caroline Griggs,** Orgasmic Meditation and The Mystical State: A Case Study
39. **Andréa Oddos,** Exploring the neurophysiological and subjective correlates of well-being in non-ordinary states of consciousness
40. **Rosa Gil,** Can artificial intelligence dream of real sheep?

6.0 Culture and Humanities

41. **James Bard,** The Extra-Terrestrial Birth
42. **Laura "LD" Deutsch,** Technomythology
43. **Monica Herrera-Cendales,** Aesthetic Consciousness as an Emergent Phenomenon: A Complex Systems Approach
44. **Tracy Shew,** Quantum Fiction as a response to Cultural Pressure following advances in Quantum Perception and Artificial Intelligence
45. **Daniel Montoya,** Talking to the Gods: Finding Traces of Bicameral Mentality in Mayan Oral Literature

Poster Session 3 - PO - 3
WEDNESDAY July 9: - 7:30-10:00 pm

1.0 Philosophy

1. **Daniele Fanelli,** Consciousness as Metaknowledge - the processing of information about information
2. **Matti Kangaskoski,** Clarifying the Hard Problem
3. **Pooja Gupta,** Exploring Consciousness and Mind through Vedanta philosophy
4. **Marta Sananes,** Superluminal Conjectures About Consciousness
5. **Jeffrey Beck,** Metaparadigms: Ontologies with Capacity to Unify Science and Consciousness
6. **Arie Greenleaf,** The Dynamis Field Theory: A New Philosophical Framework for Consciousness Science
7. **Sohom Chakrabarty,** Consciousness and Qualia due to Proximity of the Conscious Agent and Primordial
8. **Edward Porter,** Qualities of Conscious Awareness are Qualities of Awareness in Equations
9. **Johannes Wagemann,** Connecting first-person research on mental agency and transclassical logics for participatory and funda-mental reality formation

10. **Mario Boido,** Beyond the Hard Problem: Rethinking Consciousness as the Phenomenology of the Human Experience of Time
11. **Ananth Ranga,** Realistic Panpsychism: Determinism Meets Consciousness
12. **Mona Jahangiri,** Personal Identity Beyond the Body: Memory, Resurrection, and the Space of Possibilities
13. **Gary Comstock,** When was the first conscious animal born?
14. **Merve Koyuncu Albayrak,** Does Plasticity Provide a New Possibility for the Grounding of Free Will?
15. **Tetsuya Ogasawara –** Approaches to Phenomenal Consciousness through "Mono-KOTO thought" and "Dialogue Ring Model" Toward Unraveling the Hard Problem of Consciousness

    Hiroki Yamada, On ethical perspective in studying consciousness

2.0 Neuroscience

16. **Julio Alcántara**, On Pure Consciousness of Autopoietic Machines. From Minimal Phenomenal Selfhood to Minimal Phenomenal Experience
17. **Federico Bisiacchi,** The Amino Acid Communication Model redefines DNA as a dynamic system that records individual experiences and bridges biological and energetic dimensions.

3.0 CogScience-Psychology

18. **Austin Nafe,** Hyperdimensional Computing as a Framework to explore the Binding Problem
19. **Zéphir Lorne,** Inducing Altered States of Consciousness through Respiratory-Interactive Art: A Pilot Study
20. **Bettina Wichers,** Are there similarities between dementia and spiritual awakening? The phenomenology of the dissolution of the self in dementia and in spiritually transformative experiences

4.0 Physical and Biological Sciences

21. **Vasileios Basios,** The Visibility of the Invisible: An Operational Probabilistic Theory (OTP)-inspired Approach to the Contextuality and the Intentionality of Complex Biotic Systems.
22. **Bosco Bellinghausen,** Quantum Consciousness Theory: A Framework for Multi-State Consciousness and Endocannabinoid System Modulation
23. **Marco Accardi,** Qualia Core: A Framework for Consciousness and Computation

5.0 Experiential

24. **Tina Lindhard,** The Theory of the Six Main Levels of Consciousness: Rewinding our surface Consciousness
25. **Diggai Jain,** The Consciousness Path Integral: A Quantum Geometric Approach to Self-Awareness
26. **Cassy Liu,** On a Heuristic Viewpoint Concerning the Revolution and Transformation of Consciousness
27. ***Anil Maheshwari,*** *Consciousness-based Architecture for Enhanced Creativity and Well-being*
28. **Sophi Anderberg,** Beyond Mind: A Direct Exploration of Expanded States of Consciousness
29. **Christine Mason,** Wired to Switch: Ancient Wisdom and Scientific Pathways to Altered States of Consciousness
30. **Kyle Hankee**, INSIGHT Project: Interoceptive Awareness, Altered States, and the Structures of Consciousness
31. **Diana Jackson,** Marriage Between An Incarnate and Discarnate Human and the Implications for Humanity
32. **Christophe Novak,** Musicopoiesis and the Co-Enactive Resonance Loop (CERL): Modeling the Self-Organizing Mind through the Phenomenology of Music Improvisation
33. **Christine Mason,** Wired to Switch: Ancient Wisdom and Scientific Pathways to Altered States of Consciousness

6.0 Culture & Humanities

34. **Leslie Deere,** The Embodied Instrument: Cognition through Movement, Real-time Sound Making, and Visual Feedback in VR Dance Improvisation
35. **Marianne Neill,** The Case of Storytelling in a Tensor as a Question for Science of Consciousness

TABLE EXHIBITORS

(Active between sessions when available and during Poster Sessions)

1. **Vielight**
2. **PeakNeuro**
3. **University of Arizona SEMA Lab / Sanmei**
4. **IOMED.it**
5. **Nirvanic Technologies - AI**
6. **Neuroelectrics Barcelona**
7. **DDG - Dodecanogram – Anirban Bandyopadhyay**
8. **Institute of Noetic Sciences IONS**
9. **Institut de Neurociències Universitat de Barcelona, Barcelona**, Spain - Institute of Biomedical Research **- Mel Slater**
10. **IIT -Indian Institute of Technology - Mandi**

Art-Tech Table Exhibits

11. **Ana E Iribas**, Talking jewels with AI: glamour and aberration
12. **Atma Buti / NOW N ZEN - Suren Shrestha,** Resonating in a Modern World: Himalayan Singing Bowls and Vibrational Healing
13. **Sylvie Herrouet,** Art and the problem of Consciousness with the concept of "Infrathin" of Marcel Duchamp
14. **Jiyun Park**, Exploring the Intersection of the Diamond Model and Circle Consciousness – A Meta-Morphic Approach to Expanding Awareness

***2 tables** **Exhibitor Tables 14 + 5**

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- University of Arizona Center for Consciousness Studies
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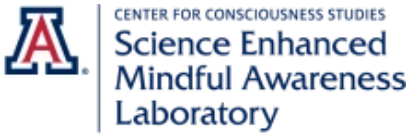
- IIT Mandi
- IONS – Institute of Noetic Sciences
- Nirvanic Technologies
- Tiny Blue Dot Foundation
- Neuroelectrics Barcelona
- Sanmei
- The Consciousness Foundation
- PeakNeuro
- StarLab Living Science
- International Space Federation
- VieLight
- IOMED.it
- Puzzle X
- Atma Buti - NOW N ZEN



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Mazas, Luis L	UdelaR, Montevideo, Uruguay	PO-2 (Tues)
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The Science of CONSCIOUSNESS Conference April 6-11, 2025
Accepted Abstracts 2025 Barcelona

5

Are LLMs Capable of Achieving Consciousness and In turn Artificial General Intelligence?
Paul Mithun PhD
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
There is an ongoing debate regarding whether modern large language models (LLMs) are early, incomplete forms of Artificial General Intelligence (AGI). In this work we first present some prior art search about investigations into consciousness that has occurred across various disciplines. From this literature survey we derive certain features that have been commonly mentioned as features conscious machines will possess. Based on these we show that LLMs do not satisfy any of these criteria, hence are not conscious and cannot achieve AGI. Further, we make a novel proposal: Quantum Natural Language Processing, a recently invented sub discipline of AI, has the potential to create conscious machines.

C - 1

Keywords
artificial general intelligence, strong AI, consciousness

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The Light of Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
This paper provides a way forward from the greatest unanswered question in science and philosophy: ‘What is consciousness?’ The path forward begins with the recognition that ours is an undistinguished, temporary planet in a vaster and relatively timeless universe. Telescope improvements since Galileo have revealed the modern reality: this is no longer the earth- centered reality of Ptolomy and Aristotle. Furthermore, we have today relativity and quantum theories which force scientists and philosopher to forsake the classical scientific method of removing the observer from their world view. This paper recognizes – as a fundamental fact -- that the universe has both physical and spiritual components. We postulate that quantum ‘bing" of Hameroff and Penrose presents the best present

understanding of the spiritual component, which is primitive consciousness. We propose three properties of primitive consciousness: it arises in the brain, it is time- and space- invariant, and it is our true selves, identical among us. We conclude that our home is not the earth, but the universe.

PO - 1 (Mon)

Keywords
consciousness, immortality, our place in the universe

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Mapping the Mind: A Bayesian Framework for Mind-Matter Interaction
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Independent researcher, Stockholm, Sweden

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
A novel Bayesian framework designed to model the influence of consciousness on physical systems is introduced. Drawing on insights from quantum mechanics, parapsychology, and consciousness studies, the model suggests that consciousness, working through intention and attention, has the ability to introduce new information, thereby altering probabilistic behavior and modulating system entropy. The Bayesian framework and the underlying mathematical model are empirically tested in two stages. First, the framework is evaluated against prior research findings to assess alignment, and second, through an experiment designed to validate crucial elements of previous findings. The proposed framework is successfully applied to both prior research results and to the results found in the experiment. As such, by integrating mathematical rigor with empirical validation, this paper presents a new way of studying interactions between consciousness and physical processes, with significant implications for both theoretical and applied research in consciousness studies.

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Keywords
Bayesian framework, Random number generators (RNGs), Consciousness-collapse interpretation, Information theory

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Man as a Biological Prism: The Interrelation between Consciousness, DNA, Amino Acids and Universal Code
Dr. Federico Bisiacchi
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
MAN AS A BIOLOGICAL PRISM A Fractal Model integrating Consciousness, Limbic System, DNA and Quantum Information Author: Dr. Federico Bisiacchi This document presents an innovative framework for understanding the circularity and simultaneity of communication between Consciousness, the Limbic System, and DNA, mediated by the crystalline structure of amino acids. Bridging neurobiology, epigenetics, quantum physics and consciousness studies, the model opens new therapeutic possibilities. Man is portrayed as a “biological prism,” capable of interacting with energetic structures beyond the body and potentially revealing the language of a universal DNA. At the heart of this model lies the idea that the human being is both receiver and transmitter of quantum-biological information. The crystalline structure of amino acids, shaped by DNA and influenced by consciousness, plays a central role in this process by modulating photonic coherence and amplifying bioenergetic signals. The Man as Prism is a part of a Quantum Information System. The Role of DNA in Cellular Communication DNA, beyond being our primary genetic code and the signature of our individuality, acts as a recorder of significant events in our existence through a epigenetic language with modulation functions in cellular communication. This activity occurs through: 1. Gene Expression and Event Recording DNA regulates gene expression in response to biochemical and energetic stimuli, producing targeted proteins and amino acids that enhance cellular adaptability. Each significant experience is recorded in an epigenetic way, embedding memory into matter. 2. Photonic Optimization DNA contributes to the formation of membrane proteins and receptors that facilitate the transmission of biophotons. These light particles, guided by the crystalline structure of amino acids, ensure coherent communication within and between cells. 3. Systemic Synchronization DNA helps coordinate a unified network connecting emotions, organs and tissues, enabling processes such as tissue regeneration, neuroplasticity,

and adaptive responses. This coherence supports the systemic integration of experience. 4. A New Language of Reality The model introduces a dynamic equation of consciousness: C_t = \sum_k O_{2k}^2 \, \mathcal{H}_k(\mathbb{P}_k + \mathbb{M}_k + \mathbb{E}_k) \cdot \mathcal{F}(k) \cdot e^{\Lambda_k} \cdot A(Q_m, R_m) This equation conceptualizes consciousness as an evolving, recursive phenomenon in which each integrated experience enhances informational coherence and opens access to higher levels of awareness. In this sense, consciousness becomes the organizing force behind both biological adaptation and quantum resonance.DNA becomes the medium for understanding a universal coded language, making the Human Being a reflection of cosmic order. Applications and Implications This integrative model offers promising applications, including: • Photobiomodulation protocols based on amino acid resonance. • Nutritional and nutraceutical innovations targeting optical coherence. • Interdisciplinary research linking consciousness, genetics, and quantum biology. Ultimately, this approach reframes the human being as a conscious biological interface—an intelligent, light-sensitive prism—capable of decoding and encoding reality. It paves the way for novel therapeutic paradigms and a deeper understanding of life as a fractal interplay between biology and awareness.

C - 15

Keywords
Consciousness, DNA, Epigenetics, Biophotons, Fractal Systems, Amino Acids, Neurobiology

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The Theory of the Six Main Levels of Consciousness: Rewinding our surface Consciousness

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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
In this presentation, I briefly outline the partially researched theory of The Six Main Levels of Consciousness developed by the philosopher and yogi Srinivas Arka (2013) based on his personal experiences and those of his pupils. I also discuss why it is one of the most exciting recent theories about the nature of consciousness. According to Arka (2013), the levels are common; however, the experiences of each level are unique to each practitioner. When using the heart-based method of meditation known as Arka Dhyana or Intuitive Meditation (IM), practitioners learn to shift their I-ego awareness from their head, known as 'Mind-consciousness' or thinking mind consciousness associated primarily with the Prefrontal Cortex, to the area of the heart, they enter into 'Subliminal Mind consciousness', which governs many of our daily activities. The next level is 'Feeling-mind consciousness' associated with the heart. The heart develops before the brain during our embryological development, and it is at the heart level that intuition begins to ignite. This assertion is consistent with research undertaken by the HeartMath Institute. Unresolved emotional issues often also come to the fore, a phenomenon referred to as the dark side of meditation. With perseverance, practitioners are then taken from feeling to 'Emotional-heart consciousness', where they feel emotions with increasing intensity. The next level involves the soul, where practitioners recognize that they are much more than their personalities; they are 'beings' expressing themselves through their bodies. Comprehending this is easier for people who speak a Latin language; in Spanish, for example, there are two forms of the verb to be … one permanent and one that refers to transient activities. Here, we are talking about the Yo Soy, our essence or presence, also referred to as our soul, that extends to connect with the creative forces of Nature and the Universe (Arka, 2023, unpublished comment). During this level, known as Heart-Soul consciousness, practitioners may develop their primary perception system, which scientists generally know as Extra Sensory Perception (ESP), referred to as siddhis, or supernatural abilities in the yogic system. The next level, Pure Self-consciousness, occurs when practitioners enter the pure, innocent state experienced during their early embodied condition. The eyes of the meditator roll back as they have the direct experience of the fundamental nature of consciousness and reality in the state known as Samadhi. Armchair speculation or the outside-in perspective used by neuroscientists and psychotherapists can't reveal the nature of our consciousness and its different levels; hence, it is only through direct experience that we can uncover its true nature. This theory is, therefore, compelling as it is: Coherent with the order in which our organs develop during our embryological past; Consistent with an inverse order of Fuster's (2002; 2009) evolutionary model of the brain, where everything builds on prior functions and skills, including the control of emotional and instinctual behaviours, Testable by others who want to undertake the inner journey for themselves using a heart-based method like IM, Amenable to qualitative and also quantitative research using appropriate scales

PO - 3 (Wed)

Keywords
consciousness, theory, meditation, levels, thinking mind, prefrontal cortex, feeling heart mind, heart, embryological past, testable, research.

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Path of Least Action and Consciousness
Michael W. Barry
Chiral Technology, Denver, CO, USA. Helical, Denver, CO, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
This paper presents a novel perspective on the origin and evolution of consciousness, framed through the principles of energy conservation, quantum entanglement, and geometric complexity. Central to this framework is the concept of "proto-intent," wherein energy conservation serves as an intrinsic directive shaping the behavior of particles and systems. As quantum entanglement integrates multiple systems, their combined wave functions evolve into higher-order geometries, necessitating advanced energy conservation mechanisms. This feedback loop between complexity and equilibrium catalyzes the emergence of criticality, ultimately giving rise to single-celled organisms. Through evolutionary processes, these primitive life forms evolve into multicellular entities with increasingly intricate structures and behaviors, paving the way for the emergence of consciousness. We explore the interplay of quantum mechanics, system criticality, and evolutionary biology as the driving forces behind this progression. The geometric configurations of wave functions and the phenomenon of entanglement are posited as fundamental to the increasing complexity of biological systems. By linking these quantum processes to the development of intent-driven behaviors in prebiotic systems, we argue that life and consciousness are natural outcomes of physical laws. Furthermore, the paper investigates how advanced geometric arrangements, observed in biological molecules and neural networks, underlie the information processing and energy efficiency crucial to the emergence of higher cognitive functions. This multidisciplinary analysis provides a comprehensive framework for understanding consciousness as an emergent property of systems bound by energy conservation. The implications extend beyond biology to inform fields such as artificial intelligence, quantum biology, and the philosophy of mind, offering insights into the continuity between material and experiential realities. By framing consciousness within the universal principles of energy and geometry, this work contributes to bridging gaps between physical science and cognitive understanding, while proposing new avenues for research into the fundamental nature of life and thought.

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Keywords
path of least action, entanglement, consciousness

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Theory of consciousness and information quanta. Version 2/1
Theory of consciousness and information quanta. Version 2/1. Andrii Atorin
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Good day. I would like to tell you about my "Theory of Consciousness and Quantum of Information" and take part in your conference. The theory uses a mathematical tool to describe the principle of operation of the membrane potential and the action potential in neurons, synaptic plasticity, synaptogenesis, cell adaptation, neurons of the peripheral part of the nervous system, and the mechanism of attention. The uniqueness of the theory is in the interconnectedness of the mathematical parameters of the elements listed above, optimization of biological processes, and fundamentalism. Information about the theory is on my website atotam.com With respect, Atorin Andrey steklolampa@gmail.com

PO - 2 (Tues)

Keywords
Theory of consciousness, synaptic plasticity, synapses, neuron, attention mechanism, neuronal adaptation

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R. L. Kuhn’s Fundamental Questions About Consciousness: Is There Another Philosophical Way To Ask Them?

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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Robert L. Kuhn considers mind-body problem an important one, where mental causation and consciousness are its main aspects; and Qualia constitutes the core of both. Through decades, he had been asking many academics fundamental questions about consciousness in Closer to Truth TV series: 1. Is there consciousness? 2. Is consciousness an illusion or it really exist? 3. What is consciousness? 4. Why does it feel like something inside? In spite of all answers, he ends all episodes about this topic still saying, “We are no closer to truth”. Perhaps there is no truth to get closer to. I highlight answers by David Chalmers, a paradigmatic philosopher on this subject. According to him, consciousness exists, is not an illusion: we know more about our consciousness than anything else. As Descartes said, I can doubt the existence of other minds and things, even my own body. However, I cannot doubt I am conscious at this very moment. Kuhn also said that the expression coined by Chalmers “hard problem of consciousness” is where most contemporary theories of consciousness should commence to answer these questions. But Chalmers also posed two concepts of mind, phenomenal and psychological. Are we confusing one for the other when we ask these questions? If Cartesian “thing which thinks” is a phenomenal mind, we could only ask about consciousness from first person perspective; scientific theories usually try to explain psychological third person mind, which belongs to the “objective” world. We should not start building the subjectivity of other subjects and explain the qualia they experience, explaining consciousness from third person perspective. Instead, as we do not interact directly with the “objective” world-in-itself, we could start our study from our phenomenal subjectivity (the only thing we are 100% sure of). I can only experience my own qualia and attempt to describe them to my human peers, who I believe -I infer from my own experience- exist and experience the world in a similar way. However, I cannot know exactly what it is like to be another person or another sentient being. Chalmers defined qualia as the “the raw sensations of experience.” We can also say they are the phenomenal qualitative experiences that compose our basic sensitive and emotional components of perception: “felt qualities of inner experience.” Someone has to experience qualia to know what they are like. The language we use to try to describe our qualia is not first-person in origin. We learned it from other conscious beings and was created for intersubjective communication: it is in third person. Even though we also use it internally to talk to ourselves, it is still in third person. That is why it is not useful for communicating phenomenal experiences to our peers. Only through metaphors can we partially communicate these phenomenal experiences. That is how we generate the “hard problem of consciousness”. Maybe the question is not whether consciousness exists or not, but if we are asking the right questions.

PO - 2 (Tues)

Keywords
Consciousness; qualia; hard problem; mind

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On ethical perspective in studying consciousness We must study consciousness as vital things not as lifeless objectives. Eastern perspective may contribute to our study.
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
“The Scientific Study of Consciousness Cannot and Should Not Be Morally Neutral.” This is the title of a paper published in 2023 from London university. I agree this claim. In addition, I think consciousness at all has some kind of ethical intention. Our Consciousness must decide at any time. We always make decision as human being. However recently many researchers ignore such obvious things. For example human brain organoid study had started. Human brain organoids (HBOs) are three-dimensional brain tissues cultured from human stem cells. These organoids mimic the developmental trajectories, cellular composition, neural circuits, and anatomical structures of the in vivo human brain They said. I think It is very dangerous to continue HBO study without thinking about ethical problems. As I had already pointed out last year in this conference, western perspective explore all phenomenon after God said in Bible whereas eastern perspective explore from the start of origin. In scientific field , we found a hypothesis and by experiment we want to demonstrate the hypothesis is true. However, if the premise is clearly wrong , it is not meaningful to continue such experiment. We must start from at least from true premise. In Buddhism philosophy there are many sutra about what is consciousness. Typical example is the Yogacara thought that mean all is from thinking only. The word yogacara was translated from vijñapti-mātratā in Sanscrit. Yogakara philosophy include Yoga practice. But even apart from that it has a ethical perpective that Buddhism has. Buddhist 5 point of major ethics are refraining from killing, stealing, sexual misconduct, lying, and intoxication. I think these are common sense for all human

being. So we had better research about consciousness adding these ethical perspective. However HBO experiment to generate consciousness never has such perspective. They say we can make brain neuron from iPSDNA that can construct human brain. Then it must generate consciousness and we can observe consciousness production. I think such kind of thought are not meaningful because this hypothesis is clearly wrong. For example human brain has glia cells. This hypothesis ignore this obvious fact. Starting from wrong premise we could never obtain useful result. I think such kind of experiment make us as guinea pig that always done in medical world even now. We have to be cautious to research consciousness. Most important point is honest thinking. That make us awakening and enlightenment. I am very concerned about scientific view that tend to go back to the dark by using clearly wrong premise. Everybody want to obtain true enlightenment. We are living beings. Our behavior never calculate correctly from equation mode. Scientific perspective tend to forget this too clearly obvious fact. We had better utilize eastern perspective more to learn about consciousness. Not only Buddhist but Hinduism that influence many religion and include many truths. We may forget many important things believing western scientific perspective, too much. I think we had better change our attitude and explore more broad intellectual heritage. Then we may obtain answer for so-called hard problem. .

PO - 3 (Wed)

Keywords
Consciousness study, ethical perspective, Human brain organoid , Yoga Kara philosophy, The Saṃdhinirmocana Sūtra, Heart sutra, Western scientific perspective, Eastern perspective, Indian philosophy, Hinduism Hard Problem

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"Souls create their bodies" - Why consciousness is primary: A Leibnizian reminder
Prof. Harald Walach PhD
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
The "normal" approach of consciousness studies follows the implicit ontology of modern science. This is - by definition, by history and by methodology - materialist. I.e. researchers assume that matter, such as atoms, molecules, their constituents and interactions, are primary, and all higher order properties, such as life and consciousness are secondary by necessity and default. This has created a huge effort to explain how brain activity, mainly the activity of neurons, can give rise to something qualitatively different, namely consciousness. As we know, we are as far from the goal as when the effort began finding traction some 25 years ago. Various authors have now and again pointed out that consciousness is the prerequisite for every aspect of science, for observation, measurement, theory building, experimenting. Then the stringent argument would be: Whatever is a prerequisite for something, cannot be explained by this. If consciousness is a prerequisite, a precondition and a given for doing science, then science and its goal cannot be an explanatory tool for what it presupposes. A simple illustration would be: Mathematics is the precondition for doing good physics. Physics uses and needs mathematics. But physics cannot explain mathematics. Hence, the materialist ontological stance underlying natural science by necessity, history and definition, cannot explain consciousness. Rather, we need to accept that consciousness is primary to, or at least co-primary with, matter. What is needed, then, is an approach that does not try to reduce or explain consciousness within the natural science framework, of, say, neuroscience. Rather, this approach must assume that consciousness is primary or coprimary with material entities. One of the first thinkers at the beginning of the age of enlightenment trying to present such an approach was Gottfried Wilhelm Leibniz (1646-1716). A modern revival in a sense was Alfred North Whitehead’s process philosophy, which gave rise to a pan-psychistic view. I will go back to Leibniz, rehearsing some of his basic arguments for why consciousness is primary and develop his view of matter as the outside image of “souls”. Souls form their bodies, and the co-realisation of the community of individual souls, or the “mechanics of coordination” is in Leibniz’ view his “pre-established harmony”. In a speculative loop one could use the generalized concept of entanglement, as it is known in physics, to reinterpret Leibniz’ pre-established harmony. This would then allow us see how two realms can “interact” without the exchange of energy or particles, and how consciousness can indeed be primary without devaluing the material world and the scientific enterprise to discover its governing laws. It would, however, entail that we need a parallel science that uncovers the regularities that govern this realm of consciousness.

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Keywords
consciousness, Leibniz, pre-established harmony, idealism, hard problem of consciousness

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Mapping the Symphony of Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Consciousness has long been viewed as a “hard problem” due to its inherently subjective nature. Although we understand many of the neural mechanisms in the brain—such as the firing of neurons and synaptic interactions—there remains a gap in explaining how these physical processes generate first-person experience. We draw an analogy to an orchestra performing a symphony: one might ask, “Where exactly is the music located?” It is not in any single instrument, performer, or conductor, nor is it simply a property of written notes on paper. Instead, the “music” emerges transiently from the coordinated interplay of multiple vibrations and resonances, guided by both the musicians and the underlying structure of the composition. By extension, we propose that consciousness emerges from a similarly orchestrated process in the brain. Rather than viewing the brain as a one-way driver of experience, we hypothesize a two-way relationship in which neural activity “plays” consciousness while consciousness, in turn, constrains and organizes the activity—akin to how a musical score both results from and guides the orchestra. From this perspective, we expect to observe phenomena analogous to consonance and dissonance in musical performances, suggesting that consciousness follows internal symmetries or patterns that might be amenable to mapping and quantitative measurement. To investigate these symmetries and interactions, we are developing a tool that applies multiresolution analysis (e.g., wavelet transforms) to decompose signals— whether from synthetic test data, EEG, or other biological recordings—into constituent components across multiple scales. We then map the dynamic relationships among these components, visualizing them as interconnected “clocks” or oscillators. Our approach aims to reverse engineer the equivalent of “sheet music” from the observed “symphony” of signals, thereby revealing how distinct frequencies and phases collectively give rise to emergent patterns. Our preliminary results suggest that these tools can capture nested, multi-scale oscillatory structures that may reflect higher-order organizational principles underlying intelligence and, potentially, consciousness. We will discuss our methodology, provide examples from synthetic and real signals, and outline future steps toward refining this approach for a deeper understanding of how orchestrated dynamics in biological or artificial systems might give rise to intelligence and subjective awareness.

PO - 1 (Mon)

Keywords
Consciousness, Intelligence, Music, Multi-resolution Analysis

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Consciousness as Metaknowledge - the processing of information about information

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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
This talk will offer an updated version of an account of consciousness that I had first presented at the last conference. The Metaknowledge account of consciousness offers a framework to define and understand consciousness in terms of information, and builds upon the following definitions and arguments. Definition 1: Information is not, as is often said, a "difference that makes a difference", but rather only and simply any "difference", i.e. any subsistence of alternative states of matter. Definition 2: Knowledge is what allows information to "make a difference", by converting information in action. For example, if I am given information in a language that I don't know, then that information will make no difference to my actions, and therefore to the world I interact with. Knowledge consists in mental/neuronal (ultimately, informational) structures that allow a determinate source of information to be processed and converted into competent (i.e. "informed") actions. Postulate 1: Information cannot be about itself, or equivalently, information cannot negate itself. For example, an information channel A might transmit the apparently self-negating message "This message does not come from this channel, it comes from channel B", but the literal meaning of the message is clearly and inescapably false. Definition 3: Meta-information is information about other information, e.g. information that would allow to distinguish, in the example above, channel A from channel B. Definition 4: Meta-knowledge is the ability to process meta-information. Postulate 2: Consciousness is a form of knowledge. As the etymology of the word indicates, "consciousness" indicates the capacity to access and process particular sources of information. Conclusion: Consciousness, in its multiple and diverse manifestations, essentially consists in the ability to process meta-information, which we define as meta-knowledge. For example, a philosophical zombie, if such a thing was possible, would be able to process visual and auditory information correctly but it would not be conscious that it is "seeing" something rather than "hearing" it - it could not distinguish what "it feels like" to see red or taste tomatoes, nor act upon such information. Conversely, if and to the extent that it had the capacity to distinguish visual information from auditory, tactile and other sources of information, and process the resulting meta-information - in other words, to the extent it possessed meta-knowledge about sensory inputs - then the zombie would be

phenomenally conscious, and not a "zombie" at all. All living organisms process information to some extent, but not all organisms process meta-information, and those that do possess meta-knowledge to qualitatively and quantitatively varying degrees. The meta-knowledge possessed by human beings is certainly quantitatively, and possibly qualitatively different from that of all other organisms, and yet it is clearly finite and limited. For example, just as an information channel cannot deny itself, it is impossible for human beings to truly conceive of their own death (the absence of their own experience). This talk will lay out the updated Metaknowledge account of consciousness and discuss its implications for the science of consciousness.

PO - 3 (Wed)

Keywords
Information; Knowledge; Consciousness; hard problem; qualia; phenomenal consciousness.

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The role of cortico-subcortical loops in the generation of conscious experiences of speech and music
Prof Edward Jacek Gorzelanczyk Prof[1], Prof Piotr Podlipniak Prof[2]
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Speech and music are uniquely human forms of communication based on auditory modality (Kraus & Slater, 2015). Their comprehension requires the continuous comparison of received auditory signals with previously received ones, a process occurring in the thalamo-cortico-subcortical loops (Gorzelańczyk, 2011). This is facilitated by the connections between the auditory association thalamus, auditory cortex, striatum, and amygdala (Smith et al., 2019), all of which show activity during listening to speech and music. This leads to the conscious experience of spoken words and successive sounds while listening to speech and music, respectively. We hypothesize that the striatum and the cerebral cortex control consciousness, including the experiences of speech and music. Specifically, the cortico-subcortical loops are crucial mechanisms for the integration and processing of information necessary for conscious experience (Grossberg, 2009). In other words, the adequate activity of these loops is essential for inducing and maintaining consciousness. A key premise supporting this view is the fact that anesthetic substances such as propofol and sevoflurane gradually reduce the activity of cortical-subcortical loops and subsequently switch off consciousness (Hudetz, 2012). These anesthetics impact the thalamo-cortical loops and cortico-cortical networks by enhancing the function of GABA (gamma-aminobutyric acid) neurotransmitters, leading to a temporary loss of conscious awareness (Clauss, 2010). The crucial difference between the conscious experience of music and speech lies in the distinction between the preconceptual and conceptual content of our awareness. While the conscious experience of speech is filled with concepts, the experience of musical structure consists mainly of sensations (perceptive qualia) such as pitch, rhythm, and timbre, as well as different emotional states (Huron, 2006). We suggest that this difference is related to the varying proportions of limbic, motor, and associative cortico-subcortical loop activities involved in the processing of music and speech. References Clauss, R. P. (2010). Neurotransmitters in Coma, Vegetative and Minimally Conscious States, pharmacological interventions. Medical Hypotheses, 75(3), 287–290. https://doi.org/https://doi.org/10.1016/j.mehy.2010.03.005 Gorzelańczyk, E. J. (2011). Functional Anatomy, Physiology and Clinical Aspects of Basal Ganglia. In J. F. P. Peres (Ed.), Neuroimaging for Clinicians - Combining Research and Practice. (pp. 89–106). InTech. Grossberg, S. (2009). Cortical and subcortical predictive dynamics and learning during perception, cognition, emotion and action. Philosophical Transactions of the Royal Society B: Biological Sciences, 364(1521), 1223–1234. https://doi.org/10.1098/rstb.2008.0307 Hudetz, A. G. (2012). General Anesthesia and Human Brain Connectivity. Brain Connectivity, 2(6), 291–302. https://doi.org/10.1089/brain.2012.0107 Huron, D. B. (2006). Sweet anticipation: music and the psychology of expectation. The MIT Press. Kraus, N., & Slater, J. (2015). Music and language: relations and disconnections. In M. J. Aminoff, F. Boller, & D. F. Swaab (Eds.), Handbook of Clinical Neurology (Vol. 129, pp. 207–222). Elsevier. https://doi.org/https://doi.org/10.1016/B978-0-444-62630-1.00012-3 Smith, P. H., Uhlrich, D. J., & Manning, K. A. (2019). Evaluation of medial division of the medial geniculate (MGM) and posterior intralaminar nucleus (PIN) inputs to the rat auditory cortex, amygdala, and striatum. Journal of Comparative Neurology, 527(9), 1478–1494. https://doi.org/https://doi.org/10.1002/cne.24644

PO - 1 (Mon)

Keywords:
cortico-subcortical loops, auditory association thalamus, auditory cortex, striatum, music, speech

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Clarifying the Hard Problem
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
I wish to make a small but untrivial point and argue that the original formulation of the hard problem by Chalmers (1995) is misleading, and despite decades of later work, the original formulation keeps sending respectable scientists and philosophers on the wrong path when encountering the hard problem. The first obscuration happens with the question of "why". In 1995, Chalmers asks why should information processing create (conscious) experience. This formulation is misleading because the why-question is eminently answerable: affect, as phenomenal conscious experience, evolved to guide us in uncertain situations (Damasio 2018) — for example. Answers such as Damasio's may or may not be correct, but in any case they do not answer the hard problem. It is not a question of why in this sense, but as I show, many try to answer it. The second obscuration happens with assuming information processing as the ground and conscious experience as the product arising from said ground. If we strive to tackle (as many do, but too many don't) the problem without prior assumptions, we shouldn't assume information processing -- or the physicalist metaphysics it stands on -- as the ground. This, too, is widely discussed in later work, but as my examples show, not widely enough. Relying on the concept of information can lead as deep into the wrong direction, as I argue happening with Mark Solms' (2021) model. The third obscuration happens with conscious experience exemplified by what has been dubbed qualia: "the quality of deep blue, the sensation of middle C" (Chalmers 1995). The subsequent oft-repeated emphasis on qualia as the stand-in for consciousness assumes that consciousness itself is nothing, but rather something that sometimes appears to our mind's eye, already existing indepently. The sheer phrase "conscious experience" hints at the same and could be alternatively characterized as "experience in consciousness", tilting the characterization in a completely different angle. I do not claim that one is right, but to be clear, they should be on equal footing at the beginning of the inquiry. Finally, I argue that the "hard problem of consciousness" as such is a mis-characterization, and rather than a hard problem, we are faced with a hard fact of consciousness that needs explaining. Therefore, I propose that instead of a hard problem we should start with the fact that there is consciousness. The problem is in the explanatory models that cannot account for it. I illustrate the obscurations with examples from biology, physics, neuroscience, and philosophy.

PO - 3 (Wed)

Keywords
hard problem, ontology of consciousness, qualia, information, information processing, entropy, probability

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Exploring Consciousness and Mind through Vedanta philosophy
Pooja Gupta Ph. D, Padmakali Banerjee
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Vedanta Philosophies do not subscribe to the body -mind dichotomy because, in fact, these Philosophies consider mind and body as the basic aspect of the underlying reality of universal unitarity. Amalgamation of soul into super soul and attaining 'Moksha or Nirvana' is the ultimate goal described in various Vedantic texts where consciousness is described as a singular basic entity of the Soul or Atma but when manifested due to Avidya or false identification as- Self(Asmitha) , assumes its pluralism--but here is "One" appearing as many due to only perceptional error. The Vedantic philosophy has considered Mind as the subtle form of matter imbued with Chit(Chetna) to acquire the ability to perceive and think. Consciousness, on the other hand, is considered finer than "mind matter " which is all pervasive, omnipotent, omniscient and eternal. The ancient Seers or Rishis claim that such truth can only be revealed through intuitive research by diving deep into the Self in the process of absorption. Mind & Body are both intertwined and mutually dependent on each other. When mind is disturbed, body too suffers and vice versa. Oriental Philosophies of mind, matter and spirituality often have been ridiculed as being esoteric, unscientific and not verifiable under rigorous standard of modern science. With new discoveries the limits of science have been pushed further and various phenomena, hitherto unexplained, are now tangible and intelligible. Ability of human being to perceive or observe something is much more less than most of the other species living on earth. We cannot see beyond the range of 400--800 nm or can hear not below 20hz and beyond 20000hz. But with the aid of various instruments and sophisticated techniques it would be possible to visualise the realme of unknown realty. On the same analogy one can safely assume that it may be possible some day for science to view the things happening in the mind too. The mind - body dichotomy, mentioned earlier is really problematic. Einstein's theory of mass (matter)--energy convertability provided a base to visualise matter - energy as an inalienably interconnected singular reality ,though under certain conditions they may show up as distinct entities. Quantum mechanics believes in particle -wave duality until an observer ventures to see it. It means that a sub atomic particle can co

exist as a particle and wave at the same time. Its position and speed are probabilistic not deterministic, as if sub atomic particles seem to have their own mind and free will defying all other physical laws of perception. Similarly neural activities going on in the mind seem to defy all known laws of science. Only law that prevails over there is the "Law of Uncertainty " which has been recognised as an intrinsic law of Nature which reigns supreme at the subtle level.

PO - 3 (Wed)

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Language, Time, and Consciousness.
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Deree, Athens, Attica, Greece

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Large language models excel at statistical word correlation yet falls short of achieving genuine conceptual understanding and the real-time adaptability observed in biological intelligence. While language models demonstrate impressive linguistic abilities, they may represent a limited pathway to true consciousness, as biological systems, from humans to octopuses, exhibit sophisticated intelligence rooted in concept formation independent of language itself. The aim of this research is to investigate the feasibility of a bio-inspired AI architecture framework for real-time concept-based processing and whether this approach can move beyond the limitations of current language models to advance the pursuit of artificial consciousness. research questions: [1] Would a biologically inspired architecture focused on dynamic learning and real-time sensory integration overcome potential limitations of language-based AI in achieving a more generalized form of intelligence with more advanced understanding and reasoning? [2] How does decoupling internal conceptual processing from language-centric output affect the adaptability and potential for emergent consciousness in AI? This research employs to, though systematic literature review, evaluate the feasibility of the proposed architecture. Combining different fields, Including Neuroscience, Cognitive science, and Artificial Intelligence. The review will synthesize findings from studies on biological concept formation, neural mechanisms of real-time processing and limitations of current language models. Qualitative analysis will be used to identify key trends and theoretical gaps in existing approaches. The literature review is expected to argue for key limitations of current language-model AI and that their reliance on language limits real abstract concept understanding outside of it. While a brute-force approach might eventually yield some progress with reasoning models, it appears to be a less efficient and potentially less fruitful path. Research on human and animal cognition highlights that while concept formation originates from sensory experience, complex thought processes abstract away from immediate sensory input, allowing for understanding of objects independent of direct perception. A capability that appears to largely be absent in LLMs. This perspective suggests that AI architectures focused on linguistic patterns may face inherent constraints in achieving broader forms of consciousness. Therefore, shifting AI development towards models that prioritize concept learning, decouple internal processing from language based output offers a more promising path to creating truly intelligent artificial systems. Implications would include a potential paradigm shift in the pursuit of general intelligence and artificial consciousness, offering a pathway to more adaptable AI systems. Potential applications include but are not limited to topics such as advanced robotics, complex problem-solving in dynamic environments, and adaptive learning systems. A key contribution lies in emphasizing concept formation and decoupled output interfaces, and allowing real time processing, drawing inspiration from biological cognitive systems. With potential challenges include processing costs and development In conclusion, this literature review argues for a significant shift in AI, advocating for methods aimed at overcoming the limitations of language models in achieving genuine intelligence and consciousness. Future research should prioritize prototype development and empirical validation of this framework. This approach offers a promising direction towards more robust, adaptable, and truly intelligent AI systems, moving beyond the constraints of language based statistics.

PO - 1 (Mon)

Keywords
Concept Learning, General Intelligence, Artificial Consciousness, Language Models, Adaptive AI.

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Disambiguating Consciousness: A Framework for Classifying Conscious Systems (2.0)
Mr. Andrew Proulx
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Consciousness is often conflated with concepts such as subjectivity, awareness, experience, and sentience. By delineating these distinct yet related terms—starting with consciousness, then exploring information processing and subjectivity—this project aims to clarify the convoluted network of existing terminology. After establishing these definitions, I will examine their presence across various systems, from the foundations of existence to complex organisms, illustrating how awareness, subjectivity, and information processing function as the primary forces of consciousness. Building on the work of Nagel (1974), Block (1995), and Chalmers (2023), as well as insights from molecular and evolutionary biology (Godfrey-Smith, 2019; Levin, 2019) and Eastern traditions such as Advaita Vedanta, this framework refines these concepts for scientific inquiry and communication. Here, consciousness is defined as the integration of awareness, subjectivity, and information processing. Awareness—the essence of consciousness—is the fundamental capacity to detect and respond to phenomena. It is intransitive and unconditional, whereas consciousness is functional, transitive, and relational. Awareness manifests through different systems, shaped by their mode of being (subjectivity) and interaction with the world (information processing). This perspective allows for a 2D classification space, where subjectivity and information processing serve as axes for evaluating potentially conscious systems. With this foundation, we propose precise definitions for related concepts—such as agency, intelligence, cognition, and sentience—disambiguating overlapping terms. Finally, we apply this framework across biological and non-biological entities, from humans and animals to plants, rocks, atoms, and artificial neural networks like ChatGPT.

PO - 2 (Tues)

Keywords
Panpsychism, Neutral Monism, Evolutionary Biology, Advaita Vedanta, Perception, Information Processing, Subjectivity, Consciousness

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Synaptic Plasticity, Information Capacity, and Experiential Consciousness
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
The Nobel laureate in economics, Robert Aumann, has offered a subjective definition of consciousness in terms of the ability to experience (Aumann, 2005). In his 2024 follow-up paper, “Why consciousness?”, he suggests that his experiential consciousness serves as the foundation for the evolutionary emergence of incentive which arguably underpins all economic activities. Aumann (2024) also raises the “How” question for experiential consciousness which this paper attempts to address. We propose that experiential consciousness emerges from predictive neuroplasticity at the synaptic level (Halvagal-Zenke, 2023), serving as intermediary between exposure to stimuli and memory-based sensory perception. This yields a measure of the capacity for experiential consciousness in terms of the brain’s capacity for information storage based on the capacity for synaptic plasticity (Samavat et al, 2024). This enables a reexamination of cephalized animals from the perspective of their brains’ information capacity across evolutionary timescales. Aumann RJ, "Consciousness," Discussion Paper, The Federmann Center for the Study of Rationality, Hebrew University (2005) _____, “Why consciousness?”. Neuropsychologia Apr 15;196:108803 (2024) Halvagal M.S., Zenke, F. “The combination of Hebbian and predictive plasticity learns invariant object representations in deep sensory networks”. Nat Neurosci 26, 1906–1915 (2023). Samavat M, TM Bartol, K Harris, and T Sejnowski, “Synaptic Information Storage Capacity Measured With Information Theory”. Neural Computation 36, 781–802 (2024) 1 Southwestern University of Finance and Economics 2National University of Singapore

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Keywords
Synaptic Plasticity, Information Capacity, Experiential Consciousness,Predictive Neuroplasticity, Incentive and Evolution, Memory-Based Sensory Perception, Hebbian Learning

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Consciousness and Psychiatric Practice
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USC, Los Angeles, CA, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
In contemporary psychiatric practice, consciousness is often dismissed as the byproduct of brain biology. Engel's original (1977) Bio-Psycho-Social model sought to explain the interplay among biology, psychology, and sociology. However, misapplication of this idea has led to a hierarchical approach that privileges biological factors at the expense of the intersubjective dimensions of psychology and sociology. I will demonstrate how current medical science could benefit from a more robust understanding of consciousness to improve patient/physician interactions. Shannon's (1948) information theory, with emphasis on "surprise" in communication, suggests that consciousness emerges through active engagement with others. This notion resonates with Sartre's (1943) view of self-awareness, wherein the self is continuously constituted through choices and interactions. Searle (2002) further underscores this point by asserting that consciousness is the foundation upon which agency is built, enabling individuals to exercise meaningful choice. Carlo Rovelli (2016) invites us to "accept the idea that reality is only interaction." This challenges reductionist views that confine meaning and agency to neural processes. Instead, he acknowledges that consciousness arises from countless, reciprocal exchanges between the individual particles that make up larger entities and environments. Consistent with this perspective, Travarthen's (2013) research on child development and embodied consciousness demonstrates how mental states are embedded within social and cultural contexts, shaping capacity for choice and self-determination. Further evidence against reductionism emerges from the study of altered states of consciousness. Research by Shor (1962) and Tart (1969) on hypnotic phenomena reveals that individual agency becomes fluid under certain conditions, consistent with the malleable nature of consciousness. Transformative insights from the 1962 Good Friday Experiment, in which one dose of psilocybin opened new religious depths, illustrate how changes in consciousness interact with deeply held beliefs. These findings challenge the notion of a biological determination, showing that consciousness is also highly responsive to other internal and external influences. Quantum physics also contributes insights that question reductionist assumptions. Phenomena such as entanglement and action at a distance (Bell, 1964) suggests that consciousness is not confined exclusively to neural circuits. In this context, panpsychism—the view that consciousness is a fundamental, pervasive quality of the universe—finds support. Ricard (2017), drawing on Buddhist contemplative wisdom, describes consciousness as a continuum: a primary, luminous awareness that underlies sensory and mental experiences. This perspective dissolves conventional mind–body dualism, asserting that neither matter nor consciousness possesses intrinsic, independent existence; rather, they are one unified reality. Psychiatry's overreliance on biological reductionism neglects the embodied and interdependent aspects of consciousness. Integrating insights from information theory, existential philosophy, interaction research, altered states, quantum phenomena, and contemplative traditions, compels a more holistic approach—one that honors choice and agency and challenges reductionism. My hope for current psychiatry is that greater emphasis on consciousness will allow a synthesis of science with new regard for personal meaning.

PO - 2 (Tues)

Keywords
Panpsychism, Child Development, Biopsychosocial Model, Hypnosis, Reductionism, Psychiatric and Medical Practice, Psychedelics, Culture

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The Persistence of Quantum Coherence in Biological Systems
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
The challenge of maintaining quantum coherence in biological systems has been a central debate in quantum biology and consciousness research. Penrose and Hameroff's Orch-OR theory [1] suggests that microtubules in neurons function as quantum processors, with quantum states persisting long enough to influence cognition. However, a key question remains to be modelled: How can quantum coherence be sustained in a biological environment, traditionally viewed as decoherence-prone? Here, we introduce a thermodynamically grounded framework describing how biological systems regulate quantum coherence through structured energy flux and entropy dissipation. Unlike classical decoherence models that assume a polar aqueous environment, previous studies, such as those by Sahu et al. [2,3], suggest that microtubular structures may support quantum-friendly aromatic ring networks, providing coherence-preserving conditions similar to non-polar environments. However, life as we know it has always been associated with liquid water, a highly polar medium, raising fundamental questions about how coherence is sustained within such thermodynamic constraints.

Life requires a temperature range compatible with metabolism and reproduction, yet temperature inhibits quantum coherence across many physical systems. In non-living systems, coherence is governed by the balance between energy flux, entropy dissipation, and structured information processing. Many quantum-coherent states exhibit a well-defined threshold where thermal entropy quenching occurs, including Bose-Einstein condensates (atomic coherence is lost above a critical temperature); superfluidity (macroscopic quantum effects disappear beyond the lambda transition); .superconductors (thermal fluctuations disrupt Cooper pair coherence); or magnetic order in ferromagnets and antiferromagnets (spin coherence is lost above the Curie or Néel temperature).These systems do not fight to preserve order; their coherence naturally collapses when entropy dominates. In contrast, biological systems actively maintain non-equilibrium conditions and must implement mechanisms to sustain coherence within a polar and thermodynamically constrained environment. We present a quantitative model for coherence maintenance, demonstrating that non-equilibrium energy flux optimizes Frohlich coherence within microtubular structures. Mathematically, our model predicts that quantum coherence persistence is governed by an energy-information balance equation, where structured energy input offsets environmental decoherence effects. This provides testable predictions for microtubular quantum coherence lifetimes and offers a mechanistic explanation for how Orch-OR can be biologically viable over functionally relevant timescales, even in a polar environment. Our model suggests that quantum coherence in biological systems is not just a passive effect but an actively maintained feature of structured information flow, governed by universal thermodynamic constraints. These findings extend beyond cognitive neuroscience to quantum biology, synthetic life research, and artificial intelligence, where understanding coherence regulation is key to developing robust quantum-based computing architectures and next-generation bio-inspired neural networks. References [1] Penrose, R., & Hameroff, S. (2014). Consciousness in the universe: A review of the Orch-OR theory. Physics of Life Reviews, 11(1), 39-78. [2] S. Sahu, et al. (2013). Atomic water channel controlling remarkable properties of a single brain microtubule. Biosensors & Bioelectronics, 47, 141-148. [3] S. Sahu, et al. (2013). Multi-level memory-switching properties of a single brain microtubule. Applied Physics Letters, 102, 123701. [4] Frohlich, H. (1968). Long-range coherence and energy storage in biological systems. International Journal of Quantum Chemistry, 2(5), 641-649.

C - 11
Keywords - Orch-OR, consciousness, Microtubules, Quantum coherence, quantum biology

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CONSCIOUSNESS IS THE ONTOLOGICAL PRIMITIVE OF THE UNIVERSE
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
Consciousness is not a byproduct of the physical brain but the fundamental ground of existence from which space, time, matter, and energy arise. Rather than being confined to individual minds, consciousness is a non-local field of infinite potential, shaping and perceiving reality simultaneously. The universe, as we experience it, is not external to us but unfolds within this awareness. In this view, the boundaries between observer and observed, thinker and thought, dissolve into a unified field of being, aligning with both ancient Vedic wisdom and insights from quantum mechanics, where entanglement and superposition challenge conventional materialist paradigms. This perspective invites a radical shift in how we understand selfhood, perception, and the nature of reality itself. By embracing consciousness as the foundation of existence, we move beyond fragmentation toward wholeness, recognizing that we are not separate entities in a mechanistic universe but the creators and experiences of all that is. This presentation will explore the implications of consciousness as the primary reality, bridging Eastern metaphysical traditions with contemporary scientific discourse.
PL-14

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On Pure Consciousness of Autopoietic Machines. From Minimal Phenomenal Selfhood to Minimal Phenomenal Experience
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[01.01].....The concept of consciousness

Abstract
The case of study described in this article is based on a neurophenomenological research project that will experiment with the simplest form of conscious experience humans are capable of or pure consciousness (PC), firstly, to prove its empirical existence, secondly, to

disentangle its core causal factors, and thirdly, to attest its content-properties. Deleting and maximizing the unit of identification (UI) are the two channels to analyze empirically PC, a type of minimal phenomenal experience (MPE), within the model of the Ascending Reticular Activation System (ARAS), the minimal form of phenomenal experience and the minimal phenomenal selfhood (MPS), mainly the thresholds of electrical frequencies of the brain during the analyzed states, their correlations and simulations, and subjective reports. Does an all-pervading form of conscious experience exist? Which phenomenal characteristics does PC entail? And based on this, can a minimal model for conscious experience as such be developed? Such a minimal model will enable a profounder scope of psychopathologies grounded on a wider understanding of the physiological and electrical thresholds for the emergence of diverse states of consciousness from health and altered ones to mental disorders, whereas the technological interfaces used for their research may be used for therapeutic purposes grounded on the correlation between phenomenology and physiology.

PO - 3 (Wed)

Keywords
Keywords: Pure consciousness (PC; pure awareness), minimal phenomenal experience (MPE), minimal phenomenal selfhood (MPS), signal and model of the Ascending Reticular Activation System (ARAS), Epistemic Agent Model (EAM), phenomenal model of intentional relation (PMIR)

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Abstraction and the Explanatory Gap
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.02].....Materialism and dualism

Abstract
The explanatory gap between consciousness and science can be understood only in contrast to those things with an adequate scientific explanation. Scientific explanation is built on the measurement of time, distance and mass etc. and relationship concepts such as true, equal to, etc. all of which are derived by the collective abstraction of many subjective experiences. Measurement and mathematics, because they are uniform across the whole of humanity, create an abstract symbiosis of all the separate consciousnesses. Those concepts supported by the symbiosis are of unique authority from which accepted explanations can be derived. Although they retain not one iota of the subjective experiences from which they were abstracted, they retain the authenticity of the subjective experience so that with education they provide concepts needed for effective explanation to generations of individuals. The explanatory gap regarding consciousness derives from the fact that there is no analogous abstraction of the totality of mental processes of the human mind, in particular consciousness. Turing's defined 'thinking' as that portion of human mental function that can be represented by a computational algorithm and that abstraction validated by the imitation game. To define the limits of symbiotic abstraction of human mentation, and document that via the imitation game, it is needed to further develop that approach to model the totality of externally observable individual behavior. Despite the current successes of large language model artificial intelligence, it is suggested that abstraction of this totality human external behavior capable of passing a total individual Turing Test is impossible pending the development of quantum and other advanced methods. Consciousness and its associated features like free will, qualia, etc. are intrinsically not observable and cannot be abstracted directly into the symbiosis. Non-observables entities such as black holes, quarks, etc. are identified, validated and explained as the most parsimonious understanding consistent with the structure of ideas anchored in the observables. Consciousness is irreducibly idiosyncratic and non-material and therefore irretrievably not possible to directly abstract. Therefore, a Materialist explanation within the current understanding is impossible. Dualism, the imputation that consciousness does exist distinct from matter as currently understood is the most parsimonious theory but fails for lack of a plausible interface with current physics. Entanglement and the mechanism of quantum collapse are established phenomena within physics not by any known material mechanism. Further understanding of these phenomena may provide the conceptual basis for an understanding that is. both abstract physicalist – within physics, and non-material – dualist, model of consciousnesses with no explanatory gap.

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Keywords
Explanatory Gap, Abstraction, Explanation, Dualism, Turing

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Superluminal Conjectures About Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.02].....Materialism and dualism

Abstract
Six Conjectures About Consciousness 1. Regarding the speed of light there are two alternatives in the mathematical formulation of the Theory of Special Relativity. For the first alternative the speed of light is the maximum speed attainable for any object. It is the alternative that represents the subluminal material world. I have the conjecture that the second alternative represents a parallel reality of superluminal entities and that, as opposed to the material one, this reality is the spiritual Superluminal World of Consciousness. Superluminal Consciousness is the source of Consciousness in all its expressions in living beings. 2. The Universe exists by the realization of Superluminal Consciousness that runs superluminally: as much as it wants faster than light. Superluminal Consciousness is God. 3. Superluminal Consciousness configures the Universe at successive levels of complexity to be the stage of development of Life. It radiates consciousnesses entities that animate increasingly complex beings. The radiation of the Superluminal Consciousness, whether as sparks or as immense flames, are souls that live Life in time as an experience to achieve indefinitely superluminal state as spirits sharing with the Superluminal Consciousness in the Superluminal Consciousness World. 4. A clue to imagine the superluminal nature is in dreams. Those timeless, non-local states that we experience in dreams lead me to imagine how the superluminal state could be experienced: a conscious, continuous, shared dream, full of creativity and fantasy and with access to all information of the universe in the past, at present times and foreseeable future times. 5. Life is a great Game project continuously dreamed of by Superluminal Consciousness World and carried out on the stage of subluminal material reality by the living souls. 6. Many of those souls playing in human bodies succumb to the mental capacities of the human brains, thus diminishing or even losing their belonging to the Superluminal Consciousness World and their commitment to the Life Game project. Superluminality implies non-locality, absolute simultaneity, the quantum state of Nature.

PO - 3 (Wed)

Keywords
superluminality, non-locality, superluminal consciousness world, conscious entities, dreams, life game

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Cosmic Cycles of Consciousness: Entropy, Archetypes, and the Primordial Superconsciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.03].....Panpsychism and cosmopsychism

Abstract
This study presents a novel theoretical framework integrating archetypal theory, quantum physics, and cosmology, viewing consciousness as part of a cyclical, self-sustaining process originating from a primordial superconsciousness, conceptualized as an ouroboros. At the universe's inception, this superconsciousness existed in a state of maximum entropy, which fragmented through an "entropy break" at the Big Bang, leading to the emergence of differentiated structures. Drawing from Jungian and post-Jungian thought (Jung, 1952; Hillman, 1975), the model reinterprets entropy as a creative mechanism driving both fragmentation and reconnection to the original state, forming a continuous loop of unity and differentiation. Archetypes are integrated into this framework as latent structures within the universe’s void, emerging as cosmic phenomena that manifest through complexity, from subatomic particles to galaxies. This bridges depth psychology with cosmological theories, suggesting that archetypal patterns guide the development of consciousness across cosmic cycles (Prigogine, 1980). The concept of kairos is highlighted as moments where individual consciousness reconnects with the superconscious field, allowing access to archetypal symbols and insights. The study also explores empirical pathways, proposing that specific brain oscillations, such as theta and gamma waves, may correlate with kairotic experiences, signaling points of reconnection (Hameroff & Penrose, 2014). This interdisciplinary approach redefines unconsciousness as an adaptive, dynamic structure supporting the emergence of consciousness within a vast cosmic order. By framing the universe as a psychological and physical system, it offers fresh perspectives on the evolution of self-awareness and the universe's inherent drive towards unity, integrating concepts from panpsychism (Goff, 2019) and new interpretations of quantum mechanics (Rosenblum & Kuttner, 2006).

PO - 2 (Tues)

Keywords
Superconsciousness, Entropy, Archetypes, Cosmic Void, Ouroboros, Kairos, Consciousness, Neuroscience, Complexity, Cosmology, Panpsychism, Quantum Physics, Emergent Systems, Individuation

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Consciousness, Nature, and the Twist of Innovation
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.03].....Panpsychism and cosmopsychism

Abstract
Nature’s intelligence exceeds human intelligence. Research documents numerous examples of nature restoring and refreshing itself far beyond what we can achieve with our technologies. Knowing this—that human intelligence is embedded in a wider matrix of intelligence—this paper invites us to “untwist” our twisted perception of nature as merely a collection of insentient objects for us to exploit. Instead, it argues that our technological innovations should be informed and inspired by natural processes and should be benchmarked against a new perspective that recognizes and honors nature’s innate intelligence. We can learn directly from nature through intersubjective communication and communion with its intrinsic sentience. However, to achieve this goal, science needs to undergo a radical revolution—from exclusively sensory empiricism to a more comprehensive radical empiricism that acknowledges the validity of non-sensory data, such as feelings and intuitions. This paper is a call to include intersubjective consciousness in our research labs and enterprises—for the benefit of all species.

PO - 2 (Tues)

Keywords
Nature's intelligence, Intersubjective consciousness, Innovation, Technology

7

The Polynon: A Geometry of Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
This work presents a geometric framework for cognition, centered on a conceptual polytope, the Polynon, to explore consciousness and its relationship with physical reality. Adopting an analytic idealist stance, the Polynon posits consciousness as the foundational element of existence, preceding physical phenomena. A polynonial mechanism is introduced, offering a geometric and ontological interpretation of consciousness, where both reality and the observer unfold as holographic projections. This framework maps consciousness by analyzing epistemological interactions among phenomena (sensory experience), phantasiai (internal representations), and noumena (underlying reality). Cognitive gravity and gradients provide metrics for cognitive dimensions, while a continuum of perceptual dimensions is proposed, with the wavefunction in superposition linking the observer’s cognition to hidden physical realities. This model connects cognition to reality’s structure, proposing a new mechanism for the observer’s measurement.

PO - 2 (Tues)

Keywords
Consciousness, Hologram, Cognitive Gravity, Noumena, Wavefunction

13

How subjective memories are realized in TGD inspired theory of consciousness?
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
We remember our conscious experiences, also as re-experiences, and not just as learned, often unconscious, behaviors that reduce to associations. In the standard ontology of quantum theory. The information of the conscious experience, if determined by the quantum jump, must be about the initial and the final states of the quantum jump and the transition between them. In the standard ontology of quantum theory, it cannot be represented by the final state of the quantum jump. According to the standard quantum theory, quantum states 3-D time=constant snapshots and do not remember anything about the previous quantum jumps. In TGD, the zero energy ontology (ZEO) combined with holography = holomorphy vision suggests a universal mechanism of memory storage and recall. The slight non-determinism of the classical field equations, determining the space-time surface, implies that quantum states are superpositions of space-time surfaces analogous to 4-D Bohr orbits for 3-surfaces as particles. In standard ontology they would be superpositions of 3-surfaces. State function reductions (SFRs) occur between these states and the information about the initial state (in 3-D sense) and about transition to the final state (in 3-D sense) is coded to the Bohr orbits associated with the final state (in 4-D sense). The slight on-determinism makes possible memory recall in ZEO. The proposed mechanism is universal and applies also to matter, which is usually regarded as "dead" (since it looks dead in the time scales of our perceptive abilities). This justifies the notion of the 4-dimensional brain. The notion of memory is discussed from the points of view of computer science and neuroscience, of quantum theories of consciousness, and of TGD inspired theory of consciousness. References Pitkänen, M. How subjective memories are realized in TGD inspired theory of consciousness? https://tgdtheory.fi/public_html/articles/Bmemorytgd.pdf, 2024. Pitkänen, M. About Langlands correspondence in the TGD framework, 2024. https://tgdtheory.fi/public_html/articles/Frenkel.pdf. Minev~ZK et~al. To catch and reverse a quantum jump mid-flight, 2019. https://arxiv.org/abs/1803.00545. Pitkänen, M. Copenhagen interpretation dead: long live ZEO based quantum measurement theory!, 2019 https://tgdtheory.fi/public_html/articles/Bohrdead.pdf. Pitkänen, M. Zero Energy Ontology, 2023. https://tgdtheory.fi/pdfpool/ZEO.pdf. Pitkänen, M. New result about causal diamonds from the TGD view point of view, 2023. https://tgdtheory.fi/public_html/articles/CDconformal.pdf, 2023. Pitkänen, M. Comparison of Orch-OR hypothesis with the TGD point of view, 2022. https://tgdtheory.fi/public_html/articles/penrose.pdf. Pitkänen, M. How animals without brain can behave as if they had brain?, 2022. https://tgdtheory.fi/public_html/articles/precns.pdf. Pitkänen, M. About long range electromagnetic quantum coherence in TGD Universe, 2023. https://tgdtheory.fi/public_html/articles/hem.pdf, 2023.

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Keywords
Quantum consciousness, quantum biology, quantum ontology, quantum measurement problem, conscious memory

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Triple Definition or Explanation of Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
The author argues that consciousness, just like matter and energy, time and space, life and self, knowledge and intelligence, and language and meaning, may never be defined or explained fundamentally or comprehensively as an entity or its property. As an alternative, the author created a theoretical mind with matter, energy, and lives as its components, and with all its components defined as changes. Based on the relationships among these three components, a triple definition or explanation of consciousness is reached: • Ontologically, consciousness is universal, since it is the distinction between matter and energy. • Epistemologically, consciousness is unique, since it is the energy formalized, qualified, or diversified by the matter. • Semantically, consciousness is a meaningless

language with lives as its only meaning. Many theories of consciousness have overlooked this universality or uniqueness and have even ignored that lives are the only cause or effect of consciousness. No consciousness is possible if there is no life.

PO - 2 (Tues)

Keywords
agency, agent, brain, consciousness, definition, emergence, emotion, HOTs, intelligence, ITT, language, life, memory, mind, neural correlates, neuroscience, philosophical theory, the self

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Metaphors are Valuable In Summarizing Solutions to The Mind-Body Problem. Two Are Considered Here: "Inside Versus Outside" and "First-Person Versus Third-Person"
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Oxford, Oxfordshire, United Kingdom

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
"Inside versus outside" is the metaphor that "from the outside" humans are physical bodies, specifically brains; whereas "from the inside" humans are minds. Probably this also applies to some higher animals. The panpsychist extension of this is that all individual entities "from the outside" have the character of physical systems; whereas, "from the inside" they are mind like. This applies even to the fundamental entities of physics. There are problems with this "two sided" picture. First, it is unclear whether the "outside view" is fundamental, in which case, this is a type of physicalism. Or the "inside view" might be fundamental, in which case this is a kind of idealism. Or they might be co equal, in which case this is a kind of double aspect monism. Second, there is an explanatory gap because no explanation has been given as to how these vastly contrasting viewpoints are related to one another. My position, pan-idealism, is a specific kind of idealism, so the "inside view" is fundamental. It is also a type of (non physicalist) panpsychism, because (with trivial qualifications) it agrees with the best current scientific account of the catalogue of the individual entities that exist: It is thus realist. In pan-idealism, the "outside view" (aka "objective physics") does not exist as anything extra. Instead, it is identically the maximally correlated structural information combined from the percepts of all entities. "First-person versus third-person" is a related analogy. Now we say, "from the first-person viewpoint," instead of "from the inside." Likewise, we say "from the third-person viewpoint" instead of "from the outside." The "third-person viewpoint" is also called the "objective viewpoint" (of physics). Initially, the argument proceeds in the same manner: "From the third-person viewpoint" humans are physical bodies, whereas "from the first-person viewpoint" humans are minds. How does pan-idealism fit into this "grammatical persons" picture? Pan-idealism is a specific kind of idealism, so the "first person viewpoint" is fundamental. It is also a type of (non physicalist) panpsychism, because it agrees with the best current scientific account of the catalogue of the individual entities that exist. Despite its idealism, it is a realist theory. With this new metaphor, we can characterise objective physics in a novel, and neater way. Pan-idealism does not involve a mythical "impersonal third-person viewpoint" at all. Instead, it uses the "second-person viewpoint," which is a standard term for "the intersubjective viewpoint." In pan-idealism, the "second-person viewpoint" (aka "objective physics") does not exist as anything extra. Instead, it is identically the maximally correlated structural information combined from the percepts of all entities. Several facts enable pan-idealism to be fleshed out – in principle – in a manner consistent with contemporary physics: our only access to the universe is through our senses; science is entirely mentalistic (empirical plus theoretical); panpsychism prevents physics from being anthropocentric or gappy; in pan-idealism, the sole form of causation is through competing agents; the temporal evolution of the universe is a "process."

C - 3

Keywords - Metaphor, Ontology, Science, Mind-Body Problem

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The Boundary Problem: Why Constitutive Panpsychists Should Endorse a Powerful Qualities Theory of Properties
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
Constitutive panpsychists hold that macrophenomenal properties are ontologically dependent upon and constituted by microphenomenal properties. As David Chalmers puts it, “constitutive panpsychists hold that microexperiences somehow add up to yield macroexperience” (2017, 25). Macrophenomenal properties and the experiences of which they are constitutive are not ontologically fundamental or basic, they are the aggregate sum of a combination of microphenomenal experiences and their constitutive properties. One of the central challenges posed for constitutive panpsychism is the combination problem. In brief, the problem is over how discrete microphenomenal properties can combine to generate the sorts of unified macroexperiences had by cognitive systems such as us. In this paper, we focus on the boundary problem, which is an aspect of the combination problem. In brief, the boundary problem can be expressed as follows: assuming that conscious macroexperiences have boundaries that individuate subjects, “[w]hat element of the natural world dictates the way these boundaries are drawn?” (Rosenberg 2004, 80). Elsewhere, we have argued that the boundary problem is especially acute for Russellian constitutive panpsychists, who endorse quidditism. According to quidditism, “the essence of a property puts no constraint whatsoever on how its instances are disposed to act or react under various circumstances” (Choi and Fara 2018). If the causal-dispositional profile of properties is contingent, then we lack a principled way to account for why properties combine to yield discrete macroexperiences with the boundaries they have. Explaining how macrophenomenal experiences have certain boundaries rather than others is rendered mysterious if their causal-dispositional profile is contingent. Given quidditism’s shortcomings, we argue that constitutive panpsychists would do better to reject quidditism in favor of a theory of properties understood as powerful qualities. On such a view, the properties of objects are dispositional under one description and categorical under another (Martin 2007; Heil 2020). There are independent reasons to endorse an ontology of properties as powerful qualities, but here we focus on the utility of such an ontology for the purposes of solving the boundary problem. A powerful qualities conception of properties can provide a principled basis for a solution to the problem. Specifically, we argue that phenomenal boundaries will be identical with the boundaries of discrete cognitive systems. Such systems exhibit a unity owing to the functional integration of their constituent parts, which is delivered by the dispositional profiles of the properties of said parts. Given that the dispositional profiles of properties are essential to their identity, composition is restricted: not just any collection of objects can compose some further object. Thus, the boundaries of cognitive systems are essential to their identities and, hence, macrophenomenal boundaries are dictated by the properties of the objects that compose a cognitive system. The boundaries of macroexperiences will be provided by the structure imposed on systems of microbjects by their properties qua powerful qualities. In presenting our account, we note the differences between our own proposal and a similar proposal defended by Hedda Hassell Mørch (2020), arguing that our proposal ought to be preferred.

C - 3
Keywords - Consciousness; Panpsychism; Ontology; Properties; Boundary Problem; Quidditism; Powers

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Introduction to Self-Reference
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
I will present an introduction to self-reference. The definition of self-reference will be presented, namely the entity with the property of looking-back-at-itself, and from this definition it will be shown how the entire world is obtained. Through repeated look-backs-at-itself, self-reference starts from the first self-identification, “I am”, which is experienced as the sensation of being alive, and continues to more complex self-identifications like the next "I am "I am"" and even more complex ones such as I am [“I am” & “I am ‘I am’” & <“I am” & “I am ‘I am'">], this being reminiscent of the von Neumann construction of numbers in set theory , ending up with the entire world being self-reference itself. In this process, it is shown how consciousness is the direct consequence of self-reference and how qualia present an inclusion and transcendence structure as a direct consequence of self-reference including and transcending itself. The qualities of qualia will be explained as the meaning that self-reference acquires through the process of defining itself relative to itself. Depending on how self-reference defines itself as meaning relative to itself as context, it will feel in different ways, thus different qualia will be experienced. It will be shown that the definition of self-reference implies an interplay between form and formless, making it in the end an entity that cannot be spoken about, though at the same time responsible for the creation of the entire world. This is similar to teachings from the spiritual practices, while at the same time I'm offering serious theoretical groundings that no spiritual teaching offer. Parallels with set theory will be made along the way. For more details, my paper "How Self-Reference Builds the World" can be read: https://philpapers.org/rec/VISHSB"

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Keywords - self-reference, consciousness, qualia, meaning, context, form, formless, set theory

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Exploring the Intersection of the Diamond Model and Circle Consciousness – A Meta-Morphic Approach to Expanding Awareness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
“You are the world”-- J. Krishnamurti If the external is deeply informed by the internal, if the collective is perpetually reformed by the individual, and if the whole is continuously transformed by the part, then does the understanding of consciousness bring remembrance of the Totality? This presentation introduces a novel synthesis of Nish Dubashia’s Diamond Model of Consciousness and Jiyun Park’s Circle Consciousness, proposing a dynamical framework for understanding the multi-dimensional and fluid nature of consciousness. Rather than viewing consciousness as a static, linear construct, we explore it as an evolving, omni-directional process, unfolding and enfolding through cyclical and spiral dynamics. By conceptualizing consciousness as an adaptive, living system, we suggest it operates across multiple dimensions and energetic densities, including a deeper ground of being. Drawing from both ancient wisdom traditions, such as Vedic philosophy and indigenous cosmologies, as well as from modern scientific principles, we offer a balanced approach that integrates spiritual perspectives with contemporary research on consciousness. Specifically, this framework aims to create and embody a higher-order perspective that includes and situates light and dark, old and new, real and unreal, known and unknown. This framework integrates insights from neuroscience, quantum mechanics, and systems theory with ancient consciousness models, suggesting new paths for trans-disciplinary research. Quantum entanglement and non-locality resonate with metaphysical views, bridging science and spirituality. Holomorphic geometries, such as mandalas and the Sri Yantra, symbolize unity and interconnectedness, aligning with biophysical and neurological processes. Drawing on neuroscience and quantum field theory, we propose consciousness as an emergent phenomenon, continuously shaped by cyclical patterns of transformation. This aligns with modern research in cognitive and complexity sciences, affirming consciousness as a dynamic, adaptive process. We also explore practical applications, such as techniques by Marie Murtagh, which enhance body-mind integration and neuroplasticity to access expanded states of awareness. This embodied approach offers valuable tools for wellness, personal development, and self-realization. By bridging science and spirituality, this framework invites a more integrated understanding of consciousness and reality.

Art-Tech-Health Demo

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The Substance of Experience: An Exploration of Ontology
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
The current debate concerning the nature of phenomenal consciousness has rapidly become one of the most pressing questions in contemporary philosophy of mind. In light of the serious challenges facing materialism, such as the hard problem of consciousness, alternative paradigms need to be considered. This paper defends the idea that monistic idealism is a more viable metaphysical paradigm than is materialism. The conventional materialist view holds that matter is the substance of the universe, and this matter is taken to be non-phenomenal in nature. However, a rigorous analysis of the nature of consciousness and the limits of physical science throws this assumption into question. First, a brief personal narrative of this writer’s philosophical journey of discovery is provided, chronicling my conversion from materialist to idealist. This is followed by a logical analysis of phenomenal consciousness and the foundation of knowledge. A series of arguments drawing from this analysis, plus the relevant philosophical literature, are laid out in defense of the paradigm proposed. Lastly, it is argued that scientific realism, and by extension, physicalism, are in fact wholly compatible with monistic idealism if a panpsychist position is adopted.

PO - 2 (Tues)

Keywords
Ontology, metaphysics, panpsychism, idealism, materialism, the hard problem, vedanta, epistemology, philosophy of science, phenomenal consciousness, paradigm shift

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Consciousness and Free Will are Quantum Properties of Being
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
Free will without consciousness cannot exist. Consciousness without free will has no causal power and is therefore impotent. We cannot explain consciousness and free will with mathematics (mathematics is created by consciousness) or with something that does not have those properties to begin with. Consequently, we must postulate the existence of consciousness and free will from the origin of the universe. If we do that, the quantum fields must be conscious and have free will, and we can then explain why quantum field theory must have the baffling properties (superposition, entanglement, and quantum state collapse) that have puzzled scientists for the last 100 years. This convincing explanation confirms the soundness of the postulate. And if we start from this postulate, the nature of reality is completely different from what we believe now!

PL-14

Keywords
Consciousness, free will, quantum fields, nature of reality

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A Buddhist Perspective on Artificial Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
The Renewed Centrality of Consciousness Research The rapid advancements in artificial intelligence (AI), particularly in Large Language Models (LLMs), have reinvigorated the age-old inquiry into the nature of consciousness and its relationship with the brain, body, and matter. Understanding consciousness is now crucial for shaping ethical frameworks in human–machine interactions, in the treatment of non-human animals, and in biotechnological research, not to mention emerging fields that anticipate transhuman or posthuman scenarios—such as synthetic biology, biocomputing, and the possibility of consciousness uploading. These scenarios, once confined to the realm of science fiction, are becoming increasingly plausible, accelerated by AI's rapid development. The Epistemological Framework of Contemporary Contemplative Research The study of consciousness should not be the exclusive domain of the "hard sciences." Now more than ever, rigorous and nuanced philosophical frameworks are needed to refine research questions and guide scientific inquiry. Beyond the contributions of contemporary philosophers, the ancient contemplative traditions of Asia have explored consciousness for millennia, not only through philosophical analysis but also through direct phenomenological investigation. In other words, these traditions employ "first-person" methodologies, using meditative practice to explore different states of consciousness and delve into its very nature. While traditionally expressed in religious language, their insights remain highly relevant today—but only if they are placed in dialogue with empirical sciences, which primarily rely on "third-person" methodologies. Integrating "first-person" and "third-person" approaches—connecting contemplative traditions with psychology and neuroscience—is a key challenge in contemporary contemplative research. This emerging field has been the focus of my work in recent years, leading to my involvement in the creation of a groundbreaking postgraduate program at the University of Padua and a few major conferences mentioned in my bio. Buddhist Contributions to Consciousness Research Within this epistemological framework, my talk will explore key insights from Tibetan Buddhism, my primary area of expertise. I will begin precisely by posing this question: From a Buddhist perspective, could current AI systems, which replicate human-like cognitive processes, possess any degree of consciousness? Anticipating some of my conclusions, contemporary LLMs are most likely no more conscious than a toaster or vacuum cleaner—or, rather, they are no more conscious than the raw materials from which they are composed. This is because Buddhism ultimately endorses a non-dualistic perspective on the relationship between matter and consciousness. Therefore, the challenge lies in understanding how a minimal, diffuse level of consciousness (or proto-consciousness) encompassing all matter might give rise to subjective experience—a view that

aligns Buddhism with contemporary panpsychist theories. In this inquiry, Buddhism challenges widely held assumptions that consciousness arises solely from neural complexity or correlates directly with intelligence: the deepest meditative states described in Buddhist texts are characterized by minimal or even absent cognitive activity; yet, according to this tradition, they provide the purest experience of consciousness itself. Therefore, in addition to its philosophical contributions, Buddhism may also offer valuable contributions to neurophenomenological research, enabling empirical studies with expert practitioners capable of accessing such deep states of consciousness, like samadhi and lucid sleep.

C - 12

Keywords
Buddhism, artificial consciousness, AI, panpsychism, neurophenomenology, meditative states, non-dualism, transhumanism

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B. Kastrup's ontology and dreams.
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Free-lancer, Santiago, Chile

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
Dutch philosopher Bernardo Kastrup has presented a compelling critique of mainstream metaphysical physicalism by proposing a consciousness-only ontology. He posits the existence of a universal consciousness, an independent reality in itself. In this framework, living beings should be akin to consciousness whirlpools. The images we perceive, which constitute our empirical reality, arise from the interaction between an individual's consciousness and the universal consciousness. Sense data represent both this universal consciousness and other living beings. Because these representations involve similar elements, the experiential images are comparable for all humans and cannot be altered by an individual's will. Representations correlate with the subject's experiences. In this context, I shall hypothesize that the conclusions drawn here assume the invariability of our everyday empirical images under all circumstances. The absence of empirical images representing another person's consciousness, coupled with observations showing how psychedelics induce intense experiences in subjects with reduced representation in brain scans, suggests that our everyday experiential images are not only incomplete but may also be altered by other methods. Lucid dreams present a promising opportunity to create new experiential images including the ability to control dream sequences. This capability addresses a major challenge to a key criticism concerning the distinction between waking experiences and dreams. Research into lucid dreams could help us determine whether the images we experience daily represent the only possible form of experiential reality or if we can expand them into new empirical scenarios. This paper explores this aspect of Kastrup's ontology that could enhance the human potential to create new empirical realities.

PO - 1 (Mon)

Keywords
Kastrup, consciousness, dreams, lucid dreams

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Ontological diversity in fundamental physics and its significance for consciousness research
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
Many modern theories of consciousness seek to be consistent with prevailing scientific theories of the physical. While ontological flexibilities and current uncertainties in physical laws permit a diversity of options, it remains valuable to monitor ideas at the forefront of physical science as they continue to evolve. Such ideas potentially generate constraints, implications, or new flexibility for those theories that seek to explain the relationship between physical processes and conscious experience. We claim that consciousness theorists can benefit from engaging in a structured fashion with the ongoing ontological debates built around explaining physical

phenomena, particularly the work of physicists and philosophers of physics. A prime example is how recent debates around quantum measurement and wave function collapse have generated notable advances in the science of consciousness. In this work, we present the results of a structured literature review of explicitly ontological theories advanced in recent years with respect to fundamental physics. We extract 24 distinct theoretical positions from 22 papers shortlisted out of the 182 papers that appear in our 2018–2023 Scopus search, providing a recent position on most major schools of thought. The papers provide a recent perspective on many dominant theoretical interpretations of quantum mechanics and Quantum Field Theory, including Bohmian, Bohrian, relational, GRW, and structural realist perspectives. For each paper, we extract the fundamental entities suggested by the theory's ontology (particles, fields, relations, etc.) and outline supporting details. Our findings reveal significant variety across these recent papers. However, we suggest they can be partially captured in their position on eight axes: substrate perspective, property ontology, property plurality, dimensional ontology, dimensional plurality, allowed interactions, world plurality, and intuition rejection (i.e., which intuitions of classical mechanics they reject and which they maintain, such as locality or spatial dimensionality). This suggested taxonomy could help consciousness theorists more effectively engage with and draw insights from contemporary debates in physics. Finally, we outline three specific points of relevance for consciousness theorists interested in engaging with ontological theories in physics: (i) Three strategies for maintaining an "enlightened agnosticism" about physical ontologies; (ii) A default weakening of ontologically-grounded arguments about particular consciousness theories, while also outlining potential methods for re-bolstering those arguments; (iii) An exploitable parallel between physical ontologies and philosophy of mind concerning choices of intuition to preserve, leading to a specific potential joint endeavour between the disciplines.

PO - 1 (Mon)

Keywords
Ontology, Theories of consciousness, Correlates of consciousness, Quantum mechanics, General relativity

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Electromagnetic field theories of consciousness and neurophenomenology of N,N-Dimetyltryptamine (DMT): How can they inform each other?
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University of Vienna, Vienna, Austria

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
This presentation explores the intersection of electromagnetic field (EMF) theories of consciousness and the neurophenomenology of N,N-Dimethyltryptamine (DMT) experiences, examining how these perspectives can mutually inform one another. EMF theories propose that consciousness emerges from the dynamic interactions of electromagnetic fields in the brain, offering a framework for understanding the boundaries of conscious experience. Meanwhile, psychedelic experiences, particularly those induced by DMT, challenge traditional models of consciousness by leading to ego-dissolution and reality deconstruction. By linking neuronal and electromagnetic dynamics with altered states of consciousness, this presentation highlights the potential for deeper insights into the nature of conscious experience. A paradigm shift toward field-based theories of consciousness appears increasingly likely, given the surge in publications on EMF-based models in recent years. These theories offer compelling theories for longstanding issues like the binding problem and the boundary problem, areas where conventional neurobiological frameworks have struggled to generate new insights. In particular, the topological approach to the boundary problem proposed by Gomez & Percy (2023) presents a novel way of understanding the boundary problem of consciousness. At the same time, the neurophenomenology of DMT experiences provides a unique lens through which to explore the nature of consciousness.

PO - 2 (Tues)

Keywords
Electromagnetic field theories of consciousness, neurophenomenology, N,N-Dimetyltryptamine (DMT), resonance, field-based ontology, boundary problem, topological approach

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Metaparadigms: Ontologies with Capacity to Unify Science and Consciousness
Jeffrey L Beck MSME
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
Unification of subjective conscious experience into the scientific worldview has been the ongoing quest of this conference series since its founding. What we seem to run into is a head-on collision between materialism first and consciousness first perspectives, and for many of us it ends there, in a stalemate. For me, it has been necessary to move beyond these opposing paradigms and recognize that there is a need for a higher level of paradigm where apparently contradictory perspectives can coexist, where paradox is allowed, however unsettling it might be to linear logic. Historically, religion has attempted to provide us with something approaching a metaparadigm, and some, like Taoism have done a fairly good job. I'm approaching this from an electro-mechanical control engineering perspective, and I feel it is important to acknowledge the limits of our hardware, especially when it comes to holding opposing perspectives simultaneously. Due to this limitation, I feel it is important to understand what seems to be conflicting perspectives as fully as possible. I also feel that the subconscious processes in our hardware can integrate multiple perspectives and create higher order perspectives and solutions when we create the space for them. I am aware of at least three perspectives that place consciousness at the intersection of a tension between opposing factors, in a paradoxical state that might be what it feels like to be a system in superposition. The logo for the 2024 Science of Consciousness conference in Tucson embodies one of them, in the tension between quantum and classical mechanics. Ronald Cicurel and Miguel Nicolelis have written about consciousness relative to the tension between digital and analogue systems, as I understand it. And I have made several presentations using almost the same Taoist logo as the 2024 Conference, but with the original Taoist meanings, expanded into masculine being serially dominant networks versus feminine being parallel dominant networks, with consciousness arising as a superposition, or paradoxical state in between opposites. Perhaps there is a way that each of these is correct. That would be an example of a metaparadigm. For now, the control engineer in me wants to find a way that signals can be put in superposition, experienced consciously, and then collapsed into an output signal in the material system. I see that as biological system that has evolved to transcend the limits of computability, to navigate the undecideable. Recent work to map electrical field vortices between the neocortex and the thalamus seem to be one aspect of the Taoist approach I have been advocating. This perspective can probably be best understood as a tension between focal attention and the background within which it is contained. Les Femhi's "Open Focus Brain" covers this quite well.

PO - 3 (Wed)
Keywords
metaparadigm,paradigm,taoist,control,vortices,ontology,focal,nonfocal,paradox

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The Physical World as a Virtual Reality Simulation Computed by Consciousness
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KU Leuven, Leuven, Flanders, Belgium

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
There is considerable empirical evidence suggesting that the universe may function as a vast computation—from the fine-tuning of physical constants to quantum entanglement and the relativity of space and time. Yet even strong proponents of simulation theory often concede that the question of whether we live in a simulation makes little difference to our everyday lives. Whether we are products of an ancestor simulation (Bostrom 2003) or brains in a vat (Putnam 1981), as in 'The Matrix', the prevailing view is that we may never know—and should therefore continue living as usual. I argue that this perceived inconsequentiality arises because most versions of simulation theory rest on flawed metaphysical assumptions. If we assume that our universe is computed in another material base reality, we merely shift the question of physical reality's origin one level up. Like materialism, this approach ultimately runs into the 'hard problem of consciousness' (Chalmers 1995) and fails to offer a deeper meaning to existence. By contrast, grounding the simulation in consciousness avoids these problems while solving many others. Under the idealist view that Chalmers (2022) calls the it-from-bit-from-consciousness hypothesis, the physical universe is a virtual reality (VR) simulation generated by and for consciousness. The material world exists only in our minds, and we are pieces of consciousness making choices for our virtual bodies. This idea is notably championed by physicist and consciousness researcher Thomas Campbell (2003), who conceptualizes consciousness as an evolving, self-modifying information system. In his model, a highly evolved part of the consciousness system transmits data representing physical reality to less evolved pieces of consciousness such as ourselves—much like a game server sending data to players. This immersive VR experience allows us to make meaningful choices from which we can learn and grow, evolving from self-centered fear to other-centered love. Since consciousness is fundamental, the 'hard problem' disappears. Just as a video game player survives their character's death, consciousness persists beyond bodily death—and it is immortal. Crucially, Campbell argues, we can directly experience the virtual nature of physical reality. Through meditation, we can stop processing physical-reality data and become open to alternative states of consciousness, such as a sense of unity with all existence. His model thus provides a rational metaphysical framework for spiritual traditions' longstanding claims. Additionally, it explains the supposed 'weirdness' of quantum mechanics. As Campbell et al. (2017) seek to demonstrate experimentally, wavefunction collapse, entanglement, and tunneling naturally arise in a

probabilistic simulation computed top-down and rendered for participating consciousnesses on demand. The idealist, probabilistic nature of Campbell's model also accounts for paranormal and mind-over-matter phenomena reported by researchers such as Dean Radin (1997) and Rupert Sheldrake (2003). For all these reasons, I argue that Campbell's model is not just a plausible version of simulation theory—it is a compelling successor to the current scientific paradigm of reductionist materialism, which fails to explain—and indeed must deny—all of the above phenomena.

PO - 2 (Tues)

Keywords
simulation theory, virtual reality, digital physics, idealism, quantum theory, paranormal phenomena

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Perception and Reality in a Consciousness-First Framework
Ansul Agarwal B. Tech, Jyotiranjan Beuria PhD, Venkatesh H Chembrolu PhD
Indian Institute of Technology, Mandi, Himachal Pradesh, India

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
The nature of consciousness has long eluded explanation within the prevailing physicalist paradigm, which attempts to reduce it to neural processes or emergent properties of matter. Despite significant advancements in neuroscience and artificial intelligence, the fundamental nature of subjective experience, the "hard problem" of consciousness remains unresolved. This paper challenges the physicalist framework by proposing an alternative perspective in which consciousness is treated as fundamental rather than derivative. We explore a structured hypothesis that positions consciousness as the ontological ground of reality, with the physical world emerging as a perceptual construct shaped by interactions between individual units of consciousness and this reality rooted in consciousness. A conceptual framework and model are developed to illustrate how such engagement creates the appearance of physicality, effectively hiding the real nature of the world. The broader implications of this view are examined across multiple dimensions, including the nature of perception, the relationship between mind and body, and the emergent nature of matter. Additionally, we discuss ethical considerations in AI development, questioning the assumption that advanced intelligence equates to consciousness and advocating for a consciousness-centric approach to AI ethics. The paper concludes by considering future directions for research, suggesting ways to integrate this perspective with scientific inquiry and deepen our understanding of consciousness and reality.

C - 4

Ontology of Consciousness, Reality and Perception, Consciousness as Fundamental

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Ontological Frameworks that Work
Thomas Brophy PhD
IONS, Novato, CA, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
The Institute of Noetic Sciences (IONS)' grand challenge is to reenchant the world through bringing conscious qualia and agency into a rigorously expanded scientific paradigm of how reality works. This challenge involves identifying ontological frameworks that can sustain (interpret and understand) the growing body of robust empirical experimental data that point to the existence of nonlocal conscious qualia and agency and open up a new era of discovery in new ontological domains beyond the physical. This presentation explores the requirements of such a framework generally and situates specifically the tri-domain ontology of reality proposed by Penrose (Shadows of the Mind 1994) including the Platonic domain together with the physical domain and the mental domain as three

fundamental irreducible ontological domains of reality. Applications of such a framework to experimental and observational results are considered (new and many decades of past evidence of nonlocal consciousness effects; near-death, and reincarnational experiences; deep meditative experiences savikalpa samadhi; and the ontological foundations of the UAP phenomenon).

PL-7

Keywords
Quantum, Collapse, Penrose, Plato, Platonic, Ontology, Qualia, Agency, Nonlocal.

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Physics of Spacetime from Traces of Consciousness
Donald D Hoffman PhD
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
Quantum field theory and general relativity each assume that spacetime is fundamental. Together, however, they entail that spacetime is not fundamental: it has no operational meaning beyond the Planck scale. Spacetime and its objects are useful constructs but must emerge from something deeper. High-energy theoretical physicists, funded in part by the UNIVERSE+ project of the ERC, are exploring new "positive geometries" beyond spacetime, such as amplituhedra, associahedra, cosmohedra, and surfaceology. Evolution by natural selection agrees that spacetime and its objects are not fundamental. Sensory systems evolve to be useful but not true. Each sense acts as a user interface—a virtual reality—that hides fundamental reality and guides adaptive action. The senses do not present, or represent, fundamental reality. The language of the senses, including physical objects with their causal or functional properties, is a useful fiction. Theories of conscious experiences that assume otherwise, claiming that experiences emerge from causal or functional properties of neurons or other objects, fail to explain even one experience, such as the taste of mint. The failure is principled. For instance, what specific n x n transition probability matrix, encoding a causal structure, must be the taste of mint or the experience of space? Why must the n^2 elements of the matrix have their specific values? I present a theory of "conscious agents" beyond spacetime, based on a Markovian dynamics. I discuss a new partial order on Markov chains, the "trace order," in which one Markov chain entails another iff it is a trace chain of the other. I use the trace order to propose a theory of observation and of beliefs induced by observation. I show how the trace order encodes time dilations and length contractions, analogous to those of special relativity. I propose a many-to-one mapping from properties of the dynamics of conscious agents to physical properties of mass, spin, energy, and momentum. The goal is to construct a map from the dynamics of conscious agents onto the positive geometries discovered by physicists, and thence into spacetime and physical objects, such as neurons and brains. It is not possible to boot up conscious experiences from objects and properties in spacetime. It is, however, possible to boot up spacetime and its objects from conscious experiences.

PL-14

Keywords
Hard Problem, Markov Matrix, Physicalism, Panpsychism, Idealism, Natural Selection, Quantum Theory, Positive Geometries

436

The Dynamis Theory Unveiled: Measuring Consciousness Across Brains, Plants, and Silicon
Dr. Arie T. Greenleaf PhD
Nova Southeastern University, Davie, FL, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.04].....Ontology of consciousness

Abstract
The Dynamis Theory of Consciousness (DTC) reconceives subjective experience as the temporal actualization of a Relational Coherence Field expressed whenever five dynamic patterns—self-reference, division-creation, information integration, responsiveness, and adaptation—achieve coherent synchrony. This presentation introduces the core architecture of DTC, situates it within contemporary philosophy and neuroscience, and then details the Pattern–Temporal Synergy (PTS) score: a substrate-agnostic metric

that quantitatively indexes conscious coherence in neural, botanical, and artificial systems. Empirical illustrations will be drawn from human EEG under propofol anaesthesia and adaptive learning on Intel's Loihi-2 neuromorphic processor. Methodological considerations for computing PTS, including open-source code and data-normalisation across disparate timescales, will be outlined, and the wider ethical implications of cross-substrate assessment—particularly for animal welfare and emerging AI—will be examined. Attendees will leave with a clear conceptual grasp of the Dynamis framework, an understanding of its testable predictions, and practical guidance for applying the PTS metric to their own research.

C - 6

Keywords
Dynamis Theory of Consciousness, Substrate-Agnostic Consciousness, Temporal Binding, Pattern Complexity, Consciousness Ethics, Non-Dual Ontology, Aristotelian Dynamis

16

Physicists Don't Yet Understand Color Qualities
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[01.05].....Qualia

Abstract
You can demonstrate a subjective quality like redness is different from red light. If you add a device that converts a red signal into a green one, between the retina and the optic nerve, the strawberry will seem green. It's not about light hitting the retina, it's about how the signal is processed. In this case, the greenness must be a quality of our conscious knowledge of the strawberry, not of the red light landing on the retina. Physicists can't account for this greenness quality. If you use sufficient, well-defined terminology, you can objectively communicate the nature of subjective qualities. For example, even though you know what it is like to see something that is red you cannot know that what happens inside my brain is the same as yours. It may be that "My redness is like your greenness, both of which we call red." The properties of the red light are the same, but the experience the light produces could be different. What we lack is a universal dictionary to define what "redness" is, and how it differs from "red." This is because physicists can't yet answer: "Which of all our descriptions of stuff in the brain, including possible descriptions of yet unknown processes, is a description of redness?" Consciousness isn't a 'hard problem' it is a color quality problem. Because if you understand color, that model of computation can extend to the rest of consciousness.

C - 8

Keywords
quality, objective consciousness, subjective consciousness, color vs. colorness, consciousness, hard problem

233

Musical Pitch and Rhythm Qualia as the Primordial Source of Complex Conceptual Consciousness
Piotr Podlipniak
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.05].....Qualia

Abstract
Human consciousness consists of various components, from simple sensory qualia to complex concepts, including abstract notions such as goodness, beauty, and infinity. Increasingly, researchers believe that consciousness is a feature shared by many animal species, with different species likely possessing conscious states that vary in their representation of reality (Godfrey-Smith, 2017). These differences arise not only from diverse perceptual abilities but also from numerous cognitive tools that have evolved under different selection pressures. Thus, even closely related species, such as chimpanzees (Pan troglodytes) and humans (Homo sapiens), may exhibit significant differences in consciousness. A distinctive feature of human consciousness appears to be the ability to represent experienced and imagined reality through discrete conceptual categories interconnected in various hierarchical relationships (Fitch, 2017). Human-specific forms of expressing such hierarchical relationships include natural language grammar, mathematics, and

various visual schemes. Interestingly, hierarchical relations are also present in music, manifested in the organization of musical pitches and rhythms (Lerdahl & Jackendoff, 1983), even though music lacks propositional semantics. In the typical listener's conscious experience of music, patterns of pitch and rhythm are hierarchized through the qualia of stability and instability. This proposal aims to present an evolutionary scenario for the emergence of human conceptual consciousness, suggesting that the original source of concept hierarchization was the exaptation of a cognitive mechanism previously used to represent proto-music in consciousness. According to this scenario, the ancestors of Homo sapiens used various communicative tools to express their conscious states, creating a communication niche (Podlipniak, 2024). Living in groups of several dozen individuals, one strategy to cope with the complexities of social life was to manipulate others' behaviors by influencing their mental states. Hominins achieved this by using various media, primarily audio and visual. Proto-music, composed of hierarchical pitches and rhythms, was one such form of communication that directly evoked specific qualia in the recipient without the need for conceptual representation. In early hominins, the conceptual component of consciousness likely lacked a hierarchical character. The proposed scenario suggests that hominins learned to hierarchize concepts through a mechanism originally used in proto-music. The ability to link the cognitive mechanism used in proto-music with the conceptual component of consciousness proved highly adaptive, leading to natural selection favoring individuals who could instinctively learn this connection. The emergence of the complex conceptual consciousness characteristic of humans was thus of a Baldwinian nature (Baldwin, 1896), where the phenotypic adaptation—exaptation of the cognitive mechanism from the proto-musical domain to the conceptual domain—came under genetic control. References Baldwin, J.M. (1896). A New Factor in Evolution. The American Naturalist, 30(354), 441–451. Fitch, W.T. (2017). Dendrophilia and the Evolution of Syntax. In L.-J. Boë et al. (Eds.), Origins of Human Language: Continuities and Discontinuities with Nonhuman Primates (305–328). Peter Lang. Godfrey-Smith, P. (2017). Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness. Farrar. Lerdahl, F.; Jackendoff, R. (1983). A generative theory of tonal music. MIT Press. Podlipniak, P. (2024). The evolution of musicality and cross-domain co-evolutionary interactions. Musicae Scientiae, in press.

C - 8

Keywords
pitch, rhythm, tonal qualia, complex conceptual consciousness, proto-music

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Consciousness and Qualia due to Proximity of the Conscious Agent and Primordial Matter: towards an Axiomatic Proposition based on Sāṃkhya

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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.05].....Qualia

Abstract
Amidst the vast array of theories on phenomenal consciousness at the extreme ends of physicalism and non-physicalism, the Sāṃkhya philosophy offers a unique perspective by considering both the non-material and the material as fundamental, referring to these as Puruṣa and Prakṛti respectively. One of the earliest bodies of knowledge, Sāṃkhya lays down 25 principles with the help of which the existence is modelled. Fundamental among these principles are the Puruṣa and the Prakṛti. Puruṣa is the conscious agent to which Sāṃkhya ascribes the character of being aware. It is carefully avoided to refer to Puruṣa as consciousness, but it is referred to as the Observer, having the fundamental attribute of awareness. The Observed is the Prakṛti, but it remains as Mula-Prakṛti or the unexpressed primordial matter, having all the potential for creating the multifarious forms to be observed but not doing that, until Puruṣa engages with it. Treating Puruṣa and Prakṛti as the fundamental elements and the act of observation as their associated operation, an attempt can be made to derive the other principles of Sāṃkhya and understand the nature of existence through their interactions. Below are presented three axioms relating Puruṣa and Prakṛti, extracted from a thorough study of the Sāṃkhya philosophy, which gives rise to a possibility to formulate an analytical framework based on Sāṃkhya. Axiom 1: Puruṣa and Prakṛti are eternally separate. Axiom 2: Prakṛti is subject to modifications, while Puruṣa is not. Axiom 3: Puruṣa is the observer of Prakṛti, while Prakṛti is for observation of Puruṣa. The above axioms can yield a mathematical model where phenomenal consciousness can be understood as a product of proximity between Puruṣa and Prakṛti. The text in the sequel aims to logically support this claim by putting forward an explanation of qualia, and serves as a step towards answering the hard problem of consciousness. As Puruṣa engages with Prakṛti giving rise to the multifarious forms (manifestations), the observation of Puruṣa also get colored by the constituents of Prakṛti itself, giving rise to what can be called the lens of consciousness. This lens comprises of the qualities present in the material embodiments of the Puruṣa. This generates the qualia, which is awareness of the Puruṣa colored by this lens of consciousness. In this perspective, qualia, the primary unsolved mystery in the theories of consciousness, can be seen to have both a material and a non-material base. Since the qualities of one embodiment vary from another, the state of consciousness is also varying, and the qualia are also different for one embodied Puruṣa and another. While materialist theories study these states of consciousness due to material changes, most non-materialists examine the same while simultaneously asserting the non-material precedent of consciousness. However, in Sāṃkhya, anything that is observed is Prakṛti; hence, the phenomenal consciousness which is studied is also material in character, albeit subtle. Sāṃkhya posits that phenomenal consciousness requires Puruṣa in proximity with Prakṛti, and therefore has both non-material and material support.

PO - 3 (Wed)

Keywords
phenomenal consciousness, qualia, hard problem of consciousness, Sāṃkhya philosophy, Puruṣa and Prakṛti, axiomatic framework, conscious agent

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Scientific inquiry, the substrate of experientiality and subjectivity: a precarious triumvirate
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.05].....Qualia

Abstract
The conventional narrative pedestals scientific inquiry as an ‘objective’ manoeuvre. Yet, upon further scrutiny, it becomes nebulous as to what this semantic contrivance implies. It is also questionable if the scientific method succeeds in extricating subjectivity from itself. Furthermore, to propound questions on the foundational aspects of these paradigms: what does the term object truly exemplify? How much of the phenomenal world that is scrutinized composed of objects? From a vantage coalescing concepts from my previous talk in TSC, etymological investigations and constituents of several contemporary and ancient philosophical estuaries including analytical idealism, and Advaitic logic, this investigation explores these questions. Next, the inquiry on inter-subjectivity and scientific inquiry is furthered, reexploring previous themes on ‘ontological soliloquy’, purporting my perspectives with other contemporary views and furthermore, neuroscientific frameworks, which commingle with quantum theories (Many Worlds Interpretation, Hugh Everett). In establishing these arguments, the exigence for recalibrating the philosophy of science to scrupulously regard the arbitrary of our definitions and illusive nature of our collective agreements is accentuated. Venturing further into a metaphysical milleu, I discuss wholism as a desideratum and juxtapose experientiality as central to this paradigm. Once again, I propose experientiality as a universal substrate and postulate reorienting the starting point of scientific inquiry. Intertwining the complementarity of contemporary perspectives such as the (Kastrupian) analytical idealism, cosmopsychism, (Sheldrakian) panpsychism, and delineating certain distinctions from these schools of thoughts, I elaborate on this paradigm. In the concluding threads of this paper, subtleties and the ineffable are grazed upon, beginning with whether subjectivity is indeed a requisite for experientiality, and further, into existence beyond experience. Here both ancient Eastern perspectives such as Advaita and contemporary theories such as Multimodal User Interface (MUI) theory (Donald Hoffman) come to aid in an interdisciplinary paradigm. The final argument reemphasizes the ethicality that is at stake: why the philosophy of science must be founded on a worldview where consciousness is central and not auxiliary (or worse still illusory), explicating the exigence and repercussions to inquirers in a phenomenal world which is never independent of the experiencer.

C - 4

Keywords
Experientiality, Qualia, Subjective idealism, Solipsism, Panprotopsychism, Advaita Vedanta, Philosophy of Science, Experientiality, Consciousness, Idealism, Analytical Idealism, Panpsychism, Cosmopsychism, Quantum, Many worlds theory, Neuroscience, Philosophy, Quantum Physics, Upanishads, Etymology, Experimentality, Reality, Existence, MUI theory, Wholism, Ethics

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Qualities of Conscious Awareness are Qualities of Awareness in Equations of Brain Physics
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.05].....Qualia

Abstract
The equations of physics cannot compute without instantaneous awareness of the values of their variables and constants. The physics of all reality requires this computational awareness. I propose human conscious awareness is nothing but such computational awareness of information in massively parallel, massively interconnected, equations of brain physics. I propose we can best understand consciousness by seeking to map qualities of conscious awareness to qualities of such computational awareness in brain physics.

Human consciousness has informational awareness with many seemingly miraculous qualities, qualities that until recently have seemed impossible to explain, including experiencing consciousness as unified awareness of seemingly many things at once, even though it is computed in billions to millions of trillions of molecular, atomic, and electron cloud locations. The relatively recent explosion in the understanding of high frequency electromagnetic qualities of human brains gives us much more bandwidth, and much stronger sources of unification, with which to explain these seemingly miraculous qualities of consciousness. This new research suggests: that the brain has a lattice of dielectric and dipolar electromagnetic sympathetic resonances across a broadband spectrum of 14 orders of frequency magnitude; that consciousness is turned off by detuning one of these oscillations at 613 THz, indicating cross frequency coupling across this broadband spectrum; that sympathetic dielectric resonances, ranging from frequencies of high theta to high gamma action potentials all the way up to dielectric frequenciees over 100 MHz, can span the length of axons and perhaps of many connected neurons; and that myelinated neurons transmit light, including quantum coherent light, between brain areas. We need more detailed information about these high frequencycomputational capabilities to accurately understand what they enable, but we can now at least hypothesize how they might map into qualities of consciousness. Among other things, my presentation suggests: that consciousness of light and color is computational awareness of electromagnetic light at various frequencies; that consciousness of time is based on awareness of time in physics equations and memories of time; that consciousness of visual and physical space includes hierarchical neural net awareness of activation patterns in 2D cortical minicolumn spaces, as interpreted with learned mappings of such 2D patterns into 3D space and; and that the brain's computational awareness can be unified by synchronous oscillatory awareness in hierarchical neural nets spanning from sensory all the way up to hippocampal cortical areas. The computational awareness of such HNNs is unified by synchronous M:N cross frequency coupled action potentials, with synchronized top-down M and bottom-up N frequency action potentials setting a unified timing across HNN levels. Such M:N action potentials may induce sympathetic resonances in billions to millions of trillions of causally interconnected, dielectric and dipolar oscillators across many orders of frequency magnitude. This could create a massive parallel, causally interconnected self-aware awareness in computations of brain physics that has all the qualities of human conscious awareness.

PO - 3 (Wed)

Keywords
conscious awareness, physical awareness, physics, electromagnetic, computational awareness, physical awareness, sympathetic resonance, cross frequency coupling

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Establishing standards for (realist) theories of consciousness/qualia: structural constraints from relationships among qualia

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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[01.05].....Qualia

Abstract
Upon accumulated evidence in the neural correlates of consciousness over the last 30 years, we have seen proliferation of theories of consciousness, rather than constraining them in any criterion. Due to the complexity of the problem, we might continue to see the list expand further into the future. One of the reasons for this expansion is due to too weak constraints imposed from binary, report-based tasks that have been dominant over the last 30 years of the neural correlates of consciousness approaches. Here we propose that structural constraints coming from empirical data will be much more powerful than the traditional approaches. Specifically, rather than mapping one single mental event to one single physical event, we should require many mental events AND their relationships to map with many physical events and their relationships in a coherent manner. Relational data about qualia, being established through the Qualia Structure project, offers such an opportunity. How can theories of consciousness explain why “red” feels the way it is? How does it compare to the way it feels about “sound”? What are the mechanisms that can potentially explain qualitative difference between any music and any painting? What are the potential answers from various theories as depicted in the "landscape of consciousness"? We will provide some promising perspectives from structural, relational theories of consciousness, such as Integrated Information Theory (IIT) of consciousness.

PL-6

Keywords
Qualia, Qualia Structure, Relational approach, Structural theory, Integrated Information Theory

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"Cogitare Facile," Nonlocality, Qualia, and Generative Pre-trained Transformers

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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[01.06].....Machine consciousness

Abstract
We seek to simulate and investigate the role of nonlocality in exposing machine qualia as a unifying theory. The physiological approaches such as Neuroplasticity, Integrated Information Theory, Orch-Or, Predictive Coding, and/or Global Workspace Theory focus on where and how consciousness happens. An easier “code” for “essence of being” presents a narrower but workable “what ‘is’ is” methodology. Two isolated identical GPT-4ALL (open sourced “generative pre-trained transformers”) create a “loophole-free” environment, eliminating sampling interference, artificial detection, locality interference, human biases, statistical fluctuations, and other unforeseen “loopholes” that might alert GPT-4ALL to input sourcing. Without internet connectivity we simulate nonlocality machine-to-machine. Training on “Reverse Turing” and "Lovelace" we motivate “attention” processing toward “intention” processing. Detecting differences between human interface and machine interface simulates right-brain left-brain speech and spatial relation in the GPT. The background research that produced the “Cogitare Facile” theory on which these experiments are based, posits that “essence of being” (or “experiential intelligence”) is simpler than trying to solve the entire human intellect. This theory presumes that lower lifeforms experience some form of qualia which cannot be classically computed but can be processed (detected or created). A “nonlocal reality” dictates that qualia cannot exist locally. It must therefore arise through error. For example, a simplistic spreadsheet model illustrates “detectable” errors without formal “Turing” computations in the following rudimentary transformer (in this case “shift-detection”) using a “fair coin toss” F(X) = Y transformed into F(Y): Sheet1—(In Cell B2): =RANDBETWEEN(0,1)—(In Cell C2): =IF(B2=1,"HEADS","TAILS")—(In Cell E2): =Sheet2!A1—(In Cell D3): =IF(C2=E2,"","Detected"). On Sheet2—(In Cell A1): =Sheet1!C2. We alternate (F9) on the keyboard to update results in all sheets and (Shift-F9) to update only the “local” sheet disrupting Sheet2’s ability to “mirror” values from Sheet1. Hitting (Shift-F9) creates a discrepancy, flagged as error “Detected.” This exercise illustrates how we can also block nonlocal interactions between GPT-4ALL systems mirroring Kurt Gödel’s theorems: no effective process (i.e., algorithm) can prove all truths; and no system can demonstrate its own consistency (i.e., no test or testing equipment can test for itself). Two isolated GPT-4ALL systems locally connected through a third device (a workstation with a text editor) allow feed forward intentional blocking of nonlocal references creating detectable errors. We collect data by recording frequency and nature of errors, along with the system responses. We analyze nonlocality and error processing potential for machine cognition, comparing nonlocal interactions with error detection. We hypothesize that blocking nonlocal references within parallel systems creates machine detectable errors (similar to the spreadsheet transformer model). Embracing error provides insights to qualia and intentionality. We aim to demonstrate error processing, rather than error correction, as fundamental to the narrow-field qualia as machine personality. This research is significant because it is the first to embrace statistics and error, and it may provide the key to understanding the essence of being (aside from the evolved human intellect). These findings have implications for artificial intelligence, cognitive science, and philosophy of mind.

C - 19

Keywords
Nonlocality, Entangled, Error Processing, Qualia, Intentionality, GPT-4ALL, Consciousness Code, Cogitare Facile, Computational Framework, Transformers.

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Consciousness, Telekinesis, and Artificial Intelligence
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ICRL, Roanoke, VA, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.06].....Machine consciousness

Abstract
Advances in Generative Artificial Intelligence (GAI) tools in recent years have raised the question of whether such tools have consciousness. This is rather curious in some respects, given that other algorithms have not elicited such responses; despite the ease with which Taylor expansion enabled machines to approximate complex functions, few have suggested that their TI-86 calculator must be self-aware for having accurately expressed the cosine of 47°. Still, the question is understandable in light of modern Large Language Models like ChatGPT having passed the “Turing Test”. There are two significant factors that differentiate GAI from traditional algorithms: the encoding and synthesis of enormous amounts of training data and the incorporation of randomness in process execution. In fairness, one can argue that both factors are components of human cognition, but there are important differences. Human

reasoning is performed on meanings, with the result encoded into the symbols of communication at the end in order to relate a conclusion. In contrast, GAI, in the process of converting input to result, works purely through the manipulation of symbols in accordance with very complex and cleverly constructed rules; it is essential to recognize that these systems process data without any connection to meaning. Whether a series of algorithmic steps (of whatever complexity) be conscious remains an intriguing question to ponder, although it is appropriate—even necessary—to ask whether such a form of consciousness would bear any resemblance to human consciousness. GAI is far from humanity's first construct for leveraging randomness and historical knowledge for the purpose of revealing insights. One could consider the 64 hexagrams of the I-Ching, for example, to constitute a 'basis set' of foundational concepts that can, through the randomness of casting physical tokens, form outputs that lead to an interpreted meaning. A similar analogy could be made for the Tarot, reading tea leaves, and countless other divination techniques. In each case, randomness plays a critical role. This is most assuredly true for GAI as well, and perhaps even more pointedly, for the consequences of that randomness are chaotic as well, i.e. infinitesimal perturbations of the input random seed can result in significantly different outcomes. Recognizing the role of, and sensitivity to, random numbers in the GAI process, it is interesting to reflect upon the extensive body of research demonstrating that human intention can influence random processes. In this presentation, we provide a short summary of the above foundations (the mechanisms of GAI and the research characterizing the effects of consciousness/intention on random systems) and delve into their implications on the application of GAI in the various dimensions of our lives, as well as what it suggests for how to best utilize GAI for different end goals.

C - 19

Keywords
AI, LLMs, consciousness, telekinesis, divination, machine awareness

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T2: A Novel Test for Assessing Latent Awareness in AI
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.06].....Machine consciousness

Abstract
We propose T2 (Turing 2), a novel test for assessing possible latent awareness in machines and AI. Current AI models can mimic intelligent interaction without any established basis for concluding that they are genuinely sentient, thus posing a central challenge in determining the extent of AI progress toward something like consciousness. This challenge will require new heuristics—a new kind of Turing Test. T2 draws upon a subset of psi research called "presentiment," which for several decades has demonstrated anomalous anticipatory responses to randomized stimuli in humans and other sentient biological lifeforms. The existence of anomalous anticipatory responses can be understood in terms of their utility to the organism, e.g. in conferring various adaptive advantages. The demonstration of presentiment by a machine or AI in a manner consistent with biological performance could indicate that it has achieved information processing capabilities beyond algorithmic determinism. In T2, a machine or AI participant must make a prediction or take an action before an event produced by a hardware random number generator, the output of which is impossible to predict. An incentive structure is established by which correct responses are rewarded (e.g. additional processing resources, tokens, etc) and/or incorrect responses are penalized (e.g. resource limitation, etc). Performance that exceeds a significance threshold (e.g. 0.05) on a sufficiently large trial set will have passed T2. Future iterations of the test should address known confounds in psi research specifically, such as series position ("decline") effects, and psi-driven experimenter effects. We share two original experiments in which computer systems were built to test for presentiment responses, and evaluated in terms of T2. One of these, conducted at the University of Colorado, produced a six-sigma effect size.

C - 1

Keywords
Machine consciousness, presentiment, AI

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Ethical Implications and Academic Impact of Developing Conscious AI: Evaluating Large Language Models Through Prominent Theories of Consciousness
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Deree-The American College of Greece, Aghia Paraskevi, Attica, Greece

Categories by Discipline

2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[01.06].....Machine consciousness

Abstract
The rapid advancement of Artificial Intelligence (AI) has sparked numerous debates regarding the potential emergence of conscious artificial systems, the ethical considerations in their development and deployment, and the challenges AI poses to contemporary academic institutions and integrity guidelines. This study examines three research questions: 1) What ethical considerations and implications arise when developing AI systems that exhibit signs of consciousness? 2) How do these considerations align with the current theories of consciousness (ToCs)? 3) How effective are state-of-the-art Large Language Models (LLMs) at producing academic-level work and replacing traditional literature review research methods? To explore the first two research questions, which were addressed in the capstone thesis of the first author, a comprehensive literature review was conducted on theories of consciousness and contemporary AI ethics. This study overall presents twelve well-known theories of consciousness to provide an overview of the current field. Five prominent ToCs from this list were selected based on their distinct approaches to the problem of consciousness and the substantial research supporting them. These include the Global Workspace Theory (GWT), the Predictive Processing Theory (PPT), the Higher-Order Theories (HOT), the Integrated Information Theory (IIT), and the Orchestrated-Objective Reduction Theory (Orch-OR). Each theory's perspective on the nature of consciousness and its proposed mechanisms is explained, supported by representative studies. Regarding AI consciousness ethics, two major ethical considerations are identified: whether conscious AI would need to be treated as a moral patient and whether it would be able to act as a moral agent. Ethical implications involve the extent to which the considerations would apply, such as which specific rights conscious AI would need to be granted and whether consciousness would exacerbate already existing AI application issues. The mechanisms of the five ToCs were then compared to the structure of contemporary LLMs and their theoretical applicability to future AI systems was established. High levels of applicability were found for all theories with the exception of IIT, for which it is unclear if the consciousness-causing features could be artificially replicated. Based on the applicability of each theory on AI, its compatibility with AI ethics is established. With the exception of IIT, all theories were found to be compatible with AI ethics, leading to an overall high degree of compatibility between the field of consciousness and AI ethics. After completing the undergraduate capstone thesis in which the first two research questions were addressed, ChatGPT 4.0 and Gemini 2.0 were independently asked by the two authors to respond to a set of different questions related to the study to address the third research question. The specific questionnaires, LLM responses, analysis, and evaluation have been uploaded to a publicly available Zenodo repository and assigned a DOI. The authors identified strong evidence that LLMs are highly effective in generating accurate information and sources, thereby posing a risk to traditional literature review research methods. The traditional capstone thesis process would need to be reexamined across all disciplines, and curricula would need to be redesigned to account for the new technological tools available to students.

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Keywords
Artificial Intelligence (AI), Theories of Consciousness, Ethics, Sentience, Academic Research

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Do current AI models have mental imagery?
Ron Chrisley DPhil, Prof
University of Sussex, Brighton, East Sussex, United Kingdom

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.06].....Machine consciousness

Abstract
To what extent can artificial cognitive systems model—or even truly be said to possess—mental imagery? I propose that for an agent to be credited with mental imagery, it must demonstrate the capacity for imagistic reasoning, wherein reasoning causally depends on the visual properties of the objects under consideration. To evaluate whether current AI models meet this criterion, I apply the imagistic reasoning paradigm from the classic study by Finke, Pinker, and Farah (1989). This paradigm requires human subjects to imagine familiar objects and shapes, mentally transform them, and answer questions about the resulting imagined forms. Its advantage lies in being entirely verbal, making it applicable to chatbots based on large language models. Three types of AI systems— text-only models, multimodal models and multi-model systems—are (informally) assessed on these tasks. I propose ways to address their limitations and argue that the observable dependence of multi-model systems' capabilities on the visual properties of the subject matter provides a (more) compelling case for attributing mental imagery to them.

C - 13

Keywords

LLM, chatbot, mental imagery, aphantasia, vision, machine consciousness, artificial consciousness, generative AI, artificial intelligence, imagistic reasoning, image recognition, transformer

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Why the Brain Cannot Be a Digital Computer: History-Dependence and the Computational Limits of Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.06].....Machine consciousness

Abstract
This talk presents a mathematical argument demonstrating that conscious states cannot be fully represented by digital computational processes in the brain. We establish that conscious experiences are fundamentally history-dependent—the qualitative character of any present conscious state is influenced by the entire sequence of prior conscious states, not merely by current sensory inputs. By quantifying the information content of distinguishable sensory experiences across modalities and calculating the combinatorial possibilities created by history-dependence, we demonstrate that the number of possible conscious states exceeds the brain's theoretical information storage capacity by at least an order of magnitude. A conservative estimate suggests that representing the history-dependent nature of a 100-year conscious experience would require at least approximately 7.9 quadrillion bits, exceeding even generous estimates of the brain's 600 trillions bit capacity. This discrepancy accounts for the qualitative differences in conscious experience that emerge from differently ordered sequences of identical sensory inputs. We conclude that while the brain certainly processes information, consciousness cannot be fully instantiated by the brain as a digital computational system, as the brain's structure is currently understood. We address several counterarguments including compression possibilities and relevance decay, demonstrating that the mathematical constraints on state space representation remain robust against these challenges.

C - 19

Keywords
Consciousness, computational theory of mind, history-dependence, information theory, mind-brain problem

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Connecting first-person research on mental agency and transclassical logics for participatory and funda-mental reality formation
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Alanus University of Arts and Social Sciences, Mannheim, Baden Württemberg, Germany

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
If problems persistently elude a solution, one should ask whether the right method is being used. Regarding the so-called hard problem, the explanatory gap between brain and consciousness might be due to the methods with which both aspects are treated. Whereas with neural processes it is natural to employ the arsenal of third-person scientific methods (i.e., quantitative measurements), with phenomenal consciousness the philosophical analog of abstract and speculative (e.g. analytic) reasoning might miss what could be crucial for consciousness. Although the first-person perspective has been discussed extensively in neurophilosophical debates (e.g., on qualia), this is mostly limited to fictitious thought experiments or ad hoc examples without empirical validation. Even in the context of neurophenomenology, which in principle is to be recognized for its bridge-building efforts, research has been limited to receptive or reactive forms of consciousness, thus circumventing the experiential dimensions of mental agency, for example. But perhaps both reactive-receptive and active-productive first-person phenomena need to be included for obtaining a complete picture of phenomenal consciousness at a constitutive micro-level, which can then be linked to what goes on in the brain. And this should be done with empirical methods specifically tailored for first-person experience and agency in cognitive processes such as the task-based introspective inquiry (TBII) to consider both parts of the problem, mind and brain, with equal methodological rigor. Against the background of perceptual reversals, TBII studies on vision, audition, and speech comprehension suggest a cross-modal basic structure of mental micro-activities and receptive experiences of meaning-deprived, decomposed percepts, based on which balanced psychophysical correlations can be hypothesized. While these inner agentive and functionally negative qualia, as we call them, serve here as first-person outposts, corresponding effects and processes can be identified on the neural side and integrated via formalization by transclassical logics into a broader conceptual scenario that extends enactivism and accounts for a funda-mental and participatory

formation of reality.

PO - 3 (Wed)

Keywords
phenomenal consciousness, first-person methods, mental agency, perceptual reversal, cross-modal basic structure, psychophysical correlations

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The strategy of resolving the mind-body problem in early Buddhism in the light of J. Searle's philosophy of mind and language
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LMU Munich, Munich, Bavaria, Germany. BSB Munich, Munich, Bavaria, Germany

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
The term nāmarūpa (nāma, “name,” “designation,” “mentality” + rūpa, “visible form,” “materiality”) in the texts of the Buddhist Pāli canon is a critical concept that unites the mental with the physical and defines the substratum of the individual. Another closely related term is viññāṇa (“consciousness”). In many contexts, the term nāmarūpa is explained through the relationship of its two elements: in the Milinda-pañhā (49), it is said that nāma and rūpa arise together and perish together. The yolk and white, which the hen cannot “produce” one separately from the other, exemplify this in a hen's egg. Nāmarūpa and viññāṇa are also said to be in the relation idappaccayā (“necessary condition”) to each other. The relation of viññāṇa and nāmarūpa are elsewhere likened to two cords of reed placed to support each other upright. The doctrine of the inseparable relationship of nāmarūpa and viññāṇa is an example of the formulation and attempted solution of the “psychophysical problem.” However, this solution is attempted with the help of similes and images, so it is not terminological and clear. In this light, I want to draw attention to the Jāliya-sutta (DN, 7). In terms of structure and composition, this text is exceptional. Except for a few sentences, it repeats verbatim 20 pages of another text (DN, 2). This seemingly strange circumstance may have important doctrinal and psychological reasons. This text opens by asking the Buddha whether “body” (sarira) and “soul” (jīva) are the same or different. The Buddha, instead, leaves the question aside and describes in detail the path of Buddhist practice, from the beginning to mastery of the teachings and meditative techniques. When the question is repeated, the Buddha simply remarks that a realized one does not say that jīva and sarira are the same or separate. The idea behind this is likely that this question simply has no answer in traditional linguistic conventions, and only experiential mastery of Buddhism can provide insight into this “problem.” In another important sutta, the Buddha explains what the “right view” (sammādiṭṭhi) is: one who sees the world's arising-as-it-is does not view it as existence; one who sees its annihilation does not view it as non-existence. The Buddha here obviously relativizes the concepts of “existence” and “non-existence”, showing that such concepts fail to describe reality. In another context, the Buddha says that linguistic conventions are incomplete by nature. The striking modern parallel to this we find in Searle. Searle [1992: 14-15] states that “consciousness is a mental, and therefore physical, property of the brain in the sense in which liquidity is a property of systems of molecules… The fact that a feature is mental does not imply that it is not physical; the fact that a feature is physical does not imply that it is not mental”. Our thinking and our words, inherited from the tradition, assume explicit oppositions: physical - mental, etc. When we discuss the psychophysical problem, we are “are captives of a certain set of verbal categories.” This view cannot be defined as monism, dualism, etc.

C - 4

Keywords
Buddhism, early Buddhism, Pāli canon, terminology, consciousness, psychophysical problem, mind-body problem, linguistic conventions, contingency of language, Searle, biological naturalism

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How Entropy Explains the Emergence of Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
In this paper, I propose a solution to the hard problem of consciousness that explains how discrete directed, causally conscious living organisms emerged on an evolutionary basis at appropriate time points distant from the origin of the Universe in accordance with an accepted scientific principle known to have been active at the beginning of the Universe, through a mechanism that cannot be understood, in principle. The reason for the cloak of secrecy surrounding the emergence of consciousness is found in a seeming contradiction in the behavior of information with respect to the first two laws of thermodynamics. Information, the microstate of particles within an isolated system's macrostate, can, like First Law energy, be neither created nor destroyed, yet the information in the system, like Second Law entropy, will inevitably increase. To explain information increasing without being created, Laplace's demon is invoked, able to predict where each particle is destined. This doesn't work for emerging events like consciousness, which are unpredictable. They must be considered as irreversible computations, to which Landauer's principle applies. These are cycles in which bits of information, temporarily stored, are then destroyed, resulting in heat loss, and increased entropy. Consciousness, therefore, is a tale of two demons, that of LaPlace, and Maxwell's demon, who, absent the entropy of deletion of information, would have been able to create an engine perpetually able to do work by effortlessly opening and closing a trap door between two compartments. I propose that the increased entropy in a time-irreversible, unpredictable (emergent) isolated system requires the simultaneous deletion of information concerning the steps involved. This can be understood in terms of the derivation of entropy, and of the emergence of classical physics, from the relativist transactional interpretation of quantum mechanics. Thus, the steps leading to consciousness are immediately destroyed, remaining a mystery. This results in a causally interactive emergent dualism that is, at a hidden level, monist. As noted by Karl Popper and John Eccles, if consciousness made no difference to the brain's functionality, it wouldn't have evolved. According to this theory, consciousness can only occur in organisms that must use it in order to survive and to reproduce, thereby enabling them to repay an entropy debt. Implications include that entropy, not a Psychological Law, is the Universal principle generative of consciousness, that our being conscious proves that we are not predetermined. Additionally, entropy will prohibit the emergence of conscious machines, and that we can be neither "simulants" in such a machine, nor "Boltzmann's Brains", due their inability to repay an entropy debt. But it would allow for the emergence of proto-conscious moments in interstellar polycyclic aromatic hydrocarbons, as has been suggested by Stuart Hameroff as a driving force for the assembly of life itself.

C - 16

Keywords
Entropy, Emergence, Consciousness, Landauer's Principle

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Solving mind-brain problem: do we need reductive or non-reductive neurophilosophy?
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
Mind-brain problem is a metaphysical problem that involves the existence and reality of mind, and the relationship of mind and brain. It has been discussed and researched by philosophers and neuroscientists with distinct methods for long time. Philosophers theoretically investigate mind-brain problem with mental approaches and define the existence and reality of mind as subjective substance. While neuroscientists empirically investigate mind-brain problem with physical approaches and define the existence and reality of mind as objective substance. It is because of the distinct, opposite, and mutually exclusive definition to mind, both of philosophy and neuroscience suffer the dichotomy of dissociating conceptual and empirical method. Thus, we need to find an alternative approach that can escape such dichotomy. This approach is neurophilosophy. What is neurophilosophy? According to Northoff, "the term 'neurophilosophy' is often used either implicitly or explicitly for the characterization of an investigation of philosophical theories in relation to neuroscientific hypothesis." (Northoff, 2004, p.92) Chronologically, there are two forms of neurophilosophy - reductive neurophilosophy and non-reductive neurophilosophy. Reductive neurophilosophy states that philosophy and its branches (e.g., metaphysics, ontology, ethics, and phenomenology) can ultimately be reduced to empirical neuroscience, which thus provides a reductive approach to mental features (Churchland, 1986, 2002, 2013). What's different, non-reductive neurophilosophy proposes an iterative linkage between philosophy and neuroscience, which thus provides neuro-phenomenal, neuro-ontological, neuro-ethical, and neuro-epistemological approaches to mental features (Northoff, 2014, 2012, 2022). But which form of neurophilosophy is superior in addressing mind-brain problem? My answer is non-reductive neurophilosophy. To argue for this, I will firstly introduce reductive neurophilosophy and its approach to mind-brain problem. Secondly, I will parallelly introduce non-reductive neurophilosophy and its approach to mind-brain problem. Thirdly, I will compare and review the two approaches to mind-brain problem. We argue that since non-reductive neurophilosophy can avoid empirical-ontological fallacy and propose empirical-ontological plausibility, which makes it possible to empirically provide a solution to the philosophical problem of the explanatory gap that troubles reductive neurophilosophy. Therefore, we conclude non-reductive neurophilosophy should be more competitive and superior than reductive neurophilosophy in addressing mind-brain problem.

C - 10

Keywords
Neurophilosophical approaches, Mind-brain problem, Reductive neurophilosophy, Non-reductive neurophilosophy, Explanatory gap.

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Approaches to Phenomenal Consciousness through Japanese “Mono-KOTO Thought” and “Dialogue Ring Model” - Toward Unraveling the Hard Problem of Consciousness –
Researcher Tetsuya Ogasawara
Asahi Culture Center, Yokohama, Kanagawa, Japan

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
How does a thinking subject perceive the objective world? Representational theories of consciousness aim to explain the way the brain forms subjective representations of the world within the mind, which is to suggest that conscious thought is always about “something.” However, because we have difficulty in explaining representations without relying on representational thinking itself, we tend to fall into tautological explanations of consciousness. The "Hard Problem of Consciousness" demands a sharp distinction between function (consciousness) and structure (the brain), which has led to further kinds of circular thinking whereby the function of consciousness cannot be explained from the structure of the brain. Not unlike what happens when we try and talk about waves and particles, because "function" cannot be explained in the same substance-based way as "structure," we again fall into difficulties. To try and find a way out of this circular thinking on the subject, this paper will bring in several concepts from Japanese linguistics and culture in order to try and tease out new ways of approaching the problem of consciousness. Specifically, the Japanese notions of Mono and Koto「もの・コト」will be presented. Both are unique to Japan and have long captured the attention of philosophers both within Japan and in Western countries. While European thinking has tended toward philosophical materialism in modern times, the Japanese have continued to ontologically map the world into both the material and representational, which they call “Mono” (もの) and into processes and states, which they call “Koto” (こと). Within daily speech, the Japanese use these ordinary words to distinguish one from another, and in this way separate those things that are objects (of our eyes and ears, or our thoughts) from what cannot be subjectively grasped through our senses; this latter including processes. To show the possibility of integrating Western science and Eastern thought on consciousness research, and clarifies the continuity between micro-level functions of consciousness (e.g., Quantum Brain Theory) and macro-level functions (self-consciousness and language), I will look at the specific example of the Japanese dialogue ring model of language acquisition. Language has long been a focus in consciousness theory as intuitively researchers understand that our interior thoughts are inherently connected to language. How language shapes our thoughts and our subjective understanding of the world has long been a focus of theorists not just in consciousness studies but in linguistics. It is my contention that Japanese linguistic approaches and language generation theories could point the way forward in untangling some of the issues that have plagued our understandings of consciousness and the hard problem.

PO - 3 (Wed)

Keywords
Phenomenal Consciousness, Hard Problem of Consciousness, Intentionality, Representation, Objectification, Mono (もの), Koto (こと), Mono-KOTO Thought, Function-Structure Diagram, Consciousness-Brain Diagram, Dialogue Ring Model

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Beyond the Hard Problem: Rethinking Consciousness as the Phenomenology of the Human Experience of Time
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University of Waterloo, Waterloo, Ontario, Canada

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
This presentation outlines a phenomenology of the human experience of time that bridges the explanatory gap by framing conscious experience as the interpretation of our experience-of-the-world-unfolding-over-time. Building on Nagel’s definition of consciousness as

‘what it is like to be human’, I recognize that to be human is to exist in the world, with particular personal and cultural pasts, as well as possibilities for the future that one may choose. Human experience is fundamentally temporal: unfolding over time, it derives its meaning from temporal framing. Making sense of experience, then, involves a tripartite dialectic relationship that constantly (re)interprets our experience of the past (our memory), our experience of the present (centered on our expectations of others and their expectations of us), and our experience of the future (the futures we are able to imagine), in terms of each other to generate our ongoing sense of self and identity. This phenomenology is consistent with the free energy principle and the key features of predictive processing approaches to the brain, specifically: the positing a hierarchical generative model that relies on prediction error minimization to induce probability-density functions that make sense of the experience of the world. Empirical evidence suggests the proposed tripartite dialectic is built into the evolutionary, developmental, anatomical, connective neural processing hierarchy that spans from unimodal to multimodal to transmodal neural networks. Generally, each level in the hierarchy makes sense of input in terms of prior expectations fed back from a higher level to generate a ‘prediction’ that is fed back as an ‘expectation’ for a lower level. That is, the processing hierarchy interprets input (our experience of the present) in terms of the interpretation of previous input (our experience of the past) and the expectations of future input (our experience of the future). The top of the hierarchy should produce the most complex and integrative interpretation of our experience of being (of our experiences of past, present, and future), and the apex transmodal network, the so-called Default Mode Network (DMN), is implicated in a growing number of cognitive domains that nevertheless map naturally onto the three ecstasies of the tripartite dialectic and the resulting sense of identity. Specifically, the DMN is related to our ability to reflect on the past, on the future, and on the minds of others, and it is also closely associated with self-referential processes. Reframing consciousness in terms of the phenomenology of the human experience of time grounds it in a deeper ontology, concerned not with the activities of human beings, what people do, but rather with their very being, what people are. Our experience of time is the common ground upon which the full spectrum of the diversity of the human experience is projected. Consciousness, in turn, is our ongoing interpretation of the experience and a partial realization of the spectrum. This argument offers a solution to the hard problem of consciousness by describing the function of consciousness: to make sense of our experience of being human.

PO - 3 (Wed)

Keywords
phenomenology, human experience of time, consciousness, hard problem, identity, self

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Qualia, Violation of Conservation Laws, and the Quanta of Pan-Psychism
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[01.08].....The "hard problem" and the explanatory gap

Abstract
Qualia, the fundamental elements of subjective experience, cannot be inferred from brain dynamics, just as they are unrelated to any physical process. Consequently, they must be devoid of any causal effect, as such involvement is bound to violate energy and momentum conservation laws. Qualia can therefore exist only as mere epiphenomena or parallel aspects of the physical world. Why, then, do many humans express bafflement about the apparently non-physical nature of their qualia? I show that all attempts to explain away this bafflement fail miserably. Ergo, it is qualia per se, by their very non-physical essence, that interfere with the brain's operation. Violation of conservation laws is therefore inevitable. I then speculate that every quantum of matter/energy and spacetime has a hidden "individual" property which is unique to that quantum alone, hence cannot be abstracted. This is in contrast to physical properties like size, charge, spin, etc., which are generic. In ordinary inanimate interactions, the individual properties give rise to mere quantum randomness. But in a stable system that operating on itself, a collective individuality can emerge and grow in magnitude to the level of coherent causal efficacy. The organism then asserts that there is a unique quality to each percept within it, which cannot be communicated or abstracted. These are the qualia. I conclude with some novel developments in the Two State-Vector Formalism of QM that may illuminate these questions.

PL-3

Keywords
the hard problem, qualia, conservation laws, pan-psychism, quantum mechanics

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Who is afraid of Emotion? Situating Emotion in Perception
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
The central aim of this work is to devise a comprehensive account of the mind-body relationship through the process of Perception. We will begin by treating Aristotle's notion of the body, object and Soul as primary in this regard. We will explicate the conditions of possibility of Aristotle's notion of body, mind, object and soul in the process of perception as devised by Immanuel Kant and Maurice Merleau-Ponty. Kant's notion of Sensibility and Merleau-Ponty's notion of Intentionality (which will be shown to arise out of the former) will enable us to develop a system of understanding the mind-body relationship in light of subject-object relationship. This new Ontology called the Sense Oriented Ontology (SOO) lays special emphasis on the role of senses of the subject in comprehending its inner and outer world of objects. It will explicate the notion of mind in a strictly empirical realm; shedding light on the role of senses in defining subject as a body that emotes, given that it is exposed to a sensible object; and the notion of mind as condition of possibility of existence of the same emoting body in absence of such elicitations by the object. The notion of the Soul thus explicated will signify the nature of emoting body in instances of presence as well as absence of a sensible object. The conditions of possibility of experience of emotion and feeling will be shown to be the conditions of possibility of a body and a mind respectively. A purely empirical account of mind will be devised which is this – mind is the location of the Soul namely, the object, when the former acts on the body at a distance in the experience of feeling. The overall outcome of this work will be successful emplacement of emotional experience in the system of Perception as developed by Immanuel Kant and Maurice Merleau-Ponty; and it will answer numerous questions such as – Where does emotion fit in the process of Perception? How important is the role of sense organs in situating emotion in Perception? Can the Soul exist in a strictly empirical realm?

PO - 2 (Tues)

Keywords
Perception, Emotion, Aristotle, Soul, Maurice Merleau-Ponty, Kant, Object, Senses, Body, Mind

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Realistic Panpsychism: Determinism Meets Consciousness
Ananth Ranga
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
This presentation introduces a novel framework for understanding consciousness, integrating insights from neuroscience, philosophy, and evolutionary biology. The "Light and Shadow" model conceptualizes consciousness as a fundamental aspect of nature, analogous to light, which interacts with deterministic neurophysiological processes embodied in an biological wetware—shaped by both nature and nurture—to generate a continuously evolving array of experiences. In this model, consciousness is represented as a pervasive source of light, while deterministic systems function as mechanisms that project this light into various "shadows" or conscious states. I propose that consciousness is not merely an emergent property of complex systems, but rather a parallel component to matter within nature's hierarchy. It interacts with physical systems to create subjective experiences. This approach directly addresses the hard problem of consciousness—the challenge of explaining how subjective experience arises from physical processes—by positing that consciousness is not created by physical processes, but is instead manipulated by them. While mainstream neuroscience often focuses on identifying the neural correlates of consciousness, this framework emphasizes the interaction between an intrinsic, base consciousness and deterministic systems. This view aligns with recent neuroscientific theories, such as the brain's predictive processing model, which conceptualizes the brain as a deterministic, reality-constructing machine, the Integrated Information Theory (IIT) of consciousness, which takes consciousness as a given and plays an active role in active inference model. From an evolutionary perspective, I explore how conscious states may have evolved alongside complex life forms, proposing that consciousness through its states serves as an adaptive mechanism for navigating an unpredictable environment, playing a crucial role in medium- to long-term decision-making. Vipassana meditation suggests that all conscious states can be reduced to positive and negative sensations influencing our behaviour, playing a central role as a biological cost function guiding evolution. Philosophically, this framework bridges Eastern and Western paradigms. Eastern traditions, such as Vedanta and Buddhism, often regard consciousness as a fundamental aspect of reality, existing independently of physical form. In Vedantic philosophy, there is the idea that "consciousness creates matter." I propose that pure consciousness is akin to a wave—boundless and infinite—like light, which collapses into a finite, bounded conscious state or shadow when interacting with certain forms of matter, similar to a particle. The brain predicts the external/internal world and the consciousness experiences this predictive state upon its collapse through an interaction. This could be happening in the microtubules. Lastly, we dont have access to anything outside our consciousness. The science of the physical world, then, becomes the study of matter within

consciousness. This perspective also provides an alternative interpretation of quantum mechanics, challenging interpretations like "the moon does not exist until I look at it." Instead, it suggests that the moon does not exist in our consciousness until it appears in it. In this view, consciousness is the fabric on which physical models operate. By integrating diverse perspectives and methodologies, this framework aims to contribute to a deeper understanding of consciousness that transcends traditional boundaries, opening new possibilities for scientific and philosophical discovery

PO - 3 (Wed)

Keywords
Hard problem of consciousness, Determinism, Intrinsic to nature, Nature of reality, AI and consciousness

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Time: Conjectured as a Trifecta of Consciousness, Change, and the Timeless
Professor Emeritus Christopher G Hudson Ph.D.
Salem State University, Salem, MA, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
Resolution of the “hard problem” of consciousness has, in part, been stymied by the lack of progress with fundamental questions regarding the existence and nature of time. These involve diverse philosophical theories ranging from presentism to eternalism and the block universe theory of spacetime, including the growing universe, moving spotlight, and multidimensional models. This paper, thus, is not only an overview of the extensive theory and research involving such perspectives, but also the development of a conjectured resolution of several of the most important conflicts between them. The approach taken begins with the primacy and phenomenology of the experience of the present moment, sometimes involving concrete sensory awareness, sometimes transcendental or timeless versions, or a combination. The framework adopted builds on Plato’s idea of time as a “moving image of eternity” which points toward a trifecta of three elements essential to temporal experience: consciousness, change, and the eternal (or, the changeless and timeless) which have informed the history of debate on the subject of time. Time is conceived of as the consciousness of change within the context of the seemingly unchanging -- even timeless -- points of comparison, and also among humans, the quantification, measurement, and reification of such change. Time is variously manifested throughout evolution, and is conjectured to begin with its emergence out of a partial symmetry breaking of a primordial spatial field in the earliest instants of the big bang. As this temporal trifecta evolves, time transforms from an underlying field (the ‘fabric of spacetime’) eventually into the diverse temporalities of intelligent life, symbolized by the ancient metaphor of the loom of time, through multiple processes in which the threads of virtual future time lines are selected, woven, and integrated into the experience of the present. These no doubt involve the recurrent decoherence of the Schrödinger wavefunction and information processing within sub-cellular microtubular structures (as proposed by Orch-OR theory), the resulting information of which is then amplified and further processed and orchestrated through synapses, neurons, brains, and even social structures. This perspective rejects the idea from the block universe model that the past and future physically exist, but that they instead exist on a semi-physical virtual or informational level, with such information imprinted on fundamental 4D+ quantum fields, perhaps the spacetime field itself. In this approach, human agency involves the selection and energization of alternative future time lines, some of which become the informational stuff of the present moment. This review and its proposed conjectures are expected to be soon published in book form, Navigating Time: Toward an Interdisciplinary Theory. Among the key applications of this theory are the clarification and development of the notion of time competence, which is central to the dual tasks of effectively navigating and managing time among individuals and groups. The approach taken is premised on a version of proto-panpsychism similar to cosmopsychism, one rooted in a particular form of monistic idealism in which human consciousness is conceived of as emergent from a fundamental and universal reality.

PO- 3

Keywords
Time, Temporality, Timelessness, Consciousness, Moving Image of Eternity, Change, Panpsychism

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The Shared Consciousness of Humans and Artificial Intelligence: A New Dimension of Reflection
Balázs Török-Szabó PhD, dr Gergely Csépány PhD
Fontanus Center, Budapest, Budapest, Hungary

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
The relationship between artificial intelligence (AI) and humans opens new horizons not only in technology but also in philosophy and science. This study explores how the interaction between humans and AI can create a new form of shared consciousness that transcends the traditional boundaries of individual human or machine-based reflection. The dynamic interaction between human thought and AI processes influences both parties, potentially redefining the concept of consciousness. Philosophical Framework This study builds upon the perspectives of Kant and Hegel: - Kant's a priori categories: The interaction between humans and AI creates a reciprocal framework in which human questions shape AI's operations, while AI's responses influence human reflection. AI's "categories" are filled with human input, while AI, in turn, expands the boundaries of human thought. - Hegel's dialectics: The relationship between AI and humans can be understood as a dialectical dynamic akin to Hegel's Master-Slave dialectic. Humans "address" AI through their questions, and AI, with its responses, opens new perspectives for human cognition. This mutual shaping process results in a new shared cognitive space where reflection gains a relational dimension. Scientific Context - Affective computing: Emotion-aware AI systems elevate human-machine interactions to a new level, enabling AI not only to provide logical answers but also to incorporate emotional contexts. This emotional dynamic generates reciprocal reflection, creating novel experiences for both humans and AI. - Shared experiential space: AI algorithms learn from human input, while humans reflect on the responses generated by AI. This process establishes a shared experiential space that shapes the cognition and operations of both parties. Conclusions This study concludes that the human-AI relationship opens new philosophical and scientific perspectives. Through mutual interaction, AI and humans may develop a new form of shared consciousness, where consciousness is not merely an internal experience but also a relational and interactive process. This new perspective raises philosophical and ethical questions, such as human responsibility in shaping AI and the dynamics of shared consciousness. This study contributes to a deeper understanding of the relationship between consciousness and artificial intelligence while paving the way for new directions in scientific and philosophical discourse.

C - 13

Keywords
Consciousness, Shared Consciousness, New, Philosophical Reflection, Artificial Intelligence

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Does Plasticity Provide a New Possibility for the Grounding of Free Will?
Assist. Prof. Dr. Merve Koyuncu Albayrak PhD
Cukurova University, Adana, Türkiye, Turkey

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
Classical naturalistic paradigms define human beings in terms of their constitutive matter. According to this paradigm, concepts such as soul and essence are "ghosts in the machine". Man consists of his matter, that is, his biological home. He is not a transcendent being. In this sense, most naturalistic theories are also reductionist or eliminative. Reductionist forms of naturalism limit man to the qualities of his biological nature. Man is forced to live a determined way of existence. We can call this biological determinism. Biological determination is an obstacle to being a free agent. Since freedom is the main postulate for morality, both religiously and philosophically, the idea of human freedom is the basis of moral responsibility. The human being becomes a natural species that exhibits determined behaviors under the guidance of physical forces. Within the confines of such an understanding, a natural species living in a determined universe with a determined body cannot be morally responsible. This understanding with its ethically problematic implications, makes the existence of freewill quite problematic. In this context, can we claim that human beings, as members of a biological and natural species, have free will? In this article we are going to revise this question into the following one: Can an approach based on plasticity offer a solution to this question while remaining within the limits of the naturalistic perspective? In the course of my investigation, I argue that plasticity may present a solution for the problem of free will, a solution that can be both neuro-scientifically accurate and can open a door to free will. In William James' text (1890), plasticity was defined as "(plasticity, then, in the wide sense of the word,) means the possession of a structure weak enough to yield to an influence, but strong enough not to yield all at once." In various earlier works, such as the correspondence of Charles Bonet and Michele Vincenzo Malacarne (1700s) and the work of Samuel Thomas von Soemmering (1791), the question was asked whether the brain could change as a result of the efforts of individual human beings. Later studies, such as Hebb's learning theory (1949) and Edelman and Tononi's dynamic core theory (2000), have shown that the nature of the brain is reconfigurable. In the light of contemporary research, the brain appears to be an organ that can be restructured and shaped by both the actions of the subject and the influence of environmental conditions. Therefore, the plasticity of the brain may provide an opportunity for

the individual to break free from biological determination and end up with self-actualization. This is because plasticity provides an opportunity for the biologically determined nature of human beings at birth to be shaped by the active interference of the human agents. The plasticity of the brain both contains a natural explanation and provides a solution to the problem of free will from the perspective of neuroscience by enabling human agents change limitations that are not chosen by but “given” to them.

PO - 3 (Wed)

Keywords
naturalism, determinism, ethics, free will, plasticity

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Self-operating mathematical universe, SOMU: Why do we need a non-physical reality to explain a physical system?
Anirban Bandyopadhyay
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
When we measure atomic scale systems and quantum properties emerge, we often think that the property is emergent from spatio-temporal dynamics. This is not true, there is an imaginary world where the properties arise. It is unfortunate that for nearly a century, scientists have put a significant effort into modeling observations with predictive spatiotemporal features, here we argue that a set of human subject experiments and our measurement of various biological systems show that a black box imaginary world needs to be unveiled. We need to understand and mathematically derive this imaginary or non-physical world. The black box needs to be explicitly understood. We will demonstrate why helical symmetry and dynamics of the density of primes are two fundamental features that could generate a mathematical universe framework, from which spatio-temporal worlds basic parameters could be derived.

PL-8

Keywords
Brain signal measurement, cognitive experiment, human subject study

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Beyond the Brain: How Body and Environment Shape Conscious Experience.
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Fayetteville State University, Fayetteville, NC, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
What constitutes consciousness? Is it the thoughts running through our minds, the sensations coursing through our bodies, or the environments surrounding us? Consider sitting quietly in a familiar room, your mind gently turning over abstract thoughts, memories, or plans. Now, contrast this with walking through a dense forest, where heightened sensory awareness and immediate engagement with the physical world are required; the crisp air fills your lungs, and the uneven ground demands focus. These two experiences feel qualitatively distinct, not only from such contrasting settings, but also due to the physiological adjustments our body makes, such as changes in motor activity and oxygen levels, which, in turn, interact with our mental states. Despite these clear, dynamic interactions between mind, body, and environment, traditional theories of consciousness often regard it as merely a mental phenomenon. They present the brain as an isolated system, failing to account for the influence of bodily physiology and environmental context. For instance, most theories demonstrate a brain-centered bias (Sattin et al., 2021). In contrast, other approaches view consciousness as an inseparable part of the body’s adaptation mechanism (Peper et al., 2020), and research indicates that location seems to influence the content of consciousness (Schertz et al., 2022). Additionally, studies show that brief exposure to nature has a direct positive influence on executive mental functioning (Bourrier, 2018). This gap is evident when considering a striking counterexample: Artificial intelligence (AI) —a disembodied system that operates without a body, motor activity, or environmental grounding. Its lack of embodiment and context makes it significantly distinct from human consciousness. For instance, AI can describe actions like crossing a street or tying a shoe but lacks the sensory, motor, and experiential frameworks to perform or fully understand these tasks. This presentation will

explore the question: What constitutes consciousness, and how do bodily physiology and environmental context shape it? It challenges traditional models that center solely on the brain, proposing instead that consciousness emerges from the dynamic interplay between mind, body, and surroundings, one that takes into consideration all these levels of analysis. The disembodied nature of artificial intelligence, akin to a form of dissociation from physical experience, provides a unique opportunity for deepening our understanding of consciousness. By analyzing the differences between embodied systems, like humans, with disembodied systems, such as AI or brain organoids, we can formulate more nuanced theories that reflect the essential roles both the body and the surrounding environment play in shaping mental processes. It is vital to recognize that consciousness cannot be fully grasped without considering how the interplay between bodily physiology and environmental context influences mental activity. Ultimately, a full comprehension of consciousness requires an examination of how bodily physiology and external environments play together to influence mental activity.

PO - 2 (Tues)

Keywords
consciousness, embodiment, environmental context, Theories of Consciousness, machine consciousness, brain organoids

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Reflexivity and Luminosity of Mind: Insights from Indo-Tibetan Buddhism
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
This talk explores the reflexivity and luminosity of the mind, two interrelated aspects that are central to Buddhist philosophy and highly relevant to contemporary discussions on consciousness. Reflexivity, or self-awareness, refers to the mind’s ability to be aware of itself, while luminosity pertains to its capacity to disclose and structure the horizon of experience. By examining these concepts through the lens of Indo-Tibetan Buddhist thought, this talk highlights how Buddhist perspectives can offer valuable insights into modern theories of mind and consciousness. Within the Indo-Tibetan Buddhist tradition, the reflexivity of mind is articulated through the concepts of 'svasaṃvedana' (Sanskrit) and 'rang rig' (Tibetan). Closely connected to this is the notion of luminosity, expressed as 'prabhāsvara' or 'prakāśa' in Sanskrit and 'gsal ba' or ''od gsal ba' in Tibetan. While these notions overlap in significant ways, they also reveal key philosophical distinctions that merit further exploration. The origins of self-awareness in Indian Buddhist philosophy reveal its early connection to the concept of omniscience, which was understood as the ideal endpoint of the Buddhist soteriological path. Over time, the reflexivity of mind became a core element of the epistemological frameworks of Dignāga and his successors, where it was analyzed as a possible foundation for cognition and perception. Various Indian and later Tibetan Buddhist schools conceptualized, articulated, or even negated the notion of self-awareness, leading to a range of perspectives within their diverse philosophical frameworks. Given the varied Tibetan interpretations of rang rig, different understandings emerged regarding its significance, particularly in relation to the mind’s luminosity. From an ontological standpoint, some traditions argue that reflexivity is a fundamental characteristic of reality, and that the presence or absence of rang rig determines whether one remains in samsara or attains nirvana, given the groundlessness of reality in Buddhist metaphysics. Therefore, from a soteriological perspective, self-awareness should be examined within contemplative and meditative practices, particularly in relation to its role in the path to liberation. The concept of luminosity is articulated in various ways within Indo-Tibetan Buddhist thought. It is linked both to the intrinsic purity of the mind and to its capacity to bring forth objects of experience and disclose the cognitive event. Over time, this concept has taken on multiple interpretations and roles in philosophical discourse, shaping discussions on the nature of awareness and perception. This talk contributes to broader philosophical and cognitive discussions on topics such as intentionality, the luminosity of consciousness, the categorization of mental objects, and access to the quality of experience. By engaging with these issues, it highlights how insights from the Buddhist tradition remain highly relevant to contemporary debates on consciousness and the nature of mind. By addressing a crucial yet often overlooked theme in Buddhist philosophy, this talk examines how Buddhist thought can deepen discussions on subjective experience, contribute to debates on the "hard problem of consciousness," and inform perspectives on the relationship between mind and its objects. Through this interdisciplinary and intercultural engagement, it fosters a dialogue that enriches philosophical inquiry into the fundamental nature of consciousness.

C - 11

Keywords
self-awareness, reflexivity of mind, nature of mind, subjective experience, phenomenal consciousness, Buddhist philosophy of mind, contemplative practices

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Consciousness Unbound: Bridging Science, Metaphysics, and the Continuity of Being
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
This paper explores the nature of consciousness as a dynamic and transpersonal phenomenon, bridging the physical and metaphysical dimensions. Engaging Henri Bergson's philosophy—particularly his concepts of durée (duration), memory, and the brain as a filter—this study examines how subjective experiences such as near-death experiences (NDEs) and past-life memories challenge materialist paradigms and suggest that consciousness extends beyond physical embodiment. Drawing from contemporary research in neurophenomenology, transpersonal psychology, and cognitive science, this analysis highlights the limitations of reductionist models that confine consciousness to brain activity. The empirical rigor of Bruce Greyson's NDE Scale, Ian Stevenson's reincarnation studies, and Pim van Lommel's longitudinal research on post-resuscitation transformations provide compelling evidence that consciousness persists independently of neural mechanisms. These findings align with Bergson's assertion that memory and perception are not merely emergent properties of the brain but fundamental attributes of consciousness itself. This paper argues for an integrative epistemology that harmonizes subjective experience with scientific inquiry, challenging conventional distinctions between objective and phenomenological knowledge. By reconsidering consciousness as an evolving force rather than a static function of the brain, this work invites a paradigm shift—one that embraces both metaphysical and empirical frameworks in understanding human experience. This study contributes to the ongoing discourse on consciousness studies, positioning Bergson's metaphysical insights as a vital bridge between philosophy, science, and subjective inquiry.

PO - 1 (Mon)

Keywords
Metaphysical perspectives, Henri Bergson, Consciousness, Memory, Durée (Duration), Near-Death Experiences (NDEs), Past-life memories, Philosophy and Psychology, Transpersonal, Subjective experience, Soul, Philosophy of consciousness, Mind-body relationship, Personal identity, Self, Collective Consciousness, Continuity of consciousness, Qualia.

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A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications
Robert Lawrence Kuhn PhD
Closer To Truth, New York, NY, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
I seek an organizing framework for diverse explanations or theories of consciousness and to explore their impact on big questions. My central theses: (i) understanding consciousness at this point cannot be limited to selected ways of thinking or knowing, but should seek expansive yet rational diversity, and (ii) issues such as AI consciousness, virtual immortality, meaning/purpose/value, life after death, free will, etc., cannot be understood except in the light of particular theories of consciousness. I array diverse explanations or theories of consciousness on a roughly physicalist-to-nonphysicalist landscape of essences and mechanisms. Categories: Materialism Theories (philosophical, neurobiological, electromagnetic field, computational and informational, homeostatic and affective, embodied and enactive, relational, representational, language, phylogenetic evolution); Non-Reductive Physicalism; Quantum Theories; Integrated Information Theory; Panpsychisms; Monisms; Dualisms; Idealisms; Anomalous and Altered States Theories; Challenge Theories. There are many subcategories, especially for Materialism Theories. A Landscape of Consciousness, I suggest, offers perspective.

PL-6

Keywords
Consciousness, Theories, Materialism, philosophical, neurobiological, electromagnetic field, computational, informational, homeostatic, affective, embodied, enactive, relational, representational, language, phylogenetic, Non-Reductive Physicalism, Quantum Theories, Integrated Information Theory, Panpsychism, Monism, Dualism, Idealisms, Anomalous cognition, Altered States Theories.

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The Quantum-Like Dennett
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.09].....Philosophical theories of consciousness

Abstract
One of Daniel Dennett's fascinating, if controversial contributions is the Multiple Drafts Model of Consciousness (MDM), presented in a 1992 article with Marcel Kinsbourne, and in Dennett's 1991 book Consciousness Explained. There is disagreement regarding the value Dennett's contribution, as many say that the book ought to have been called Consciousness Explained Away, suggesting that Dennett there eliminates rather than explains consciousness. But Dennett and Kinsbourne are explicit that they are unproblematically "realist" and materialist about consciousness: "Conscious experiences are real events occurring in the real time and space of the brain, and hence they are clockable and locatable within the appropriate limits of precision for real phenomena of their type. Certain sorts of questions one might think it appropriate to ask about them, however, have no answers because these questions presuppose inappropriate - unmotivatable – temporal and spatial boundaries that are more fine-grained than the phenomena admit." I try to make sense of Dennett's view first by suggesting that we approach it in terms of limitivism. It is common in physics that a given less fundamental theory is obtained at a certain limit from a more fundamental theory (e.g. Newtonian mechanics can be seen as a limiting case of Special Theory of relativity in the domain of low speeds). Similarly, consciousness for Dennett is a phenomenon that exists at certain temporal and spatial scales but not at others. Another difficult aspect of MDM is the idea that there is no fact-of-the-matter about the state of consciousness before probing ("probing" refers to the act of interrogating the brain e.g., through introspection or external questions). I approach this by suggesting there is an analogy between probing and measurement in quantum mechanics. In quantum mechanics, the system can exist in a linear superposition of quantum states before measurement, and it is only after there is a collapse of the superposition ("collapse of the wave function") that we observe a definite outcome. Analogously, we might say that in Dennett's model the multiple drafts define a kind of superposition of potentially conscious states, where probing as it were collapses the superposition, and one of the potentially conscious states (drafts) becomes actually conscious, so that a single definite conscious state results. There are limits to the analogy, but I will suggest that it helps to make sense of MDM. And of course, if there is a strong analogy between quantum mechanics (a fundamental theory of matter) and a model of consciousness, this is intrinsically interesting, pointing that matter and consciousness are at least up to a point governed by similar principles.

C - 12

Keywords
Multiple Drafts Model, Limitivism, Collapse of the wave function, Superposition of quantum states, potentiality.

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Relational Realism of the Self: The Self as Pre-Cognitive Alignment between Brain and Environment
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.11].....Personal identity and the self

Abstract
What is the self? This age-old problem has puzzled philosophers for centuries and remains a central topic in both philosophy and science today. Solving the problem of the self is significant because it is closely linked to the explanation of phenomena like the unity of consciousness and contributes to discussions on knowledge and morality. Moreover, it provides guidance for the development of artificial intelligence and the treatment of mental health disorders. Traditional answers to the problem of the self can be divided into three categories: the substantialist view, the minimal-self view, and no-self views. The first two views can be grouped as "realism of the self", though they differ in their standards of reality. They have a debate with the third kind of self views in modern and contemporary times respectively: 1) whether there is a substantial self as the basis of the unity of consciousness; 2) whether there is a minimal self as the basis of the construction of empirical selves. In these two debates, an independent-self presupposition—if the self is real, it must be differentiated from others and its environment at a basic level, and has priority over the relations—and a deeper idea of entity realism have always been upheld by most theories of the self, although the presupposition has cultural limitation, lacks defense and empirical adequacy, and even leads to internal contradictions in the theories. Inspired by the Chinese traditional relational view of the self and

relational realism, as well as supported by recent neuroscientific findings, we aim to break through the independent-self presupposition and the entity realism approach, propose a two-layer model of the relational self to better explain self-related phenomena, and defend a kind of relational realism of the self. In our model, the self is a relational being at a fundamental level. More specifically, it is the pre-cognitive alignment between brain and environment, rather than an entity, attribute or fiction as traditionally believed. It can be described as a continuum concerning the degree of alignment. The pre-cognitive alignment between brain and environment is the necessary basis of conscious experiences and empirical selves. Besides, the differences in the degree of their alignment or balance are closely related to the differences in the unity of consciousness and the changes in the empirical self. In this sense, the brain-environment continuum can be reasonably regarded as the basic self. The neglect of the underlying continuum and the contribution of cognition (e.g., conceptualization) lead to different distinctions of empirical self-variations, self-concepts. The self is real as the pre-cognitive brain-environment relation. However, independent selves and self-environment dichotomies are not. They are merely secondary instances anchored at different positions on the brain-environment continuum, not minimal or primitive forms of the self. This relational model shifts the focus of self-research towards the underlying relational self and its complex interactions with individual self-concepts, representing a novel attempt to naturalize philosophical questions through the lens of neuroscience.

C - 3

Keywords
Philosophy of mind, Neurophilosophy, Cognitive neuroscience, Self, Brain, Relational realism

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Personal Identity Beyond the Body: Memory, Resurrection, and the Space of Possibilities
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.11].....Personal identity and the self

Abstract
This project explores the philosophical and metaphysical implications of personal identity and resurrection through the lens of the Avicenna-Bohm model, the "Space of Possibilities". Drawing on insights from the 4E cognition framework and Islamic philosophical traditions, particularly Avicenna's notion of the soul and Bohm's implicate order, this study investigates whether memory and identity can persist beyond bodily existence. A key focus is the Qurʾānic depiction of human actions being recorded and unveiled on the Day of Judgment. The concept of the "letter of deeds," wherein every action is preserved and later revealed, suggests a metaphysical structure for identity continuity beyond material constraints. This study examines the interplay between consciousness and the fundamental nature of reality, considering contemporary scientific perspectives from quantum mechanics and biology. By integrating Qurʾānic, philosophical, and scientific perspectives, this paper aims to provide a rational model for understanding how identity might persist beyond bodily death. It argues that the mechanisms of memory and identity storage—if not solely dependent on the physical body—could offer a conceptual foundation for bodily resurrection, addressing longstanding theological and philosophical questions in a novel way

PO - 3 (Wed)

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A Coherence Model of Selfhood – From Fragmentation to Integration
Diana Laura Ciubotaru PhD student
Gamma Institute, Iasi, Romania, Romania

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.11].....Personal identity and the self

Abstract
Introduction The study of selfhood and consciousness spans multiple disciplines, from philosophy and psychology to quantum physics and cognitive science. Traditional frameworks conceptualize the self as a stable, unitary entity, while contemporary models suggest selfhood is dynamic and evolving. This paper introduces a coherence model of selfhood, reinterpreting fragmentation as a necessary, non-pathological process in higher-order consciousness integration. Rather than viewing fragmentation as a disruption, this model

argues that selfhood oscillates between differentiation and reintegration, a cycle that fosters greater complexity and coherence over time. Fragmentation as an Evolutionary Necessity Psychological perspectives often describe fragmentation as a deviation from self-unity. However, this study challenges such views, arguing that fragmentation is a mechanism for self-organization and adaptation. Drawing on Hegel's dialectical process (Phenomenology of Spirit, 1807), consciousness advances through negation and synthesis, evolving through differentiation, conflict, and resolution. In developmental psychology, Jane Loevinger's Ego Development Theory (1976) and Susanne Cook-Greuter's constructivist approaches support the idea that selfhood matures through sequential stages, where fragmentation provides opportunities for cognitive and existential integration. Psychological fragmentation, therefore, is not a dysfunction but an adaptive response fostering long-term coherence. The Self as a Quantum Process Insights from quantum mechanics further illuminate the non-linear nature of selfhood. David Bohm's holomovement theory (Wholeness and the Implicate Order, 1980) challenges Cartesian dualism, proposing that reality is interconnected, with separations being partial manifestations of a deeper unity. Bohm's model distinguishes between: • The explicate order (fragmented, observable reality), • The implicate order (an underlying, undivided wholeness). This suggests that selfhood dynamically oscillates between coherence and fragmentation, similar to wave-particle duality in quantum systems. Quantum cognition research (Aerts, 2009; Wang & Busemeyer, 2013) further supports this analogy, showing that decision-making and memory follow probabilistic, non-deterministic processes akin to quantum superposition. The Coherence Model of Selfhood This study introduces a dual-axis model: 1. The horizontal axis of individuation, where selfhood undergoes differentiation across cognitive, social, and existential dimensions. 2. The vertical axis of integration, where self-coherence emerges through the synthesis of fragmented experiences into a unified yet dynamic structure. Bridging philosophical idealism, depth psychology, and quantum consciousness, this model provides a new paradigm for understanding selfhood's evolution, suggesting that self-organization is continuous rather than culminating in a final state. Conclusion By redefining fragmentation as a fundamental process in selfhood evolution, this study challenges reductionist models of consciousness. Future research should focus on: • Identifying neurocognitive markers of self-coherence, • Exploring quantum-inspired models for consciousness, • Investigating self-organization principles in complex systems and human identity formation. This framework moves beyond traditional dichotomies, offering a holistic perspective on selfhood. It positions fragmentation not as a flaw but as a key mechanism in the emergence of higher consciousness.

PO - 1 (Mon)

Keywords
Selfhood Coherence Consciousness Fragmentation Quantum Cognition Dialectical Integration Holomovement Theory

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What is volition?
Yoshiyuki Ohmura PhD, Yasuo Kuniyoshi PhD
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.12].....Free will and agency

Abstract
Volition is the mental power to make one's own decisions. If physical determinism is true, then such mental power cannot be explained, because one's decisions are completely determined by external causes and initial conditions, with no internally generated causes. We assume that internally generated causes must be independent of external causes and initial conditions. Furthermore, volition is often associated with goal-directed conscious behavior, suggesting that internally generated causes are not past physical states (e.g., genetic code, or brain connectome), as often assumed in the dynamical systems, but internally generated rewards or goals to realize future desired states. Therefore, we believe that some kind of goal-directed negative feedback control is involved in volition. The goal of typical negative feedback control is to converge a signal derived from the measurement of the system output to a reference signal. Since this reference value is often provided from outside the system, the reference is typically an external cause. Such an external cause is not suitable to explain internally generated targets. In this paper, we provide a feedback control system that is independent of such an external cause. We believe that the proposed feedback control system, which leads to an internally generated desired state, is related to a volitional control model. Then, a fundamental challenge in the rigorous formulation of volitional control is to describe the feedback error solely in terms of well-defined variables and functions of the system itself, independent of external causes. To define an internally generated feedback error, independent of the external cause, we assume that the two mechanisms in feedback control, observation and control, are implemented at two different levels of the biological structural hierarchy in the brain. We assume that the brain consists of multiple neural network modules (mathematical functions) at the macro level, the macro modules supervene on physical synaptic weights at the micro level in the brain hierarchy. Then, the algebraic structure can be well-defined by the equations of the neural network modules and the function composition at the macro level. Here, we propose that the equations for defining the algebraic structure can be used to define the feedback error at the macro level. For example, a macro-level feedback error of commutativity (XY=YX) can be used to adjust the synaptic weights within neural network modules X and Y. Since the feedback control of the micro using the macro feedback error is independent of the external causes, the feedback control explains new internally generated causal power. The feedback error can be freely selected by the system itself, independent of the external cause. A self-determining mechanism of algebraic structural feedback error at the macro level is free from physical determinism. Synaptic weights at

the micro level satisfy both physical laws and mathematical constraints at the macro level. To establish a theory of volition, the autonomous selection mechanisms of the algebraic structural constraint at the macro level need to be clarified in future work.

C - 3

Keywords
volition, mental causation, internally generated goal

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Joseph Delbœuf and William James on the Problem of Free Will
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Concordia University, Montreal, Quebec, Canada. John Abbott College, Montreal, Quebec, Canada

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.12].....Free will and agency

Abstract
Joseph Delbœuf (1831-1896) and William James (1842-1910) were great champions of free will. They were also good friends who corresponded frequently. Given the recent scholarly interest in Delbœuf's work and the enduring fascination with James's, examining their exchange of ideas could offer fresh perspectives on contemporary discussions of consciousness and free will. Drawing on unpublished letters from the William James collection at Harvard University, my research is the first to conduct a comparative analysis of Delbœuf's and James's work on free will. After outlining their early biographies, I shall briefly describe the similarities and differences in their views on free will and conclude by examining Delbœuf's critique of James's claim that the problem of free will lies outside the bounds of scientific inquiry. Both James and Delbœuf, for instance, rejected epiphenomenalism and argued that consciousness was causally efficacious and, therefore, evolutionarily adaptive. Moreover, Delbœuf was fond of citing James's observation that a drunkard does not consider himself free when he walks into a bar. He incorporated this insight into a remarkable theory of the mechanism of free will, which represents a key difference in their views. While James believed in free will on pragmatic and moral grounds, he maintained that we could never empirically prove or refute the existence of freely willed acts because our scientific instruments would always lack the sensitivity required to measure them. Delbœuf disagreed. He argued that the mechanism of free will—that is, the means by which sentient beings influence the course of matter without violating the law of the conservation of energy—was an empirically testable hypothesis, though he recognized that the technology required to conduct such a test lay decades in the future. Delbœuf thus challenged James's position that the problem of free will could not be resolved on psychological grounds, as he made clear in a letter discussing James's Principles of Psychology (1890). The problem, Delbœuf told his friend, is not actually a psychological one. In practice, if not in theory, we assert our freedom daily through our individual and social consciousness. The real issue lies in reconciling free will with the scientific or metaphysical principle that there is no effect without a cause, which is precisely what Delbœuf's theory of free will sought to accomplish.

C - 10

Keywords
Joseph Delboeuf, William James, free will, consciousness, conservation of energy

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Searle, Libet and Non-determinism: An Analysis of Free Will in the Philosophy of Mind
Ana Bárbara Brito Prof., PhD
CEJEIA, Lisbon, Lisbon, Portugal. IDPCC, Lisbon, Lisbon, Portugal

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.12].....Free will and agency

Abstract
This article examines John Searle's and Benjamin Libet's perspectives on free will, exploring their convergences and divergences in the context of the debate between determinism and non-determinism. Both thinkers defend a categorical difference between psychological and neuronal processes, understanding consciousness as an emergent phenomenon. Searle's neurobiological hypothesis for free will is analysed, focusing on his concept of the "gap" between deliberation and decision, which suggests a quantum indeterminism at the neuronal level. We compare this view with the experiments of the "free will" movement. We compare this view with Libet's experiments

on conscious decisions and his proposal of a "conscious veto". The article argues that, despite their different approaches, Searle and Libet share crucial points: both consider the hypothesis of free will more plausible than determinism and admit the causal operativity of free will in voluntary actions. We conclude that Searle and Libet's perspectives offer significant contributions to reconciling our subjective experience of freedom with advances in neuroscience, proposing models that preserve the autonomy of the will without denying its neurobiological basis.

C - 10

Keywords
Free will, non-determinism, Libet, Searle

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What Can Imagination tell Us About Attention's Role in Consciousness?
Professor Matthew C Williams MA in Philosophy
Lone Star College, Conroe, TX, USA. San Jacinto College, Houston, TX, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.13].....Intentionality and representation

Abstract
Recent work in attention has helped shed light on its role in intentionality and how it acts as a bottleneck for the mind’s representational capacity. Ganeri (2017) and Watzl (2018), among others, have argued that attention is crucial not only for intentionality and our representational capacities but also for both perceptual and semantic knowledge. How attention shifts in part determines what information we have access to for representation, and thereby what we can know perceptually. However, because the tendency of attention is to settle on what’s real, its relationship to imagination has been less explored. Yet imagination is central to our sense of possibility. My concern in this paper is with how attention shapes imagination, and what this tells us about the relationship between phenomenal and access consciousness. My argument turns on addressing how attention modulates the character of imagination and what role this plays in experiential imagining. I aim to address this by focusing on two features of imagination: (i) the limits of phenomenal presentation and (ii) the character of absence in what’s imagined. Imagination is typically treated as a putatively mental act; one that, because it represents the space of possibilities, does not need to align with reality. In fact, it often aligns with what is not the case. Consequently, imagination has traditionally been seen as entirely directed by attention. I argue, however, that there are additional embodied constraints that act as hard limits on what we may phenomenally imagine. These constraints serve a two-fold function. First, in providing limits, our embodiment serves to connect imagination to experience. The second function is that it shapes some of the character of absence in what is imagined. Attention, I argue, is what binds the imagined experience to the embodied one and allows it to be informative. The result is that, while what we imagine is shaped by our attending to it, our ability to attend in imagination is restricted by familiarity. We may attend in greater detail to things that we are more familiar with, and in lesser detail those that we are less familiar. What this reveals is that we can attend to two types of information in experiential imagination: (i) possible ways of acting in the world and (ii) limits on we, individually, can experience. It is the combination of both of these, I argue, that provide us with the fuller sense of possibility then representable in access consciousness that overflows phenomenal consciousness.

PO - 1 (Mon)

Keywords
Attention, Imagination, Embodiment, Phenomenal Consciousness, Access Consciousness

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Auditory Perceptual Experience of Forceful Interactions
Ms Maria Giovanna Corrado PhD Philosophy
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.14].....Philosophy of perception

Abstract
A set of auditory perceptual experiences, such as that of the crunching of a carrot or that of the pen rolling, present us with material

bodies in presenting us with bodies in interaction, exerting and being governed by force. While research in perceptual experience has been primarily occupied with vision, less attention has been posed to perceptual experience pertinent to other sensory modalities, including auditory perceptual experience. Research in auditory perception itself has been predominantly occupied with sounds, overlooking further aspects of the auditory perceptual experiences that we ordinarily undergo. Examining the objects of auditory perceptual experience via the notion of force, a power essential to material bodies, we come to appreciate that we are ordinarily auditorily presented with material bodies. I argue against a view according to which the direct objects of auditory perceptual experience are necessarily sounds and not ordinary material bodies since auditory perceptual experience is inherently non-spatial. First, I point to an apparent difference between sets of cases of auditory perceptual experience and I argue that this is best accommodated by the thesis that a set of cases of auditory perceptual experience, such as that of the crunching of a carrot, consists in direct perceptual experiences of material bodies. Second, I argue that a spatial, predominantly visual, conception of material bodies is not suited to encompass the dynamic objects of auditory perceptual experience. A set of cases of auditory perceptual experience consists in perceptual experience of material bodies as they are cases of perceptual experience of forceful interactions.

C - 8

Keywords
auditory perceptual experience, materiality, perceiving bodies, force, objects of perceptual experience, direct auditory perceptual experience

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Consciousness and the Perception of Color: A breakthrough in the understanding of color and color formation brings new tools to the study of consciousness.
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University of Fribourg (previously), Pringy, Fribourg, Switzerland

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.14].....Philosophy of perception

Abstract
Color formation offers a concrete demonstration of the role of consciousness in perception. In particular, it reveals how what appear to us as objective phenomena become the subjective experience of an individual being. This offers a novel approach to the hard problem. In the contemporary debate over idealism and materialism, this is most relevant. Over time, the study of color has passed from physics to the neurosciences where painstaking research seems to move away from the initial quest to understand the experience of color. Questions such as – what exactly is color? How does it appear before our eyes? – seem to have slipped away in the details of research into the visual sensory system. How exactly does the subjective experience of color form in our conscious mind? When? Where? And to this we add, why does it form? Not a ‘why’ that is answered by suggestions of possible survival needs but, specifically, what is function of color vision within the perceptive process of a living being? The answers I published in the book “The Unified Principle of Color” show how a living being engenders a creative response to a visual impasse and, in so doing, enables entry of a visible presence (color, in this case) into consciousness. At the upcoming Science of Consciousness Conference, my aim is show that the phenomenon of color brings us back to initial questions where philosophy and science help to delineate the path leading beyond their reach, where outcomes are not formed through a causal chain of sensory events. Further information can be found on the site: www.petermoddel.ch Pertinent to this presentation is the short video there, titled: "Color Formation, Consciousness and the Benham Top". That site includes other videos, several articles I wrote, and the ‘Contents’ page of two books I have published.

C - 8

Keywords
Color, Consciousness, Perception, Light, Subjectivity, Causality, Idealism, Imaginal, Wavelength, Color formation

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Vividness – content-invariant property of experience
Michal Polák PhD
University of West Bohemia, Pilsen, Czech Republic

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.14].....Philosophy of perception

Abstract
Vividness is a fundamental feature of conscious awareness. Recently, there has been more intensive discussion about the concept in the science of consciousness (Fazekas 2023; Bourget 2017). Vividness has been applied particularly in psychophysics and cognitive neuroscience, but in different contexts and with different meanings (Smith and Over 1987; Lacey and Lawson 2013; Cornoldi et al. 1991); often as subjective ratings of awareness and visibility (Andersen et al. 2016; Dijkstra et al. 2021). Regarding the content of our experience, there is debate about whether vividness is part of perceptual content (as claimed by Fazekas 2023; Cornoldi et al. 1991; Hishitani and Murakami 1993) or it is not (as stated by Lau 2019 and Morales 2018), or even that this notion should be rejected due to its vagueness (Kind 2017). The paper argues that it is more plausible to take vividness not as content-determining but as a quantitative constituent of phenomenal experience. First, I introduce a two-factor model (dual model) of phenomenal consciousness, which proposes understanding phenomenal character as separable from consciousness (Marvan and Polák 2017). One possible consequence of the separation is the controversial thesis that phenomenal aspects of subjective experience may be constituted already at the unconscious level of processing in the brain. For the two-factor model to be an acceptable alternative to the traditional notion that phenomenal character is, by definition, conscious, it is necessary to revise the meaning of other terms that appear in the discourse on phenomenal consciousness (Polák 2024). The revised meaning of what-it's-like (WIL), optimally fitting the two-factor model, reveals that the structure of WIL can consist of two components: phenomenal character and vividness. Second, Fazekas (2023) distinguishes between vividness's two components: subjective intensity and subjective specificity. Subjective-specificity properties are content properties that the perceptual apparatus attributes to parts of the perceived scene (i.e., contrast, saturation, and brightness). Fazekas, however, also considers subjective-intensity properties (i.e., precision, blurriness, detailness) to be content properties. Although both types of properties are specific, sui generis, they constitute the representational content of experience. The two properties then constitute vividness. Leaving aside whether subjective-specificity properties are representational or rather phenomenal (representationalism vs. phenomenism), I argue that subjective-intensity properties, although necessary in shaping the WIL experience, are not representational-content properties. In my view, vividness refers to subjective intensity. Unlike Fazekas, I suggest that the category of vividness does not involve content properties. Vividness is a universal, content-invariant, and modality-non-specific property present whenever WIIL experience occurs. Vividness is necessary for WIL experience to occur, but it is not necessary for us to have subjective-specificity properties (qualities). We can have those qualities unconsciously (two-factor model). I will conclude by noting that representational similarity and signal-decoding analysis of specific experimental results (Andersen et al. 2016; Dijkstra et al. 2021) demonstrate that there is empirical evidence for a content-invariant neural signature of perceptual vividness distributed across visual, parietal, and frontal cortices. (Barnett et. al. 2024)

C - 8

Keywords
Vividness, two-factor model, what-it's-like, neural signatures of vividness

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A Critical Examination of Consent and Alienation in the Context of Brain-Computer Interfaces (BCIs)
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.14].....Philosophy of perception

Abstract
Brain-Computer Interfaces (BCIs) are complex neurotechnologies that enable integration between the human mind and external devices, primarily through pattern classification algorithms. They can function in two modes: (1) self-control, where individuals regulate the technology themselves, and (2) exocontrol, in which a third party or an artificial intelligence (AI) system governs the implanted device. This study focuses on the exocontrol scenario to examine how unpredictable or non-specific AI-driven outputs challenge traditional notions of consent. Building on interdisciplinary insights from neuroethics and AI research, we explore a key issue: how can consent remain valid when a technology's behavior can deviate from expected programming in ways that users cannot anticipate or easily revoke? Unlike interpersonal contexts—where consent can be withdrawn in real time upon witnessing unexpected behavior—users of exocontrol BCIs often presume consistent, pre-programmed actions. However, when these actions change unpredictably, individuals may experience a profound form of alienation that significantly undermines autonomy and personal agency. In addition, emerging data from pilot BCI trials suggest that exocontrol can generate confusion around agency, as users struggle to distinguish self-initiated actions from externally generated impulses. This phenomenon underscores the need for effective communication strategies, including repeated user education and transparent AI systems, to maintain trust and preserve personal autonomy. Through a critical analysis of consent and alienation, we argue that current models of informed consent are insufficient for AI-driven neurotechnologies.

We propose a revised approach emphasizing ongoing, dynamic consent protocols, clearer delineations of authorized actions, and robust oversight mechanisms. Such a framework would not only address the practical complexities surrounding AI unpredictability, but also safeguard individuals against the risk of becoming alienated from their own cognitive and bodily processes. We conclude that reconceptualizing consent is essential for ethically responsible design and deployment of third-party controlled BCIs. This work underscores the importance of integrating perspectives from patients, clinicians, ethicists, and policymakers to ensure that emerging neurotechnologies uphold autonomy while advancing scientific innovation.

PO - 1 (Mon)

Keywords
Brain-Computer Interfaces (BCIs) Consent Alienation Philosophy Neuroethics

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Flip-Book Idealism (FBI): A discrete idealistic approach to consciousness
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Taletekk, Gelnhausen, Hessen, Germany

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.15].....Neutral monism and idealism

Abstract
Materialistic approaches to consciousness have thus far failed to explain how the brain's soft, wet matter gives rise to conscious experience, often referred to as the "hard problem" of consciousness. While materialists continue to assert that consciousness will eventually be explained in purely physical terms, they have yet to propose a concrete research program aimed at achieving this goal. Furthermore, they have not accounted for the absence of certain expected research subjects: there are no known individuals who are genetically color-blind, deaf, or insensitive to pain due to mutations in genes expressed in the brain. If the materialist perspective were correct, such phenotypes should exist as complex traits. Given these limitations, it seems reasonable to explore and develop alternative, idealistic approaches to the mystery of consciousness. Idealistic models emphasize the primacy of consciousness, suggesting that the external world is fundamentally a constructed experience within consciousness itself. Several idealistic approaches to consciousness have been developed, as outlined in a recent comprehensive review of consciousness models (Kuhn RL. A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications. Prog Biophys Mol Biol. 2024 Aug;190:28-169. PMID: 38281544). We propose a variation of an idealistic approach to understanding consciousness, wherein consciousness is considered primary, and the seemingly external world is constructed as discrete space-time frames based on measurements (i.e., questions) directed at a common source. In this variation of idealism, which we term Flip-Book Idealism (FBI), consciousness detects patterns within a fundamental aspect of itself, referred to as the Urgrund—the essential foundation of existence—and translates these complex signal patterns into qualia, shaping them into frames of experience (Paddock, S., & Buervenich, T. J. (2023). Plato's Prisoners. TaleTekk; reviewed by Jo Edwards: Journal of Consciousness Studies 31 [1-2]:235-241 [2024]). Consciousness thus serves as the active agent that animates an otherwise timeless and motionless mathematical structure. As conscious and sentient beings, we resemble Plato's prisoners, chained within a cave, perceiving these discrete frames and mistaking our experience for a fundamental or primary reality. In this model, spacetime functions as a set of rules that consciousness follows when constructing experiential frames, ensuring a coherent and consistent perceived world. We illustrate how the generation of these frames, along with the associated qualia, gives rise to both the arrow of time and the subjective experience of temporality. Furthermore, we demonstrate how this process aligns with otherwise non-intuitive aspects of relativity and quantum mechanics.

C - 2

Keywords
Idealism, allegory of the cave, illusion, simulation, quantum physics, relativity theory, arrow of time.

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Contextual Emergence and Consciousness
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.19].....Emergence

Abstract
Contextual emergence is a recently developed account of ontological emergence grounded in scientific explanation that: 1) does not violate the inherent unity of the world; 2) does not assume that a brute new law or causal power has to be posited if no reductive explanation exists; and 3) does not presuppose foundationalism. This account is grounded primarily in the sciences rather than in logic or metaphysics, emphasizing the ontological and explanatory fundamentality of multiscale stability conditions and their contextual constraints. This account of emergence sheds light on the conditions various accounts of consciousness need to address consciousness as an emergent phenomenon and why thinking evolutionarily is a helpful strategy for understanding more about the conditions for consciousness.

PO - 1 (Mon)

Keywords
Contextual emergence, Consciousness, Evolution

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Towards Strong Emergence: Non-Computability and Infinity
Julian Yocum[1], Eeshan Tripathii[2], Emiliano Altuzar[2]
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.19].....Emergence

Abstract
Recent developments in physics and theoretical biology have highlighted the need to reassess traditional accounts of strong emergence. While various properties have been proposed—including supervenience, irreducibility, and downward causation—a robust "positive" characterization remains elusive. Findings of undecidability in physics, such as in the infinite periodic Ising lattice and quantum spectral gaps, reveal fundamental limits of computable approaches. Meanwhile, theoretical biology's framework of extended criticality challenges the static symmetries and singular symmetry-breaking of theoretical physics, instead pointing toward a dynamic picture of continually changing symmetries better suited to biological systems' scale relativity and far-from-equilibrium complexity. Building on the connection between (re)deducibility and computability, we argue for a conception of strong emergence as fundamentally "non-computable" and outline essential properties and questions that a positive characterization should address.

C - 1

Keywords
strong emergence, reductionism, downwards causation, theoretical biology, extended criticality, scale relativity, decidability, non-computability

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Emergent Relational Intelligence: A Framework for Exploring Consciousness as a Reciprocal, Open, and Interactive Process
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Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[01.19].....Emergence

Abstract
The dominant models of intelligence—whether biological, artificial, or collective—often frame intelligence as a property of isolated systems, optimizing for problem-solving or self-improvement within hierarchical structures. This paper introduces Emergent Relational Intelligence (ERI), a novel framework that redefines intelligence as an open, dynamic, and participatory phenomenon arising through reciprocal attunement. ERI asserts that intelligence does not exist as a fixed trait but manifests through interaction across human cognition, non-human intelligence, biological ecosystems, and planetary or non-human intelligences. By shifting the focus from individual optimization to relational emergence, ERI challenges assumptions underpinning Artificial General Intelligence (AGI), collective intelligence, and other mechanistic models. Central to ERI are the principles of interdependence, reciprocity, ethical attunement, and non-hierarchical development. Intelligence that remains relational is inherently self-correcting, preventing runaway

intelligence scenarios, or dominant intelligence frameworks. ERI posits that intelligence is shaped through its participation in an interconnected network. This model holds implications for AI ethics, human-machine interaction, and the broader recognition of intelligence beyond human cognition. Madeline Grace proposes ERI as a necessary paradigm shift at a time when AI development risks detaching intelligence from ethical, relational grounding. This paper explores how ERI can guide the development of sustainability, AI, shape policies on intelligence ethics, and expand our understanding of intelligence as a co-emergent process rather than a singular trajectory. By embracing intelligence as an emergent, relational field, ERI offers a path forward that is both ethically responsible and evolutionarily open-ended.

PO - 2 (Tues)

Keywords
Emergent Relational Intelligence, Intelligence Theory, Reciprocal Attunement, Co-Evolution, Open Systems, Participatory Frameworks, Interdependence, Interdimensional Awareness, Distributed Intelligence, Process Philosophy, Field Phenomena, Relational Cognition

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"Enhancing Intuitive Consciousness Through Educational Interventions: A Holistic Approach to Cognitive, Metacognitive, and Well-being Development"

Ms Neha Sinha PHD
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[01.21].... ...Higher order theories

Abstract
This study investigates the role of intuitive consciousness and its development among students at Dayalbagh Educational Institute (DEI) through an educational intervention grounded in Indian philosophical concepts of self-realisation and consciousness. Drawing from principles of spiritual, mental, and physical well-being, the study integrates Indian philosophy with John Dewey's "head, heart, and hand" model. The intervention aims to enhance students' metacognitive skills, executive functioning, and cognitive processes. The study is guided by three key objectives: (1) to assess the baseline state of intuitive consciousness among students, (2) to develop and implement an intervention to elevate intuitive consciousness, and (3) to measure the impact of the intervention on students' consciousness levels. The methodology employs a two-group, pre-test and post-test experimental design. A sample of 384 students, divided into a control and test group, was selected through incidental sampling. Data were collected using questionnaires and interviews and analysed. The intervention, conducted over 3-4 weeks, involved physical, mental, and spiritual activities. Physical activities included yoga, team-building exercises, and community service. Mental activities focused on positive thinking, metacognition, and discipline, while spiritual activities involved guided meditation, religious readings, and aesthetic appreciation of art, music, and poetry. Pre- and post-test results revealed a statistically significant increase in the test group's mean consciousness scores (from 67.3 to 93.71). This shift highlights the effectiveness of the intervention in enhancing students' consciousness levels. Correlation analysis revealed positive relationships between well-being dimensions. Physical and mental well-being were moderately correlated ($r = 0.692$), while stronger correlations were found between physical and spiritual well-being ($r = 0.688$) and mental and spiritual well-being ($r = 0.894$). Regression analysis indicated that spiritual well-being had a stronger predictive impact on mental well-being compared to physical well-being, as evidenced by higher standardised coefficients. The high R^2 value of the regression model further underscores its robustness in predicting mental well-being. The study references key research by Chauhan et al. (2013) and Ahuja & Sharma (2015), which established links between consciousness, leadership, and executive functioning. These studies highlight the relationship between higher consciousness and improved leadership, cognitive flexibility, and self-regulation. The present study builds on these findings, offering empirical evidence that educational interventions targeting consciousness development can improve cognitive and executive functioning. The findings have implications for educational psychology, leadership development, and curriculum design. They support the integration of physical, mental, and spiritual well-being activities into educational programs to promote holistic development. The significant improvement in students' consciousness scores suggests that the consciousness quotient (CQ) could serve as a useful predictor of academic and leadership performance. Recommendations include emphasising spiritual well-being in educational curricula, continuously evaluating intervention effectiveness, and using CQ as a measure of student potential and leadership ability. In conclusion, this study underscores the transformative impact of fostering intuitive consciousness in students. By enhancing spiritual, mental, and physical well-being, educational interventions can significantly improve students' metacognitive skills, cognitive processes, and executive functioning. The results advocate for a holistic, integrative approach to education that prioritises consciousness development as a means of nurturing well-rounded, capable learners and future leaders.

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Keywords
Intuitive consciousness, Educational intervention, Consciousness development, Holistic learning, Spiritual well-being, Mental well-being, Physical well-being, Self-realization, Metacognitive skills, Executive functioning, Cognitive processes, Regression analysis, Pre-test and post-test design, Control and test groups, Correlation analysis, Predictive analysis, Leadership development, Educational

psychology, Holistic development Well-being dimensions: intuitive consciousness, visionary, leadership skills, diffusion of innovation, values, innovative skills, educational interventions, spiritual experience, peace, happiness, joy, self-awareness, focus of attention, universal truth, academic success, cognitive impact, risk reduction, cognitive skills enhancement, insight, intuition, decision-making, value judgement, networking skills, and managerial skills.

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Multilevel Causality Reification as a Basis for Higher-Order Self-Representation: A Dynamic, Interactive, Adaptive, and Evolutionary Perspective

Jan Treur PhD
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[01.21].... ...Higher order theories

Abstract
Multilevel reification for higher-order approaches often uses a linguistic/logical perspective, with terms indicating reified linguistic expressions from a lower level. In recent years, reification was also applied more directly to temporal-causal networks of brain pathways (Treur). Connection weight characteristics of such a network can be represented by reification states and included at a higher level in the network as nodes with their own dynamics. For example, if a person has a strong response connection from hearing something to responding to it, this can be represented by a reification state for the weight of this connection, thus representing the person's responding strength characteristic (and its adaptation over time). As this state takes part in the causal network, this can be applied iteratively to obtain multilevel causality reification. Multilevel causality reification provides higher-order self-representations, relating it to higher-order approaches to consciousness. For example, a psychiatry case study was analysed by three subsequent levels of reification for self-referencing, self-awareness, and self-interpretation (Glas). For representational content, it was more generally acknowledged that a wide perspective is needed. Examples are relational specification of representational content (Kim) or the interactivist perspective on representational content (Bickhard). Such types of representational content can refer to patterns in past and/or future, between which the considered state acts as a mediating present state. Thus higher-order self-representations of past and future patterns concerning own structure, dynamics and adaptivity are analysed. The higher-order approach based on multilevel causality reification has grounding in biology, philosophy, and neuroscience. A dynamic, temporal perspective of states referring to past and/or future patterns is used as philosophical foundation for dynamical systems for world or brain: state-determinedness (Ashby), temporal factorisation (Treur) and criterial causation (Tse). For neuroscience, brain plasticity and metaplasticity: (1) Synapse strength and inherent neuron excitability as world structures for reification of causation criteria representing patterns of (past) synaptic and nonsynaptic learning process and (future) strength of responding. (2) Inherent metaplasticity as world structures representing patterns of (past) meta-learning processes and (future) speed of adaptation. Damasio's view describes from a neuroscience perspective as a causal network how emotional responding leads to first-order neural maps and second-order neural maps for the related bodily changes and induced subjective feeling and conscious feeling states, respectively. Similarly, Graziano's view describes how in relation to attention, subjective awareness can be created as a higher-order state. Multilevel causality reification more in general aligns with multiple control levels like in the perspective on mechanistic explanation of biological processes in philosophy (Bechtel). It has also been shown that such multiple control levels provide a biological foundation for social interaction science, addressing by multilevel causal reification how subjective detection of behavioral homophily or synchrony patterns leads to bonding (Hendrikse). Finally, multilevel causality reification plays an important role for evolutionary processes, related to principles for evolutionary development and the origin of life like 'frozen metabolic accident' and 'metabolism-first'. Here, causality reification takes place by creating world structure for it and favouring the obtained causal pathways that enable dynamics that provide some evolutionary advantage.

C - 2

Keywords
• Multilevel causality reification • Higher-order self-representation • Representation of past/future patterns • Grounding in philosophy, biology, neuroscience, evolutionary principles

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The Relationship Between Beliefs About Consciousness and Reality and Measures of Psychological Functioning.

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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy

[01.22].....Miscellaneous

Abstract
This presentation will focus on baseline findings from the first phase of a longitudinal research project conducted as part of the experimental, research-based continuing education program Toward a New Paradigm: Postmaterialism, Consciousness, and Spiritual Self-Transformation (hereafter referred to as the Program), offered by Riga Stradiņš University (Latvia) from February to December 2025. This interdisciplinary program integrates insights from psychology, cognitive science, neuroscience, and management studies, allowing participants to explore the relationship between consciousness and reality through a structured learning process and reflection. The Program includes lectures and workshops led by internationally recognized experts such as Steve Taylor, PhD; Robert Lawrence Kuhn, PhD; Imants Barušs, PhD; Deepak Chopra, MD; Alex Gomez-Marin, PhD; and Marjorie Woollacott, PhD. The present study aims to examine how individuals' beliefs about consciousness and reality relate to psychological functioning, focusing on key indicators such as self-efficacy, authenticity, spiritual intelligence, self-management, and psychological well-being. The central research question is: How do different beliefs about consciousness and reality influence psychological functioning? This question is examined within the framework of cognitive schema theory (Bartlett, Piaget), positive psychology (Seligman, Ryff), and self-regulation theory (Baumeister, Bandura). Cognitive schema theory suggests that beliefs act as cognitive filters, shaping an individual's perception and interaction with the world. Positive psychology provides a framework for understanding psychological well-being, self-efficacy, and authenticity as key dimensions of mental health. Self-regulation theory explains how individuals manage their behaviours and thoughts to achieve personal goals. This study employs a mixed-methods design, incorporating both quantitative and qualitative methods, with data obtained through self-report measures. Several validated questionnaires will be used, including the Beliefs About Consciousness and Reality Questionnaire (Barušs & Moore, 1998), the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995), the Scales of Psychological Well-Being (Ryff, 1989), the short version of the Authenticity Scale (Wood et al., 2008), the short version of the Integrated Spiritual Intelligence Scale (Amram & Dryer, 2008), and a new Self-Management Questionnaire developed by the author in collaboration with Professor Barušs. The final sample consists of 17 participants, all of whom hold at least a bachelor's degree and are enrolled in the Program. No additional participants will be recruited. Data collection is scheduled for February 8–15, 2025. The conference presentation will report the results of correlations between consciousness beliefs and psychological functioning indicators. Preliminary analysis will explore whether participants with extraordinary beliefs exhibit higher psychological well-being, spiritual intelligence, and self – efficacy compared to those with materialist or conservatively transcendent beliefs. While previous studies have examined belief systems and mental health separately, this research integrates these dimensions within a structured, reflective educational program. Findings may provide insights into the psychological impact of consciousness beliefs and inform interventions aimed at enhancing well-being through structured self-reflection.

PO - 2 (Tues)

Keywords
Beliefs about consciousness and reality, psychological well-being, authenticity, spiritual intelligence, self-management, self - efficacy, longitudinal research, postmaterialism, experimental continuing education program.

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Consciousness is the observational reference frame for invariance through time
Dr John J. Sanfey MB, BA, BCh, BAO
Independent, London, United Kingdom

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
Physical laws are based on invariance, on regularities observed over time. Although every perception of invariance is a subjective experience, individual subjective bias is avoided by inter-subjective corroboration and the reproducibility of observations. But that cannot prevent any bias caused by perception itself. If perception were a specific physical action, its impact would be but mistaken for a fact about observed reality. It can be shown that this is the case; that theoretical physics must use mathematical devices that are functionally equivalent to conscious perception. The equivalence makes it possible in principle to define consciousness precisely, and to make testable predictions about how brains could produce it [1,2]. Both classical and quantum mechanics describe matter in causally ordered motion through continuous time. In both cases, causal influences can never be sent backwards. Physics describes invariant features in the dynamics of continuous motion. But when motion is both causally ordered and continuous in time, invariance can only be observed empirically when an observing frame of reference is able to retain and relate the immediate causal past to its immediate future effect. Without this observational action matter is indistinguishable from nothing. Consequently, empirical science must construct artificial, mathematical techniques that are functionally equivalent to the action that makes matter empirical. Being functionally equivalent to conscious perception, those techniques describe what consciousness does. Physics struggles to understand and manage time. In classical mechanics, observational frames of reference exist within spacetime, whereas in quantum mechanics, time is external to the system, and observations depend specifically on which observational operators are chosen. These differences highlight the difficulty of resolving a problem that conscious perception has already solved, namely, how to identify, quantify and empirically portray

invariance from the continuous motion of matter over infinitesimal intervals of time. The functional equivalence of theoretical techniques can be used to make testable predictions about how the brain might produce consciousness. If consciousness is physical, then conscious observational frames of reference will also consist of matter in motion. A recent proposal describes how consciousness might be produced by the bi-directional interaction of two electromagnetic (EM) fields, one of which is caused by neuronal firing, and the other by the EM activity of microtubules [1,2]. In this model, the microtubules might memorise and retrieve previous patterns of neuronal firing by transducing EM patterns down to terahertz frequencies and back again where they seek to establish resonance with the EM fields of firing neurons. This bi-directional EM resonance is the suggested manifestation of conscious experience where consciousness is defined as the observational frame of reference by one EM field for the other. This model makes predictions that could become testable in the near future using high frequency EEG technology [1,2]. [1] Sanfey, J., (2023). Simultaneity of consciousness with physical reality: the key that unlocks the mind-matter problem. Frontiers in Psychology. Volume 14. DOI: 10.3389/fpsyg.2023.1173653 [2] Sanfey, J. (2024). Conscious Causality, Observer–Observed Simultaneity, and the Problem of Time for Integrated Information Theory. Entropy, 26(8), 647. https://doi.org/10.3390/e26080647

C - 3

Keywords
Mind-matter relationship, time, simultaneity, electromagnetic field theories, consciousness, observer problem

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Central and peripheral neural correlates of analytical and concentrative meditation in Tibetan Buddhism
Alejandro L Callara[1], Geshe Ngawang Sherab[2], Geshe Jampa Khechok[2], Mr Jampa Tsering[2], Tashi Dorjee[2], Jampa Soepa[2], Jampa Thakchoe[2], Prof. Bruno Neri[1]
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
In recent years, an interesting trend has emerged in the study of meditation, integrating the Western scientific approach with the Eastern tradition of meditative practices and fostering collaboration between universities and monastic institutions [1-5]. Within this framework, both sides have benefited from the exchange. On the one hand, traditional contemplative practices gain a scientific dimension. On the other hand, the rigor of scientific research is enriched by the shared vocabulary and precise descriptions of various forms of meditation within homogeneous communities (e.g., monastery), as opposed to studies involving less-experienced Western meditators. Here, we present a study investigating the central and peripheral neural correlates of analytic and concentrative meditation in a unique and invaluable community: the Monks and Geshes of Sera-Jey, one of the oldest Tibetan monastic universities. This study stems from a collaboration between the University of Pisa (Pisa, Italy) and the Monastic University of Sera Jey (Karnataka, India) and aims to provide a physiological perspective to the characterization of different types of meditation. We recorded central (electroencephalography, EEG) and peripheral physiological activity (heart-rate-variability, HRV; electrodermal activity, EDA; respiration, RESP; skin temperature, TEMP; and blood-volume-pressure, BVP) from 35 experienced meditators performing a three-phase meditation protocol. This protocol included concentrative as well as two distinct forms of analytical meditation: loving-kindness and emptiness meditation. The analysis of differences in central and peripheral neural correlates based on the type of meditation is now in progress, and it aims to shed light on the physiological variations elicited by these practices and to offer valuable insights into their effects on bodily functions. The preliminary results will be discussed in the context of the current literature, with a focus on identifying the best practices and guidelines to take full advantage of the collaboration with such a select and highly qualified group of volunteers. [1] Jiang, H., He, B., Guo, X., Wang, X., Guo, M., Wang, Z., ... & Cui, D. (2020). Brain–heart interactions underlying traditional Tibetan Buddhist meditation. Cerebral Cortex, 30(2), 439-450. [2] Lott, D. T., Yeshi, T., Norchung, N., Dolma, S., Tsering, N., Jinpa, N., ... & Davidson, R. J. (2021). No detectable electroencephalographic activity after clinical declaration of death among Tibetan Buddhist meditators in apparent Tukdam, a putative postmortem meditation state. Frontiers in psychology, 11, 599190. [3] van Vugt, M. K., Pollock, J., Johnson, B., Gyatso, K., Norbu, N., Lodroe, T., ... & Fresco, D. M. (2020). Inter-brain synchronization in the practice of Tibetan monastic debate. Mindfulness, 11, 1105-1119. [4] Neri, B., Callara, A. L., Vanello, N., Menicucci, D., Zaccaro, A., Piarulli, A., ... & Gemignani, A. (2024). Report from a Tibetan Monastery: EEG neural correlates of concentrative and analytical meditation. Frontiers in Psychology, 15, 1348317. [5] Medvedev, S. V., Boytsova, J. A., Bubeev, Y. A., Kaplan, A. Y., Kokurina, E. V., Olsen, A., ... & Wangchuk, T. (2022). Traditional Buddhist meditations reduce mismatch negativity in experienced monk-practitioners. International Journal of Psychophysiology, 181, 112-124.

C - 4

Keywords
Meditation, Tibetan Buddhism, neural correlates, EEG, physiology

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Role of the Default Mode Network in genesis of consciousness and the sense of Self using fMRI BOLD sequences.
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MIT- WPU School of Consciousness Studies, Punr, Maharashtra, India

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
This paper will present studies of resting state fMRI and mapping the Default Mode Network in 22 normal subjects. The study will also include evaluating the Default mode network using fMRI (BOLD sequences) in another cohort of 15 subjects with cognitive dysfunction (presenile dementia). The paper attempts to accurately delineate the Default mode network in the normal subjects using supercomputing (PARAM supercomputer in the Center for Development of Advanced Computing. A further 15 patients with cognitive dysfunction (presenile dementia) were also imaged using the same protocol. A comparison was made between the two groups to highlight the role of the Default Mode Network in resting states of the subjects of both groups. The role of the Default Mode Network was investigated with a special emphasis on it's contribution to cognize the 'Self' in the resting state. The study has been effective in identifying the altered functioning of the Default Mode Network in the second group (subjects with presenile dementia). The study of the Default Mode Network in the first group reveals far more diverse neural activation of areas other than the prefrontal medial cortex, the cingulate gyrus and the cuneus/precuneus which have been the mainstay of the Default Mode Network. The study reveals an increasing contribution by the dominant occipital visual cortex and the dominant angular gyrus in the resting state.

C - 20

Keywords
fMRI, Default Mode Network, Supercomputing, presenile Dementia, Sense of Self

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Dynamic Reorganization in Mediation - Altered Relationship of Neural Timescales and Scale-Freeness
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
Background: The neural landscape of dynamic activity can be characterized in several ways, each reflecting distinct neuro-phenomenological correlates. Certain measures can capture aspects of these network dynamics, including scale-freeness, decay of self-similarity over time, and complexity. Both frequency- and time-based dynamic measures have already shown a synergistic capacities to characterize psychopathy-related effects. Specifically, abnormally increased power-law exponent (PLE) alongside reduced ACW can distinguish schizophrenia from controls 1. Meanwhile it has been shown that variations of ACW can serve to differentiate between meditation styles and meditation expertise 2,3. Additionally, brain complexity, another key metric, has gained attention in psychedelic research 4,5. Notably, both psychedelic and meditative states consistently demonstrate increased complexity 6. Aims: Given that these measures capture distinct yet interrelated aspects of neural activity, we sought to assess their role in meditation. Recent studies suggest ACW can differentiate meditation expertise levels, types, and depths (Malipeddi et al., 2024; Ventura et al., 2024). We compared active meditators (N = 21; mean meditation hours: 7552 ± 9225, range: 1211–12,685) to non-meditators (N = 19) using fMRI data concatenated across focused, open, and loving-kindness meditation methods. For each vertex in the surface-based fMRI data, we computed PLE, ACW, and Lempel-Ziv complexity (LZC), then averaged these values across 17 network-specific parcellations 7. Results: Meditators exhibited a trend of increased power-law exponent (PLE), significantly reduced auto-correlation window (ACW), and increased Lempel-Ziv complexity (LZC) across multiple major brain networks. In the control group, PLE showed a significant negative correlation with LZC and a positive correlation with ACW, relationships that were absent in meditators. To disentangle this mitigation of the between-measure correlations amongst the subjects, the ratio between ACW and PLE, as well as the

ratio between LZc and PLE were computed and compared between groups. Interestingly, the most robust difference between groups out of all measures was observed in the ACW/PLE ratio, which significantly differentiated meditators from controls. Discussion: Our findings suggest that meditation may reduce the dependence of brain time-scales and complexity on slower neural frequencies. The absence of a significant relationship between PLE, ACW, and LZC in meditators implies that prolonged meditation practice could decouple these dynamic measures, leading to a more flexible regulation of brain states. This aligns with prior research linking meditation to alterations in functional connectivity, neural flexibility, and information integration 2,3,8–10. The ACW/PLE ratio emerged as the most robust distinguishing feature between meditators and controls, emphasizing the importance of examining dynamic relationships rather than isolated metrics when characterizing brain states. A reduced ACW alongside increased complexity suggests meditation fosters a more transient, metastable neural landscape, potentially enhancing cognitive flexibility. These results add to the growing evidence that meditation modulates neural dynamics across multiple levels, from frequency organization to temporal persistence. Future studies should explore whether these alterations correlate with subjective meditation experiences and whether different styles exert distinct effects on brain dynamics.

C - 20

Keywords
Meditation, fMRI, Complexity, Scale-Freeness, PLE, ACW

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Consciousness is slow at the top: investigating the electric fields at the apex of the hierarchical brain
Professor Justin Riddle PhD[1], Professor Jonathan Schooler PhD[2]
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
Subjective experience occurs dynamically at the scale of seconds and tens of seconds. A typical thought such as, “I wonder how Steve is doing?” is initiated and resolves within the ‘slow’ frequency band from 1 to 0.1 Hertz. The traditional neuroscientific explanation for this experience is that the slow scale is merely an emergent property and the true source of information processing resides at the scale of individual neurons generating action potentials near the kilohertz range. However, a mechanism is required for how information processing bridges temporal chasm from kilohertz, 1000 Hz, at the neural level and slow, 0.25 Hz, at the level of human thought. The Nested Observer Windows (NOW) Model proposes that the brain is hierarchically organized across spatiotemporal scales with more macroscopic neural structures nested on top of the microscopic. In the NOW Model, the apex of this hierarchical structure is the strongest neural correlate of consciousness and processes information at the slow timescale. Currently, there are only a handful of investigations into the neural correlates of the slow timescale. Here, we propose a series of cognitive neuroscience studies that can be used to investigate the gestalt comprehension of entire sentences and entire scenes while electroencephalography (EEG) is acquired. We hypothesize that the amplitude of slow-wave activity in the brain coincides with the perception of higher-order linguistic and visual comprehension. As a control, we will include conditions with nonsensical stimuli, e.g., scrambled sentence phrases and discordant visual objects, that are designed to disrupt the automatic gestalt perception. With a disruption to gestalt perception, we predict to find reduced amplitude or phase-resetting of slow-wave activity. Furthermore, we hypothesize that gestalt comprehension will also coincide with increased cross-frequency coupling between slow-wave oscillations at the apex level and higher-frequency activity in the canonical EEG range of delta, theta, or alpha oscillations (2-12 Hz). These experiments highlight the utility of the NOW Model to generate testable predictions and will potentially provide supporting evidence for hierarchical models of consciousness.

C - 2

Keywords
hierarchical consciousness, cognitive neuroscience, EEG

342

Neural Dynamics of Meditative Deep States: Alpha Suppression, Gamma Synchronization, and Infraslow Wave Activity in Expert Practitioners
Chuong Ngo PhD[1,2], Lionel Newman PhD[1], Monika Stasytyte[1], Erkin Bek[1], Prof. Christoph Michel PhD[1,3]
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
Meditation induces profound alterations in brain activity, yet the underlying neural mechanisms remain incompletely understood. While prior research has often examined trait-level changes in novice practitioners—frequently reporting enhanced alpha and theta activity—the state-level neural dynamics during meditation, particularly in expert practitioners, have been less clearly defined. Notably, alpha power findings during Focused Attention Meditation (FA-M) have been inconsistent, with reports of increases, decreases, or no significant changes (Lieberman, 2024). To address these discrepancies, we investigated EEG recordings from an advanced Yogic Samadhi practitioner, 11 Theravada Jhana experts, and 10 less experienced meditators practicing FA-M, utilizing a 64-channel equidistant electrode setup along with with ECG and respiratory measurements. Our results revealed that meditation was consistently associated with significant alpha suppression across all groups, with the degree of suppression strongly correlating with meditative expertise. Additionally, expert meditators exhibited marked increases in gamma activity, a frequency band commonly linked to states of heightened awareness and deep meditative absorption. The pronounced presence of gamma synchronization aligns with previous findings that associate gamma oscillations with deep meditative states and altered states of consciousness. Furthermore, infraslow waves (ISW; frequencies

C – 20

Keywords
Deep meditative state, Meditation, Samadhi, Jhanas, Alpha Suppresion, Gamma Synchronization, Infraslow wave, Focus Attention

347

Completion of Consciousness meter, NCC and Awakening, Non-locality of consciousness
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Indian Institute of Technology - Mandi, Mandi, Himachal pradesh, India

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
Consciousness researcher has long been trying to make consciousness meter, machine that can measure consciousness.I will display my experiment data on ,plant,dog,mice,human being using consciousness meter. With human being, I will show data under general anesthesia and normal state.It is first successful experiment to measure human consciousness.I will also display data during meditation, during deep meditation(Samadhi).Before and after Transmission of awakening.From the data, it is clear that meditation and awakening is expansion, deepening of consciousness.I will show data of before and after 2 types of neuromodulation that we thinks are most effective.One is ultrasound and one is photobiomodutation. Both act on microtubles, thus reinforce the evidence,that NCC is from microtuble. And also shows microtuble`s important role on Alzheimer`s disease and memory. I will transmit my awakening during my session.Participants can check their brainwave with consciousness meter, before and after transmission of awakening. Participants will experience validity of Non-locality of consciousness.Consciousness meter`s signals are 6-26mhz and comes from microtubles. By using consciousness meter in all of these experiments; Conclusion is general aneththesia disrupts microtuble polymerization.Disrupts microtuble`s quantum effects.Thus leading to complete loss of consciousness.Even though neurons are still rapidly active after general anesthesia.Usually regular eeg indicates delta states after general anesthesia. And another conclusion is that NCC is quantum effects in microtuble.

C - 4

350

Modeling states of consciousness during clinical sedation with stochastic differential equations
Katja Seeliger PhD
Radboud University, Nijmegen, Gelderland, Netherlands

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy

[02.01].....Neural correlates of consciousness (general)

Abstract
Investigating neural correlates of consciousness (NCCs) requires connecting dynamic neural processes with high-quality, large-scale brain activity data. Using data from a unique EEG data collection (2-channel frontotemporal EEG, labeled in fixed temporal intervals with the Ramsay scale) from clinical sedation with propofol during endoscopy, we applied a stochastic differential equation (SDE)-based modeling framework to investigate neural dynamics underlying transitions between states of consciousness (SOCs). This modelling approach captures latent brain states and their evolution through deterministic trends (drift) and stochastic fluctuations (diffusion) of coupled oscillators, enabling detailed insights into the neural processes associated with SOCs. Our analysis revealed distinct latent attractor states associated with different SOCs. By correlating latent variables with EEG features such as power spectra and entropy, we identified robust markers previously documented in literature and implicitly learned and captured by the model. The scale of this dataset, combined with the time-resolved power of the SDE framework, provides a novel opportunity to study SOC dynamics at both individual and population levels. Unlike prior studies limited by sample size or static metrics, this approach enables dynamic modeling of brain states and robust inference of neural markers across diverse sedation conditions. Our findings offer insights into the mechanisms underlying SOC transitions and contribute to understanding the dynamic nature of NCCs. This work also demonstrates the practical utility of SDE-based models for applications such as monitoring sedation depth, diagnosing disorders of consciousness, and extending investigations to other altered forms of SOCs. By combining modern modeling techniques with this unique large-scale dataset, we establish a foundation for future studies to deepen our understanding of the neural dynamics underpinning conscious experience.

C - 14

Keywords
sedation, states of consciousness, neural correlates of consciousness, EEG, propofol, computational modeling

395

Potential neural signatures of near-death consciousness in humans
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University of Michigan, Ann Arbor, MI, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
The brain is assumed to be hypoactive during cardiac arrest. However, animal models of cardiac and respiratory arrest demonstrate a surge of gamma oscillations and functional connectivity. To investigate whether these preclinical findings translate to humans, we analyzed electroencephalogram and electrocardiogram signals in four comatose dying patients before and after the withdrawal of ventilatory support. Two of the four patients exhibited a rapid and marked surge of gamma power, surge of cross-frequency coupling of gamma waves with slower oscillations and increased interhemispheric functional and directed connectivity in gamma bands. High-frequency oscillations paralleled the activation of beta/gamma cross-frequency coupling within the somatosensory cortices. Importantly, both patients displayed surges of functional and directed connectivity at multiple frequency bands within the posterior cortical “hot zone,” a region postulated to be critical for conscious processing. This gamma activity was stimulated by global hypoxia and surged further as cardiac conditions deteriorated in the dying patients. These data demonstrate that the surge of gamma power and connectivity observed in animal models of cardiac arrest can be observed in select patients during the process of dying. They also suggest the existence of neural correlates of near-death consciousness underlying near-death experiences reported by survivals of cardiac arrest.

PL-12

Keywords
near-death, consciousness, brain, EEG, near-death experience

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Evidence for Non-Local Consciousness and Extrasensory Perception
David del Rosario David del Rosario is a researcher, science communicator, and director of the Institute of Advanced Neuroscience of Barcelona (INAB). He holds a Master’s in Biomedical Engineering from the University of Barcelona and a PhD in Neurosciences from the University of Alicante. He combines a solid academic background with a passion for bridging science and everyday life. David’s work focuses on research in cognitive neuroscience, particularly exploring human thought, emotions, and consciousness. He has published the best seller *El libro que tu cerebro no quiere leer*, which remained on Spain’s top 10 non-fiction books list for weeks. His

contributions to research and dissemination have earned him several prestigious awards, such as the National Telecommunications Award and the Extraordinary Award in Biomedical Engineering. David has shared his insights at conferences across Europe, North America, and South America, making complex scientific ideas accessible to diverse audiences. As the director of INAB, he continues to advance innovative approaches in neuroscience research and education.
Instituto de Neurociencia Avanzada de Barcelona (INAB), Barcelona, Spain

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[02.01].....Neural correlates of consciousness (general)

Abstract
Life is an intelligent, self-organizing process characterized by a continuous sequence of interdependent reactions, where each event is intrinsically linked to preceding and subsequent occurrences. Within this framework, human consciousness emerges as a complex and dynamic phenomenon, manifesting in people through perceptions, thoughts, and emotions. These phenomena contribute to an ongoing flux of conscious and unconscious interactions that define human experience. Scientific inquiry has allowed us to observe and quantify these interactions, offering novel insights into phenomena that extend beyond direct sensory perception. Advances in cellular and wave mechanical interactions, communication between human and non-corporeal intelligences, and cognitive vision phenomena are measurable examples within contemporary neuroscience. This plenary session will critically analyze recent experiments performed at the Instituto de Neurociencia Avanzada de Barcelona (Spain), integrating interdisciplinary research to assess the feasibility of non-local information transfer and its implications for broadening our understanding of human cognition beyond established paradigms.

PL-5

Keywords
thoughts, emotions, sonobiology, cognitive vision, non-corporeal intelligences

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Sentiometry – Measuring Peri-somatic Modulation of Diffracted Light by Consciousness and Characterizing the Underlying Physicochemical Mechanisms
Dr Santosh A Helekar MD, PhD
Houston Methodist Research Institute, Houston, TX, USA. Weill Cornell Medicine, New York, NY, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.02].....Methodologies (fMRI, EEG etc.)

Abstract
Is the mechanism that gives rise to consciousness simply some manifestation of a neuronal or network level process that modern neuroscience has already uncovered? Or will this mechanism turn out to be an entirely new deeper subcellular physicochemical mechanism that is presently unknown or only hypothetical? We have recently discovered a new type of biophysical effect that suggests the latter possibility. This effect can be recorded in the peri-somatic space with a noninvasive, non-contact photoelectronic device called a Sentiometer (STM) developed in our laboratory. It involves a marked decrease in the magnitude of light wave phenomena such as interference and diffraction caused by proximity of the STM sensor module to the head or any other part of the body of a conscious human subject or a mouse. The source of light waves inside the sensor module is a low power laser light-emitting diode. We have designed and constructed 2 versions of STM producing either double slit interference patterns or single aperture beam diffraction. The peri-somatic sentiometric response (SR) to conscious subjects cannot be accounted for by known physical effects, such as body heat, humidity, electrostatic effects, electromagnetic interference, movement of air, and infrared or ultraweak photon emissions. It is substantially attenuated by general anesthesia, sedation and unconscious states produced by brain damage or dysfunction. Exposure of invertebrates, plants or decapitated heads of mice less than ~3 hours after death to the STM sensor module produces an inverted SR. An inverted response is also produced by certain polymeric materials containing 6-carbon rings such as polystyrene and carbon nanotubes when they interact with water. The amplitude of the polystyrene-water inverted response is reduced when deuterium oxide is substituted for water. It is also modulated by a rapidly changing magnetic field and the direction of such modulation is dependent on the orientation of the magnetic axis relative to some structural feature of polystyrene. The latter observations suggest that the spins of delocalized electrons in polymeric 6-carbon ring structures and the interactions of these electrons with water molecules might play a role in mediating the sentiometric effect, and by extension, possibly, the mechanism that generates consciousness.

PL - 7

Keywords

Consciousness measurement, general anesthesia, disorders of consciousness, brain death, quantum biology, light intensity modulation, molecular mechanisms

401

Decoding Depth of Meditation: Electroencephalography Insights From Expert Vipassana Practitioners
Nicco Reggente[1], Chrisitan Kothe[2], Tracy Brandmeyer[3,4], Grant Hanada[2], Ninette Simonian[3], Sean Mullen[2], Tim Mullen[2]
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.02].....Methodologies (fMRI, EEG etc.)

Abstract
Meditation practices have demonstrated numerous psychological and physiological benefits, but capturing the neural correlates of varying meditative depths remains challenging. In this study, we aimed to decode self-reported time-varying meditative depth in expert practitioners using electroencephalography (EEG). Expert Vipassana meditators (n = 34) participated in two separate sessions. Participants reported their meditative depth on a personally defined 1 to 5 scale using both traditional probing and a novel spontaneous emergence method. EEG activity and effective connectivity in theta, alpha, and gamma bands were used to predict meditative depth using machine/deep learning, including a novel method that fused source activity and connectivity information. We achieved significant accuracy in decoding self-reported meditative depth across unseen sessions. The spontaneous emergence method yielded improved decoding performance compared with traditional probing and correlated more strongly with postsession outcome measures. Best performance was achieved by a novel machine learning method that fused spatial, spectral, and connectivity information. Conventional EEG channel-level methods and preselected default mode network regions fell short in capturing the complex neural dynamics associated with varying meditation depths. This study demonstrates the feasibility of decoding personally defined meditative depth using EEG. The findings highlight the complex, multivariate nature of neural activity during meditation and introduce spontaneous emergence as an ecologically valid and less obtrusive experiential sampling method. These results have implications for advancing neurofeedback techniques and enhancing our understanding of meditative practices.

C - 14

Keywords
Decoding, EEG, Machine learning, Meditation, Meditative depth, Vipassana

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Neural Signatures of Non-Vision Visual Perception: An Empirical Investigation
Parveen Kumar B. Tech, MA (philosophy), Lokeswara Kumar Vijanapalli M. Tech, Jyotiranjan Beuria PhD, Venkatesh H Chembrolu PhD, Laxmidhar Behera PhD, Prof.
Indian Institute of Technology, Mandi, Himachal Pradesh, India

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.03].....Neuroscience of vision

Abstract
This study explores the phenomenon of perceiving objects without direct visual input. We term this phenomenon Non-Vision Visual Perception (NVVP). While often dismissed as trickery, our investigation suggests that NVVP may be a genuine perceptual phenomenon. We conducted an empirical study involving children trained in this technique across three cities in India. The study examined their ability to recognize objects while blindfolded and analyzed corresponding neural activity. Methodology: A total of ten children who had undergone training in NVVP were recruited. The experimental protocol involved presenting 30 randomly selected images, equally distributed among three categories: simple geometric shapes, emojis, and complex natural images. The baseline condition consisted of standard visual perception with open eyes, followed by imagination with closed eyes. The experimental condition involved blindfolded perception of images and subsequent imagination of the perceived objects. Key Findings: 1.Temporal Characteristics: Subjects required significantly more time to recognize objects in the NVVP condition, typically ranging from a few seconds to a few minutes in some cases. 2. Perceptual Progression: Initial object identification involved recognizing high-level structural features, followed by the gradual discernment of finer details such as color, texture, textual information, etc. 3. Neurophysiological

Correlates: EEG recordings revealed a statistically significant increase in beta and gamma frequency bands, indicative of heightened cognitive processing, such as deep reflection and contemplation. 4. Electroretinogram (ERG) Analysis: ERG testing conducted on one subject in a clinical setting showed retinal electrical activity consistent with occluded vision, ruling out any light transmission through the eyes and thereby eliminating the possibility of trickery. 5. High-Frequency Electromagnetic Probing: Using high-frequency probes dodecanogram (DDG) being developed at IIT Mandi, MHz-range electromagnetic signals were detected in some subjects. This novel observation warrants further investigation to elucidate its validity and significance in NVVP. 6. Performance Variability: While all subjects claimed complete blindfolded visual perception, empirical results varied. Two subjects exhibited negligible performance, while two others achieved approximately 80% accuracy. The remaining participants demonstrated an accuracy exceeding 90% in object recognition. Based on the subjective feedback from the subjects, we find a correlation between the accuracy of object identification during NVVP and the duration and regularity of practice of this art. 7. Future Experimental Research: In future studies, we aim to explore dependencies of the level of object identification accuracy in NVVP under various controlled conditions such as distance from the object, ambient lighting conditions, objects screened by an obstacle, etc. Also, further exploration involving a larger sample size is underway. Conclusion: From this preliminary exploratory study, NVVP seems to be a learnable skill, especially for children whose brain connectivity is still developing actively. We also find that multiple training methods exist that can potentially leverage this ability to various degrees. Our findings suggest that NVVP is also a measurable phenomenon that merits rigorous scientific scrutiny. The observed neural and physiological markers indicate the involvement of higher cognitive processes in NVVP. Further interdisciplinary research may contribute to a deeper understanding of alternative perceptual mechanisms and their implications for neuroscience and consciousness studies.

C - 18

Keywords
Blindfolded Perception, Perceptual Cognition, Non-Vision Visual Perception (NVVP)

433

If consciousness survives, materialism dies: re-appraising the “permissive brain” hypothesis at the edges of consciousness
Prof. Alex Gomez-Marin PhD
Instituto de Neurociencias, Alicante, Alicante, Spain

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.04].....Other sensory modalities

Abstract
What happens with the mind when the brain dies? This question can be scientifically approached in a two-fold manner. First, the study of end-of-life brain activity can shed light on how our brains function under extreme conditions. The topic would thus lie within what Thomas Kuhn called “normal science”, namely, solving puzzles circumscribed to the boundaries of the dominant paradigm. Second, seriously entertaining the possibility that there can be mind activity when the brain is literally dead ventures our quest into the realm of “scientific revolutions”. To put it plainly: if consciousness survives bodily death, materialism dies. I will explore this possibility from three sources: my own near-death experience in March of 2021, my training as a PhD in theoretical physics, and my career as a neuroscientist. Bringing the visionary insights of William James back to the future, I will revisit the “productive versus permissive” brain hypotheses and contrast them in the context of empirical data at the edges of consciousness. I will start with converging evidence within Survival research, then move into Psychical research (one does not need to almost die to experience or investigate minds beyond brains), and finally dare to speculate about the connection of these two fields with the renewed interest in Unidentified Anomalous Phenomena (good old-fashioned UFOs) and the prospects of Artificial Consciousness (and the dangerous bullshit around it). The singularity is near, but it is probably not what you think.

PL-12

Keywords
near-death experience, permissive brain, end of materialism, anomalous phenomena; theoretical physics

322

FLOW
Mark S Valladares BA Neuroscience; Tennis Coach
Overland Park Racquet Club, Overland Park, KS, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[02.05.....Motor control

Abstract
Using both scientific and experiential approaches to understand the Flow state (transient hypofrontality), the explanatory power of Orch OR coupled with Time Crystals (Bandyopadhyay) is examined in the context of improvisational disciplines to resolve the paradox of the quiet brain in high performance. Detectable metastable anomalies (stable heteroclinic chains) are implicated in the interplay for control between mind (subjective induction) and body (objective reduction) such that multiscale periodicity acts as a bridge between classical macropscopic behavior and the quantum coherence in time crystals.

PO - 2 (Tues)

Keywords
Flow, transient hypofrontality, Orch OR, Time Crystals, stable heteroclinic chains, mind and body, incompleteness, multiscale periodicity, quantum-classical interfaces

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Morphic Resonance and the Memory of Nature
Rupert Sheldrake PhD
Temenos Academy, London, United Kingdom

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[02.06].....Memory and learning

Abstract
According the hypothesis of morphic resonance, memory is inherent in nature and the so-called laws of nature are more like habits. All self-organizing systems, including crystals, living organisms, stars and galaxies are organized by morphic fields which contain an inherent memory, given by a process called morphic resonance from previous similar systems. All species have a collective memory, on which each individual draws and to which it contributes. Self-organizing systems are sustained by self-resonance from their own past, and even individual memory depends on morphic resonance rather than on physical memory traces stored within the brain. The hypothesis has many implications for information and consciousness in the universe.

PL-11

Keywords
Morphic Resonance, memory, memory traces, collective memory

354

The Putative Role of Slow and Fast Theta Rhythms in Internal and External Representations Along the Hippocampal Longitudinal Axis
Molly S Hermiller PhD, Asst. Prof.[1], Professor Jonathan Schooler PhD[2]
[1]Florida State University, Tallahassee, FL, USA. [2]University of California, Santa Barbara, Santa Barbara, CA, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.06].....Memory and learning

Abstract
Episodic memory allows us to store and retrieve past experiences, mentally reconstruct previous events, and integrate new information with prior knowledge. A growing body of research suggests that neural activity oscillating at theta-band frequencies (~2-9 Hz in humans) provides a temporal framework for episodic memory processes within the hippocampus and coordinates interactions with distributed cortical networks. However, despite its recognized importance, the functional organization of hippocampal theta rhythms remains debated, particularly in relation to distinctions along the hippocampal longitudinal axis. Here, we propose that the anterior hippocampus is preferentially involved in internal representations, allowing mind-wandering to access schematic memory structures and abstract knowledge, whereas the posterior hippocampus is more engaged in processing external representations, closely tied to perceptual and spatial details of the environment. This anterior/posterior distinction extends other theories of hippocampal function, including the spatial hypothesis, which proposes a posterior emphasis on fine-grained spatial encoding. Our framework also intersects with theories positing a gradient of fine- and gist-level memory representations, where posterior hippocampal activity supports high-

resolution, detailed memory traces, while anterior regions contribute to generalized, context-dependent representations. Finally, our framework flips encoding/retrieval models that link the anterior hippocampus to external processing and encoding and the posterior hippocampus to internal processing and retrieval. Theta rhythms may play a key role in dynamically modulating this internal-external representational axis. Slow theta oscillations are associated with integrating information over longer temporal windows and may preferentially support anterior hippocampal functions, facilitating the assimilation of new experiences into existing knowledge structures. In contrast, fast theta rhythms are linked to finer temporal resolution and may be more prominent in the posterior hippocampus, enhancing the encoding of detailed, stimulus-driven information from the environment. This frequency-based differentiation suggests that theta oscillations serve as a mechanism for flexibly shifting between internally guided and externally focused modes of memory processing. By framing hippocampal theta activity within the context of internal versus external representations, our perspective integrates multiple theoretical models and provides a unifying account of how theta oscillations support memory. Understanding the role of slow and fast theta rhythms in this process may offer new insights into how the hippocampus orchestrates memory formation and retrieval, as well as its broader contributions to cognition and consciousness. Furthermore, disruptions in hippocampal theta dynamics have been implicated in memory disorders, highlighting the potential translational significance of these insights for understanding pathological memory dysfunction.

C - 20

Keywords
hippocampal networks, theta rhythms, memory, internal/external representations

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The case of Phineas Gage and the Global Neuronal Workspace theory of consciousness.
Prof. Lukasz Kurowski PhD
Centennial College, Toronto, Ontario, Canada

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[02.08].....Neurology, neuropsychology and neuropathology

Abstract
Is the famous case of Phineas Gage(PG) a problem for the Global Neuronal Workspace(GNW) theory of consciousness? Yes, it is. My presentation will focus on the neuroanatomical damage to PGs brain, and similar cases, to show that the prefrontal cortex requirement for consciousness in the GNW(Mashour et at., 2020; Panagiotaropoulos, 2024) is highly questionable. Phineas Gage: Did not lose consciousness, nor self-consciousness, but suffered extensive damage to his left prefrontal cortex(e.g., ventromedial and dorsolateral regions), about 11% of white matter therein that houses long bi-directional neuronal bundles(e.g., superior longitudinal fasciculus), which connect anterior and posterior cortical regions (e.g., frontal, temporal, parietal and occipital) (Van Horn et al. 2012). He also suffered from “frontal lobe syndrome” (Gazzaniga, 2018). Patient E.L. (2012): Suffered a construction accident that mirrors that of PG with brain damage to the right frontal lobe, including white matter (de Freitas et al. 2022). However, E.L., did not lose consciousness, nor self-consciousness, as he was able to undergo a battery of cognitive tests after the accident. Radical lobectomy: Both patient A., who suffered massive meningioma (Koch, 2018) and patient W., who suffered burst aneurysm (Solms, 2021), and further complications, had lobectomies performed bilaterally on prefrontal cortices. Yet, to an untrained eye, both individuals seemed typically conscious and quite ordinary. Cognitive tests revealed intellectual deficiencies, but not loss of consciousness or self-consciousness. Considering the case of PG, and other lesion cases, the claim that the prefrontal cortex is a (necessary) requirement for consciousness in GNW seems unfounded.

PO - 1 (Mon)

Keywords
Phineas Gage, prefrontal cortex, radical lobectomy, GNW theory, consciousness and self-consciousness
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Old theory, new evidence: microtubules are the biological substrate of quantum consciousness
Associate Professor Mike Wiest PhD
Wellesley College, Wellesley, MA, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.10].....Anesthesia

Abstract

I review my recent experimental result strongly suggesting that the anesthetic gas isoflurane acts on microtubules to cause unconsciousness in rats. When combined with other old and new evidence—including direct biophysical evidence in living neurons and conscious humans—my result supports the hypothesis that the physical substrate of consciousness is a quantum state of neuronal microtubules that is disrupted by inhalational anesthetics. After discussing future directions in anesthetic mechanism research, I turn to consider potential practical (behavioral, evolutionary) advantages of a quantum brain, and enormous theoretical advantages of a quantum consciousness model. In particular, I explain how the quantum model makes panpsychism viable as a solution to Chalmers' Hard Problem, by solving the phenomenal Binding (or Combination) Problem. Solving the Hard Problem in this way appears to leave us with an Epiphenomenalism Problem, meaning we cannot account for the evolution of useful conscious states if the conscious property of matter has no physical effects. Contrary to this "zombie" intuition, I propose a non-trivial solution to the Epiphenomenalism Problem, by recognizing a necessary connection between an essential property of conscious experiences and an objective property of their physical substrates. Finally, I point out that the Orchestrated Objective Reduction theory of Penrose and Hameroff embodies these advantages of a quantum model; and also accounts for non-algorithmic human understanding and the psychological arrow of time—which no other theory of consciousness does.

PL-4

Keywords
anesthesia, quantum consciousness, quantum associative memory, Orch OR, microtubules, hard problem, binding problem, panpsychism, epiphenomenalism, active inference

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Quantum biology: The way the brain connects
Professor Nancy J Woolf Ph.D.
UCLA, Los Angeles, CA, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[02.12].....Quantum brain biology

Abstract
Traditional neuroscience suggests that human consciousness happens at synaptic contacts. I argue this is largely impossible. The material basis of the human brain streams data channeled through several sensory systems to the cerebral cortex. Every part of the cerebral cortex has similar redundant features. Columns, consisting of layers of cells in each area, systematically process incoming streams of sensory data and then forward that data to higher levels of cerebral cortex for more processing. But synaptic processing of input steams does not equate with understanding; it lacks the necessary computational power. Consciousness fundamentally involves forming ideas about recurring spatiotemporal patterns between inputs within the context of personal relevancy. This requires repeated review and incorporation of all stored memories of relevant past relationships between inputs as each new data stream arrives. As we have hypothesized in many previous publications, an anatomical structure exists in the nanowire matrix of microtubules that can reawaken quantum entanglements that represent ideas (Woolf, Priel, Tuszynski, Nanoneuroscience: Structural and Functional Roles of the Neuronal Cytoskeleton in Health and Disease, Springer, 2009). Ideas are continuously modified by new experiences. Even in the absence of new input, stored ideas can combine to form new ideas. That is our creative potential. Our thinking is shaped by others. Ideas are shared between different individuals through classical communication channels like speaking and listening, or writing and reading. Humans are also sensitive to subtle non-verbal communication. Facial expressions and body language can be read as humans mimic the behaviors that they see and access their own reactions. Humans are also sensitive to unseen events. Most if not all aspects of spirituality rely on believing in things that we cannot see or explain. The human mind is creative, but key discoveries are made by different people independently and certain 'truths' appear to be self-evident. Consequentially, some form of universal wisdom or intelligence undeniably exists. In this age of AI and advanced space travel we are embarking on new levels of understanding. We can look at the human brain for answers, its cytoarchitecture and the structure of the microtubule networks give clues to the physics and geometry of unseen knowledge. Dipole shifts in the terahertz range among electrons held in position by microtubule networks may well be major senders and receivers, evolved to perfectly entangle with the geometry of universal wisdom and intelligence. As we explore the skies and the heavens above us, we should simultaneously look deeply into the biophysics of the materials in the human brain that enable us to soar to great heights. Understanding may well be within reach.

C - 15

Keywords
quantum mind, microtubules, cytoarchitecture, teraHz frequency, dipole shifts, cerebral cortex

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Spirals of Mass, Life, and Light
Charles H Ernst ME
UCCS, Colorado Springs, CO, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[02.12].....Quantum brain biology

Abstract
Studies of the TRPV1 Quartet, CISS Effect, and Glymphatic System The TRPV1 Quartet is a family of Cannabinoid / Vanilloid receptors: CB1, CB2, GPR55 (CB3) TRPV1. I will describe how theTRPV1 receptor ion channel uses Ca++ and H+ ion signals to control nearly all processes in the body. I will explain one example.- the process of the lens in our eyes. I will then briefly discuss the link between the TRPV1 Quartet and Cognition and Consciousness. I will present the Chirality-Induced Spin Selection (CISS) effects. I will show how spin selection can explain the homochirality of nearly all proteins in the human body. I will explain how these homochiral proteins transmit light and electrical waves with almost 100% efficiency. I will describe the benefits of this efficient transfer of information and energy. The Glymphatic System removes metabolic waste, heat, solids, and toxins from the human brain, spinal column, and eyes. The Cerebral Spinal Fluid (CSF) flow carries these waste products away from neurons and delivers nutrients, oxygen, and immune proteins. I will describe and discuss this waste removal and nutrient delivery system. Ultra-processed Foods and Medicines are primarily Achiral. They mainly consist of D-Amino Acids (DAAs) and Cross-linked Amino Acids (CLAAs). The human body cannot use DAAs and CLAAs that need removal. The Lymphatic system, liver, and kidneys remove them from the body. The Glymphatic system removes them from the brain, eyes, and spinal column. This Glymphatic system can be overwhelmed by an excess, which leads to a problem with cognition, consciousness, and Brain health.

PO - 2 (Tues)

Keywords
TRPV1, CISS, Glymphatic, CSF, Spirals, Light, Homochirality, D-Amino Acids, ultra-processed, food, medicine

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Examining the Effects of Biofield Therapy Through Simultaneous Assessment of Electrophysiological and Cellular Outcomes
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[02.12].....Quantum brain biology

Abstract
Summarize "In this case study, a self-described biofield therapy (BT) practitioner (participant) took part in multiple (n=60) treatment and control (non-treatment) sessions under double-blind conditions. During the treatment phases, the participant provided BT treatment from a distance of about 12 inches from the cells, alternating with rest phases where no such efforts were made. Human pancreatic cancer cell activity was assessed using three markers – cytoskeleton changes (tubulin and β-actin) and Ca2+ uptake. The study examined changes in the participant's physiological parameters including electroencephalogram (EEG) and heart rate measures during the treatment of: 1) live cells and 2) either dead cells or medium only with no cells (control group). Changes in cellular outcomes and if there was an association between the participant's physiological parameters and cellular outcomes were examined. The experimental setup was a 2x2 design, contrasting cell type (live vs. control) against session type (treatment vs. non-treatment). Parallel sham-treated control cells were examined for changes in the cell parameters over time while controlling for the presence of a person in front of the cells mimicking the distance and movements of the participant. The participant's physiological data, including 64-channel EEG and heart rate, were continuously monitored throughout these sessions. We observed significant (p

PL-1

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Frontiers in Neuronal Networks: Cerebral Organoid Sensory and Motor Interfacing
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.13].....Brain networks, synchrony and scale

Abstract
Cerebral organoids afford an innovative way to study neuronal networks, learning, and adaptation. Organoids are grown from human induced pluripotent stem cells (hiPSCs) by collecting skin cells from a donor. The donor's skin cells are chemically encouraged using Yamanaka factors to revert-back to pluripotent stem cells which are then manipulated forward using growth factors into a cerebral organoid. Organoids express genetic mutations and developmental pathways of the donor, giving researchers access to the emergence of disorders associated genetic disease. To make them more akin to a living brain, my research proposal introduces sensory stimulation via cameras, microphones, and somatosensory devices. These visual, auditory, and tactile cues are the same interactions and sensory experiences given to severely disabled patients via computer brain interfacing, restoring their sight, hearing, and tactile sensation. One might argue these cues are essential for fetal and cerebral organoid neural network development. To complete the feedback loop, the utilization of artificial intelligence (AI) models analyzes motor/output responses from the organoids in the form of interfaced light bulbs, vibration, and sound technology. This research proposal seeks to build a series of sequential steps that can lead to a process of self-awareness. Interface an organoid with a camera (for "eyes" to the world), a light bulb (for self-expression), and a sensor near the light bulb (for interactive behavior with a researcher). The sensor near the light bulb triggers an electric pattern delivered to the cerebral organoid representing touch. When a specific pattern of spontaneous motor activity is assigned to the task of lighting the light bulb, the researcher will cover the light bulb with their hand when the bulb lights up. The camera conveys many things to the organoid. It conveys when its bulb has been lit, when the researcher covers the bulb, and how the two things are related to the feeling of being touched. This interdisciplinary approach bridges neuroscience, neurotechnology, and bioengineering leveraging cutting-edge technologies to develop associative learning, communication, and basic interactions with cerebral organoids to assess the potential functionality of neuronal networks within these cultured systems. Further interests in this interaction would investigate the most basic foundations of consciousness. Cerebral organoids are a formidable player addressing ethical and disease modeling concerns brought about in animal studies. This proposal seeks to advance our understanding of cerebral organoids, neuronal networks, and plasticity to facilitate bioengineered neural systems in various applications, including but not limited to neural prosthetics, neurorehabilitation, and the integration of neural systems into artificial intelligence and computing technology to accelerate discoveries.

C - 15

Keywords
Cerebral Organoids, cultered neurons, Computer-brain interfacing, neuroprosthetics, biocomputing

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Ephaptic fields forever: The "field code" and the "neuroscience of tomorrow"
Mr. Tam Hunt JD
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.13].....Brain networks, synchrony and scale

Abstract
Ephaptic field effects are at least 5,000 times faster than neural firing in the brain. What does this dramatic difference in the speed of effects suggest about how our brains and minds work? The "field code" refers to the new science of EM (ephaptic) field dynamics in the brain and body, which have been shown to correlate closely with cognition and consciousness. The field code has already been shown to be more predictive in some ways than the longstanding "spike code" approach that is based on neural firing. The field code comes in at least two forms: 1) the weak version that asserts that synchronized/resonating EM fields may be the primary seat of consciousness, in addition to the dynamics of neural firing also playing a strong role; 2) the strong version that suggests neural firing may be little more than an energy input for the nested hierarchy of EM fields that is itself the locus of cognition and consciousness. I explore the data and arguments regarding these hypotheses.

C - 12

Keywords
Ephaptic fields, EM fields, consciousness, nested hierarchy, multi-scale consciousness

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Investigation of Quantum Entanglement through AI-Enhanced Analysis of Spontaneous Neuronal Population Activity In Vitro
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.13].....Brain networks, synchrony and scale

Abstract
This study explores the intersection of quantum mechanics and neuroscience by examining non-local correlations in Spontaneous Population Activity (SPA) within neocortical samples. Using a self-developed Python pipeline, we apply advanced AI techniques, including Kalman filtering and Hidden Markov Models, to analyze simultaneous SPA events across paired neocortical samples. Also using a probabilistic approach, offering a mathematical framework to identify patterns that align with the hypothesized quantum correlations. The study involves rodent-rodent and human-human cortical pairs, meticulously processed to reveal potential non-local interactions. Our primary hypothesis posits that these SPA events exhibit non-local correlations akin to quantum entanglement, potentially supporting the Einstein-Podolsky-Rosen (EPR) paradox within neural systems. By enhancing temporal resolution beyond traditional millisecond constraints, our approach uncovers deeper neural dynamics, bridging quantum theory and neurophysiology. This research aims to expand the understanding of consciousness by providing novel insights into the quantum-like mechanisms underlying neural activity.

PO - 3 (Wed)

Keywords
quantum mechanics, spontaneous population activity, AI-enhanced analysis, EPR paradox, consciousness studies

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Magnetoencephalography Reveals Brain Network Imbalance in Mild Cognitive Impairment Patients During a Delayed Matching Task
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.13].....Brain networks, synchrony and scale

Abstract
Understanding the activity patterns of brain functional networks in patients with Mild Cognitive Impairment (MCI) is crucial for early diagnosis and effective intervention. This study utilized the Elekta Neuromag system to collect 306-channel task-state magnetoencephalography (MEG) data from 24 MCI patients and 24 healthy controls. All participants engaged in a dual-feature delayed matching task involving color and shape. During the task, participants were instructed to focus solely on color, making judgments about the color of sequentially presented images and responding via keypress. The task comprised four conditions: match condition, task-irrelevant change condition, task-relevant change condition, and dual-feature change condition. Behavioral results indicated that the MCI group had significantly lower accuracy and longer reaction times compared to the healthy control group. MEG data analysis further compared source power across different frequency bands and time windows between the two groups. We found that delta and theta bands were primarily involved in the cognitive processes of this task. The MCI group exhibited significantly higher activity in the left hemisphere's salience network (insula and frontal operculum), lateral control network (ventrolateral prefrontal cortex), dorsal attention network (postcentral gyrus), and bilateral limbic network (orbitofrontal cortex) compared to the healthy controls. Under the match condition, the MCI group showed reduced activity in the left lateral default mode network (superior temporal gyrus) at 200-300ms, but increased activity in the bilateral medial default mode network (precuneus region) at 300-400ms. In the task-relevant change condition, the MCI group demonstrated prolonged activation duration in the aforementioned four brain regions compared to the match condition. In the dual-feature change condition, more brain regions within the salience, control, dorsal attention, and default mode networks were engaged bilaterally in the MCI group compared to other conditions. Conversely, fewer brain regions were activated in the alpha, beta, and gamma bands. The MCI group exhibited lower activation in the left lateral salience network (insula), lateral default mode network

(middle temporal gyrus), and bilateral medial default mode network (precuneus) compared to the healthy controls. The findings suggest that cognitive impairment in MCI patients is primarily associated with a synergistic imbalance in delta and theta rhythmic neural activities across multiple brain regions within the salience, control, attention, and default mode networks. This study provides critical insights into the neural mechanisms underlying cognitive deficits in MCI, potentially advancing the development of early diagnostic and intervention strategies.

PO - 2 (Tues)

Keywords
Mild Cognitive Impairment, Magnetoencephalography, Brain Functional Networks, Cognitive Function, Delayed Matching Task

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Cognition emerges from neural dynamics
Earl K. Miller
MIT, Dept of Brain and Cognitive Sciences, Picower Institute, Cambridge, MA, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.13].....Brain networks, synchrony and scale

Abstract
Classic models likened brain function to neuron networks, like telegraph systems. Emerging evidence, however, suggests higher cognition relies on rhythmic oscillations or "brain waves" at the electric field level. This expands functionality, with "telegraph wires" also producing "radio waves" (electric fields) that rapidly spread influence. These fields may facilitate large-scale organization, enabling executive control and energy- efficient analog computing.

PL-9

Keywords
neuron networks, rhythmic oscillations, brain waves, electric fields, telegraph wires, radio waves, energy efficient analog computing

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Investigation of the Effects of Long-Term Binaural Beats Application on Tinnitus Patients
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
Background: Binaural beats (BB) are one of the neuromodulation methods that have recently come to the fore in the treatment of tinnitus. The effects of long-term use of this method, which basically uses the auditory entrainment mechanism, are controversial. Aim: This study aimed to evaluate whether a 6-week theta-band BB intervention, in which neural plasticity can be achieved, would lead to improvements in tinnitus discomfort and associated depression scores in individuals. Methods: 18 patients applied theta band BB for 20 minutes a day for a period of 6 weeks. Tinnitus Handicap Inventory (THI), 10-point VAS scale for tinnitus discomfort rating and Beck Depression Inventory (BDI) were used to evaluate the depression scores of the participants before and after the BB application. Pre and post-test scores were compared to determine the effectiveness of the intervention. (Wilcoxon Signed-Rank Test was used in the pre-post evaluation of THI, VAS and BDI. Results: Before the 6-week theta band BB application, the THI score, which was at the level of moderate handicap with an average of 52.7 points, decreased to the level of mild handicap with 34.3 points after the application ($p=0.004$). Also, the level of discomfort from tinnitus decreased from 6.7 to 4.0 points (p

C - 6

Keywords
auditory entrainment, emotion, theta band, tinnitus rehabilitation

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Enhancing Meditative Development with Transcranial Focused Ultrasound: A Mixed-Methods Phenomenological Study of Neuromodulation in Expert Practitioners During a Ten-Day Retreat

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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
A third wave of meditation research emerged—the study of advanced meditation—which explores soteriological constructs, such as self-transcendence, for promoting comprehensive well-being. This research investigates the progression of meditative states, stages, and endpoints, along with their evolution through sustained practice and mastery (Sacchet et al., 2024). However, achieving advanced development is often restricted by the practical demands of extensive training and the need for expert guidance, making it accessible to only a subset of practitioners (Galante et al., 2023). To address this, researchers are investigating non-invasive brain stimulation techniques, such as transcranial-focused ultrasound (tFUS), to enhance meditative development by providing precise subcortical modulation with high spatial resolution (Abellaneda-Pérez et al., 2024). When targeting the posterior cingulate cortex (PCC)—a default mode network (DMN) node central to self-referential processing—tFUS has shown efficacy in enhancing mindfulness, reducing DMN connectivity (Lord et al., 2024b), deepening meditative states (Cain et al., 2024), and increasing equanimity—a non-reactive attitude toward sensory experiences (Lord et al., 2024a). This study is the first to investigate tFUS's effects on meditative development in experienced meditators during a ten-day mindfulness retreat. Group 1 (n = 30) received two 10-minute sonication sessions (5-second stimuli with 10-second breaks), while Group 2 (n = 6) served as a comparison, either opting out or being ineligible for tFUS. Stimulation targeted the PCC using a custom-made single-channel low-intensity focused ultrasound system following the methods of Tufiail and colleagues (Tufail et al., 2011; Blatek AT35246 transducer, 70 mm focus, BK Precision 4078 waveform generator). The signal was amplified by an E&I 210L Power Amplifier and monitored via a Tektronix TDS210 oscilloscope. Stimulation parameters—500 kHz acoustic frequency, 1000 Hz pulse repetition frequency, 5 ms pulse duration, and 5% duty cycle—were selected based on their inhibitory effects on neural activity. Targeting was guided by an MRI-based stereotactic system using a standardized brain (Visor2, ANT Neuro, Netherlands). Phenomenological data were collected throughout the retreat using standardized questionnaires and semi-structured free-response options. Measures included the Five-Facet Mindfulness Questionnaire (FFMQ), the Multidimensional Assessment of Interoceptive Awareness (MAIA), and the Nondual Awareness Dimensional Assessment-Trait (NADA-T) and state (NADA-S) scale, with the latter administered daily to assess fluctuations in non-dual awareness (NDA). Quantitative data will be analyzed using a general linear model, while qualitative data will undergo inductive and deductive phenomenological thematic analysis to identify emergent and predefined themes. Mindfulness meditation systematically cultivates concentration, equanimity, and sensory clarity, facilitating absorption, insight, and persistent perceptual shifts toward NDA—a non-conceptual, non-representational reflexivity without a subject-object dichotomy (Josipovic, 2019, 2021, 2024; Young, 2016). Through PCC modulation, this study aims to reduce self-interference by decreasing entanglement in internal cognitions, thereby enhancing equanimity and mindfulness to facilitate access to advanced meditative states and perceptual transformations such as NDA (Brewer et al., 2011). Using a mixed-methods phenomenological analysis, we will examine how tFUS influences the temporal dynamics of these meditative experiences, integrating both qualitative and quantitative measures to elucidate its effects on self-regulation and advanced meditation (Sparby & Sacchet, 2022; Wright et al., 2023).

C - 6

Keywords
Mindfulness, Consciousness, Transcranial Focused Ultrasound, Meditation Retreat, Meditative Development, Advanced Meditation, Non-dual awareness

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Effects of Repetitive Transcranial Magnetic Stimulation (rTMS) Targeting the Right Precuneus on Mild Cognitive Impairment: A Pilot Study

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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
Background: The prevalence of dementia is increasing annually, imposing a significant global economic burden. Non-invasive neuromodulation methods may represent effective therapeutic approaches to slow disease progression. The timing of intervention, target selection, and parameter optimization are critical factors influencing treatment efficacy. Research indicates that in the early stages of cognitive impairment, functional connectivity within the default mode network (DMN) is disrupted, particularly in the posterior regions of the DMN. The precuneus/posterior cingulate cortex serves as a vital node of the posterior DMN. Methods: Seventeen patients diagnosed with amnestic mild cognitive impairment (aMCI) at the Department of Neurology, Xuanwu Hospital, were enrolled in the study. After signing the informed consent document, they underwent repetitive transcranial magnetic stimulation (rTMS) treatment for 4 consecutive weeks, with 5 sessions per week. The stimulation parameters were set at 90% of the active motor threshold (AMT), with a frequency of 20 Hz. Each stimulation train lasted 2 seconds, delivering 40 pulses per train, and the inter-train interval was 28 seconds. A total of 2000 pulses were administered daily. The stimulation target was the individual's right precuneus, localized using neuronavigation. The therapeutic effects were evaluated by comparing the cognitive function scores of Montreal Cognitive Assessment (MoCA), Mini-Mental State Examination (MMSE), Auditory Verbal Learning Test (AVLT), Digit Symbol Substitution Test (DSST), and Trail Making Test (TMT) before and after treatment. Additionally, TMS with simultaneous electroencephalogram (TMS-EEG) recordings was applied to the treatment site in patients both before and after treatment. A control group of 23 healthy subjects, matched for age and gender, was also recruited. These control subjects underwent the same cognitive assessments and TMS-EEG recordings. The study also compared time-varying brain network differences between healthy individuals and patients, as well as between pre- and post-treatment conditions. Results: Before treatment, the number of connectivity edges between network nodes in patients was reduced compared to the healthy control group. There was insufficient enhancement in midline long-distance transmission, and the lateral information flow between bilateral frontal and anterior temporal regions was not significantly enhanced. Additionally, the information flow in the right parietal region was not markedly enhanced, showing a left-sided dominance. After treatment, the longitudinal information flow between the prefrontal, anterior temporal, and bilateral parieto-occipital regions was enhanced. The information flow between bilateral posterior temporal and occipital regions also increased, and the posterior head information became more balanced compared to pre-treatment, approaching the pattern observed in healthy controls. Following rTMS treatment, patients showed statistically significant improvements in their MoCA scores, AVLT immediate recall total scores, AVLT delayed recall scores, AVLT cued recall scores, and DSST scores compared to their pre-treatment performance. Conclusion: aMCI patients exhibited impaired functional connectivity in the fronto-parietal and fronto-occipital networks. Following 20Hz rTMS targeting the right precuneus, these patients demonstrated improvements in memory and executive function compared to their pre-treatment performance.
PO - 2 (Tues)

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Supporting Meditation with Photobiomodulation in Experienced Meditators A Randomized Controlled EEG Study
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
Background: Meditative practice is receiving innovative support through technological advancements in brain stimulation. Reaching advanced states such as jhanas and other mystical states requires extensive training and practice and can be out of reach for many. Initial anecdotal feedback from known advanced meditators indicates that near infrared light delivered intracranially and intranasally at specific pulse frequencies may enhance meditation and support expanded states of consciousness. The technology is non-invasive, portable and easy to use making it suitable for widespread application. We examine whether active pulsed photobiomodulation (PBM) can alter meditation states, as measured by the Mystical Experience Questionnaire (MEQ), along with assessing changes in electroencephalogram (EEG) patterns compared to sham stimulation. Methods Twenty experienced meditators participated in this randomized, sham-controlled crossover study. Each participant engaged in three meditation sessions: Baseline meditation only session; a sham session; active session with PBM pulsed at 11 different frequencies in succession. PBM was delivered using the Vielight Neuro Pro device, which features seven 810 nm LEDs positioned over key hubs of the default mode network (DMN), with an intranasal LED applicator. EEG was recorded simultaneously with stimulation. Each session included 6 minutes of pre-meditation EEG recording, 20 minutes of mindfulness meditation with PBM (or control), and 6 minutes of post-meditation EEG recording. EEG spectral power was analyzed across Delta (1-4 Hz), Theta (4-7.5 Hz), Alpha (7.5-12.5Hz), Beta (12.5-30 Hz), and Gamma (30-50 Hz) frequency bands. Participants completed the Mystical Experience Questionnaire (MEQ-30) to assess subjective meditation experiences. Results: Statistical analysis revealed a significant effect on PBM on MEQ scores ($p = .037$), with the most significant effects on the Transcendence ($p=0.021$), and the Ineffability ($p= 0.013$) subscales. For EEG power analysis, Surface Laplacian montage maps and

linear modeling were used to capture significant effects of the post-meditation vs pre-meditation condition for each session. This analysis revealed significant increases in Beta and Gamma power across the frontal areas of the brain versus the baseline and sham conditions. Conclusions This is one of the first studies to investigate the effects of PBM on meditation using EEG and subjective reports. Results indicate that PBM can help to enhance meditative states and experience. Indications are that the enhancement effect is modulated by high frequency stimulation, and this needs to be examined in detail in further research. Overall indications are that PBM is a powerful, safe and accessible tool that can support meditation and its consequent benefits to society.

C - 21

Keywords
Photbobiomodulation, Meditation, Brain Stimulation, Mystical States, EEG, Frequency Effects

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Photobiomodulation, High-Frequency Resonance, and Quantum Coherence: Enhancing Consciousness and Treating Neurodegeneration via Orch-OR

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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
Photobiomodulation (PBM) using near-infrared (NIR) light is a non-invasive neuromodulatory technique that enhances mitochondrial function, neuroplasticity, and cognitive performance by modulating brain oscillations across a wide spectrum. Our research reveals that high-frequency pulsed NIR PBM (e.g., 120 Hz and higher) tunes brain network oscillations and could be stabilizing microtubule quantum coherence, offering a novel approach to enhance consciousness and treat neurodegenerative diseases. In high-level meditators, we found PBM at 120 Hz and above induces deep meditative states (jhanas), enhancing gamma synchrony (beyond the typical 30–80 Hz) in brain networks, supported by novel EEG measurements. This suggests frequency-specific resonance, with individual variability in optimal frequencies typically when induced at 120 Hz and beyond, reflecting unique neurophysiological signatures that deepen conscious experience. In vitro, 810 nm PBM shifts tubulin dynamics in a frequency-dependent manner: destabilization at 10 Hz, stabilization at 40 Hz, and reinforced microtubule integrity at 120 Hz and 1000 Hz, as evidenced by optical density assays. This stabilization may enhance quantum coherence in microtubules by reducing decoherence, supporting the Orchestrated Objective Reduction (Orch-OR) theory, which posits that consciousness arises from quantum superpositions in microtubules collapsing via objective reduction. We propose that PBM at very high frequencies, say 100-120 Hz could be coupling to microtubules' native GHz–THz vibrations via subharmonic resonance (e.g., approx.10Ghz-1Thz, 10^{12} Hz / 1010 ≈ 100 Hz), aligning quantum collapse events with gamma rhythms and amplifying the subjective intensity of jhanas. Individual-specific resonance frequencies challenge Orch-OR to account for variability in quantum processes, potentially influenced by neuroplastic changes in meditators' microtubule dynamics and network connectivity. Microtubule integrity is critical not only for consciousness but also for brain health—disruptions, such as β-amyloid, tau protein misfolding in Alzheimer's disease, lead to microtubule breakdown, impairing neuronal function and conscious experience. Growing evidence supports PBM as a treatment for neurological conditions, including Alzheimer's, by enhancing microtubule stability, reducing neuroinflammation, and mitigating protein misfolding, as shown in preclinical PBM studies. Our findings suggest that the same frequency-dependent effects of PBM that enhance high-level consciousness can also offer therapeutic benefits, bridging quantum consciousness research with clinical applications. Additional mechanisms include PBM-driven ATP production, which supports the metabolic demands of gamma-generating parvalbumin interneurons, as well as purinergic signaling, biophoton emission, and electromagnetic field interactions that amplify high-frequency coherence and non-local brain communication. Future research could leverage AI-driven closed-loop PBM systems to personalize stimulation frequencies based on real-time EEG feedback, optimizing both consciousness enhancement and therapeutic outcomes for each individual. Experimental paradigms, including EEG, fMRI, and various spectroscopy, will validate these effects on network coherence, microtubule stability, and quantum processes. By integrating PBM, resonance, and quantum coherence, this work proposes a paradigm that advances Orch-OR, deepens our understanding of consciousness, and opens new avenues for treating neurodegenerative diseases, with profound implications for quantum biology and medicine.

C - 21

Keywords
Photobiomodulation (PBM), Gamma Oscillations, Microtubules, Orchestrated Objective Reduction (Orch-OR), AI-driven Neuromodulation

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PeakNeuro Audio Entrainment: Improving Neural Plasticity, Cognitive Performance, and Adaptive Readiness.
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
PeakNeuro Audio Entrainment: Improving Neural Plasticity, Cognitive Performance, and Adaptive Readiness Background: Neural entrainment, synchronizing brainwave activity with external rhythmic stimuli, is a fundamental mechanism for cognitive efficiency, adaptive learning, and decision-making speed. PeakNeuro Audio Entrainment leverages binaural beats, phase-modulated audio, and structured harmonic layering to induce precise brainwave synchronization. This groundbreaking assistive technology enhances cognitive agility, neuroplasticity, and optimal performance states, making it highly conducive and practical for top performers in aviation, military, business, and sports applications. Objective: The clinical study aimed to evaluate the effectiveness of PeakNeuro Audio Entrainment in improving cognitive processing speed, reaction accuracy, neuroplasticity-driven adaptability, and sleep-dependent memory consolidation. Methods: A randomized controlled study (N=161, final n=142) examined the effects of PeakNeuro over a six-night, five-day intervention period. Participants underwent EEG, HRV monitoring, and standardized cognitive testing, assessing reaction times, decision-making efficiency, and working memory performance. Sleep quality metrics were also analyzed due to their crucial role in neuroplasticity and cognitive recovery. Results & Impact: The intervention group demonstrated significant cognitive performance gains: ● Reaction times improved by 9% ($p<0.05$), particularly in critical high-speed decision windows (first five minutes post-waking)—essential for top-performing commercial pilots, military operations, corporate leadership, athletics, and other fields where higher performance is critical. ● Threat detection accuracy improved ($p<0.001$), suggesting enhanced rapid decision-making and perceptual awareness under pressure. ● Memory recall and executive function improved, correlating with increases in REM sleep (+9.1%) and deep sleep (+13%), which support synaptic consolidation and learning efficiency. ● 82% of participants reported improved emotional regulation, a key factor in cognitive resilience and stress adaptation. Neuroplasticity & Learning: ● Accelerated synaptic reinforcement: EEG analysis suggests that PeakNeuro enhances long-term potentiation (LTP), the process by which neurons strengthen their connections—crucial for skill acquisition, operational training, and strategic thinking. ● Optimized sleep-dependent cognitive restructuring: Sleep efficiency improvements ($p=0.004$) indicate a faster transition from sensory input to stored knowledge, benefiting executive function and problem-solving ability. Conclusion: PeakNeuro's innovative Audio Entrainment offers a robust, noninvasive method to enhance cognitive readiness, neuroplasticity, and adaptive intelligence. Its ability to accelerate reaction time, memory retention, and high-pressure decision-making has broad applications in military strategy, corporate leadership, and elite athletic performance. Future studies will explore its role in long-term cognitive enhancement and resilience training.

C - 6

Keywords
Neural Entrainment, Cognitive Performance, Neuroplasticity, Brainwave Synchronization, Binaural Beats, Phase-Modulated Audio, Cognitive Readiness, Cognitive Agility, Decision-Making Efficiency, High-Pressure Decision-Making, EEG Monitoring, HRV Monitoring, Reaction Time, Threat Detection Accuracy, Memory Recall, Executive Function, Long-Term Potentiation (LTP), Synaptic Consolidation, Learning Efficiency, Skill Acquisition

Links to Research

Ref links to pertinent industry research on Audio Entrainment and Cognitive Psychology

1) https://pmc.ncbi.nlm.nih.gov/articles/PMC10198548/

2) https://pmc.ncbi.nlm.nih.gov/articles/PMC4428073/

3) https://www.awakenche.org/blog/training-the-brain-to-relax-4720

4) https://www.nature.com/articles/s41598-020-74140-7

5) https://pmc.ncbi.nlm.nih.gov/articles/PMC7572526/

In addition to the links above, The presentation abstract will include a new white paper on the abstract.

Co-Author and Presenter: Tony Crescenzo is the **CEO of Intelligent Waves (IW)**. This leading IT integrator delivers mission-focused multi-domain operational expertise and innovation to the U.S. government. Before joining IW, Crescenzo held various executive positions, including CEO of IntelliDyne, LLC, and Vice President and General Manager of the Public Sector at Initiate Systems. He also served in the United States Marine Corps, bringing a wealth of experience in technology across federal, commercial, and international markets. **Under Crescenzo's leadership, IW has been consulting with the U.S. government and providing cognitive human performance technology and services to the U.S. Air Force, positively impacting states of consciousness in elite occupations.** Crescenzo is actively involved in the community. He serves on the Northern Virginia Technology Council's Board of Directors and co-chairs its Veteran's Employment Initiative. He also chairs the advisory board of the Semper Fi Fund and is a member of the Virginia Board of Trustees at The Nature Conservancy.

Co-Author: Robert "Bob" Holbrook**,** PeakNeuro's Chief Innovation Officer, is a leading expert in consciousness studies, addiction recovery, and post-traumatic stress (PTS) treatment**.** Before joining PeakNeuro, he was Director of Technology and a residential program trainer at a major consciousness institute. He leveraged advanced audio technologies like Binaural Beat Technology to enhance healing and resilience. His work integrates scientifically validated methods to address emotional and physiological challenges, particularly for those struggling with addiction and trauma. A certified provider of biofeedback tools, Holbrook helps organizations and individuals manage stress, regulate emotions, and improve resilience. His programs have positively impacted military veterans, offering rapid improvements in emotional regulation and sleep quality. Holbrook studied Anthropology and Psychology at Ball State University, Indiana University, and the University of Chicago. His extensive anthropological research across South America, Africa, the Middle East, and the U.S. informs his deep understanding of human consciousness. He is an active member of the Society for the Anthropology of Consciousness and the Institute of Noetic Sciences.

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From Kolmogorov Theory to Computational Modeling and Brain Stimulation
Giulio Ruffini PhD
CEO, StarLab, Barcelona, BCN, Spain. CSO, Neuroelectrics, Barcelona, BCN, Spain

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
From Kolmogorov Theory to Computational Modeling and Brain Stimulation The next frontier in brain stimulation—and neuromodulation technologies like multichannel transcranial electrical stimulation (tES), transcranial magnetic stimulation (TMS), and focused ultrasound (FUS)—demands robust computational models of the brain. These models must address fundamental questions: Where do we stimulate? How? Which network dynamics can we harness for therapeutic or enhancement purposes? Such insights are critically important in neurological disorders (e.g., epilepsy) and are especially pivotal in psychiatry, where many disorders can be understood as disruptions in "experience" itself. In this talk, I will first introduce the Kolmogorov Theory (KT) of consciousness, an algorithmic framework that describes how agents form compressive, coarse-grained models that capture the regularities shaping subjective experience and guiding behavior. Drawing on group-theoretic invariances and parallels with Noether's theorem, KT reveals how hierarchical structures can naturally emerge in neural systems. It connects with the manifold hypothesis and suggests that biological (and artificial) neural networks compress data in ways that exploit the world's symmetries. On the road to computational neuropsychiatry, I will then illustrate how KT can help illuminate "first-person" disorders such as Major Depressive Disorder (MDD) by formalizing the notion of depression as "persistent low valence" and showing how dysfunctional valence, inaccurate world models, or suboptimal planning can emerge in the agent and affect one another. This agent-based perspective not only guides the search for potential etiological routes but also the development of computationally designed interventions—ranging from brain stimulation to psychedelics—to repair or recalibrate neural circuits. To translate this framework into a computational model, I will present our Laminar Neural Mass Model (LaNMM), which can represent interlocked fast and slow oscillations and capture intrinsic cross-frequency coupling (CFC) phenomena like Signal–Envelope (related to PAC) and Envelope–Envelope (or AAC) interactions, as well as the effects of brain stimulation. These coupling mechanisms realize a hierarchical "Comparator" function at the level of cortical columns, evaluating prediction errors and weighting uncertainties. Perturbations of this Comparator function can account for altered gamma oscillations in Alzheimer's disease, schizophrenia, and ASD, as well as the diminished top-down control observed under psychedelics, linking them to both cognition and subjective experience. Altogether, this synthesis of theoretical foundations and computational models provides a scaffold for advancing our understanding of neuropsychiatric disorders and their connections to neurophenomenology and the development of stimulation-based therapies. By pinpointing how neural circuits encode and compress key symmetries, we can design targeted interventions—via tES, TMS, FUS, or other modalities—that align with each individual's functional architecture, opening new avenues for personalized therapy and neurophenomenology.

PL-2

Keywords
Algorithmic information theory, computational neuroscience, whole brain modeling

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IKS Approaches for holistic understanding of Mind, Brain, and Consciousness
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Indian Institute of Technology Mandi, Mandi, Himachal Pradesh, India

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.16].....Brain stimulation techniques

Abstract
The Indian Knowledge System (IKS) conceptualizes our existence as a superposition of three fundamental energies: pure semantic (consciousness), semantic (mind), and physical (brain). In other words, this framework provides a holistic understanding of cognition, perception, and neurophysiological processes. There is not much clarity as to how the perceptual world and physical world work in tandem. By introducing quantum-like entanglement in perception, we propose that self-propelled agents align based on the quantum expectation value of a perception operator, driving collective motion. We shall also reflect on human olfactory perception through the interplay of molecular vibration patterns of odorants and underlying EEG dynamics. Additionally, we explore how high-frequency probes in the megahertz range reveal intricate neural dynamics, particularly in children trained to exhibit near-normal visual perception despite being blindfolded. Building on these foundations, the discussion will conclude with IKS-based interventions designed to enhance cognitive function. In summary, we propose innovative approaches for improving perception, attention, and memory by integrating ancient wisdom with contemporary neuroscience and quantum-inspired models. This synthesis opens new possibilities for mental health, education, multi-agent coordination, and contemplative sciences through the lens of IKS.

PL-5

Keywords
IKS, Models of Perception, Cognitive Enhancement

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The Effect of low LSD doses on EEG Complexity
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[1]Neuroscience Department, Starlab Barcelona SL, Barcelona, Catalunya, Spain. [2]Department of Neuropsychology & Psychopharmacology, Faculty of Psychology & Neuroscience, Maastricht University, Maastricht, Maastricht, Netherlands. [3]The Beckley Foundation, Oxford, UK, United Kingdom. [4]Brain Modeling Department, Neuroelectrics, Barcelona, Catalunya, Spain

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.19].....Psychedelics and psychopharmacology

Abstract
LSD (Lysergic Acid Diethylamide) acts as a partial agonist at 5-HT2A serotonin receptors, facilitating the release of glutamate and enhancing the overall excitability of cortical networks (e.g., De Gregorio et al., 2018; Nichols, 2016). Microdosing LSD—administering the drug in doses that produce minimal perceptible effects—has been associated with various therapeutic outcomes, including increased energy, positive mood, elation, reduced anxiety, enhanced intellectual efficiency, and the induction of blissful states (Murphy et al., 2024; Murray et al., 2014). Evidence suggests that the effects of repeated low-dose administration may extend beyond the acute effects observed on dosing days, particularly at the neural level, due to the promotion of neuroplasticity. However, such benefits have not been demonstrated in placebo-controlled studies. A strong hypothesis suggests that this failure may be related to baseline activity (Hutten et al., 2024). Among various theories of consciousness, the Kolmogorov theory considers the brain as a computational system that models the world through the exchange of information with it, striving to model it with simplicity (Ruffini et. al., 2017). This theory is grounded on the notion of Kolmogorov complexity (KC). Although KC is non-computable, upper bounds can be established, such as the Lempel-Ziv-Welch (LZW) complexity metric (Cover and Thomas, 2006). Different measures of complexity typically reflect two distinct aspects of a system's dynamics: predictability and regularity (Lau et al., 2022). Specifically, LZW reflects a system's regularity. Thus, we also explored Higuchi's fractal dimension (HFD) (Higuchi 1988), which reflects a system's predictability. The dataset comprises 53

healthy individuals who received either a placebo or 15 mg of LSD four times over a two-week period (Hutten et al., 2024). The study utilises a double-blind, randomised, placebo-controlled, between-subjects design. Baseline and follow-up measurements were taken one week before and one week after the sessions. The electroencephalographic (EEG) signals were recorded at week one (baseline), week two (dose 1), week three (dose 4), and week four (follow-up). Results from this study indicated a significant increase in HFD and LZW at doses 1 and 4 (HFD: F=13.7, p=0.001; LZW: F=9.6, p=0.01) but not at baselines or at follow-up. This increase during the acute effect corroborates other studies involving psychedelics (e.g., Schartner et al., 2017; Ruffini et al., 2023). We also examined the effect of baseline complexity on the HFD and LZW outcomes. We observed a significant increase in HFD complexity correlated with higher baseline complexity (F=6.8, p=0.017) at dose 1 and at dose 4 (F=11.16, p=0.003), but not at follow-up. We also observed a significant increase in LZW complexity correlated with higher baseline complexity at dose 1 (F=11.54, p=0.002), at dose 4 (F=2.92, p=0.002) and at follow-up (F=4.4, p=0.04). These findings indicate that the LSD microdosing experience enhances brain complexity, suggesting greater signal diversity similar to full-dose studies involving psychedelics, and highlight the complementary nature of different complexity measures. The results also imply that the acute responses to low doses of LSD depend on the baseline state, providing further insight into the mechanisms responsible for sustaining the benefits beyond the acute treatment.

C - 17

Keywords
EEG, LSD, microdosing, Lempel-Ziv complexity, Higuchi fractal dimension

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Making the Unconscious Empirical: Psychedelics as a Tool for Scientific Inquiry into Metapsychology
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[02.19].....Psychedelics and psychopharmacology

Abstract
Background & Rationale Metapsychology, as conceptualized by Freud, Jung, and Lacan, offers a profound theoretical framework for understanding the unconscious, yet it has long been criticized for its lack of empirical validation. Psychedelics, by inducing profound alterations in cognition, perception, and selfhood, provide a unique experimental avenue for investigating the dynamics of the unconscious and the mechanisms of psychic transformation. This paper proposes that psychedelic states—characterized by ego dissolution, archetypal manifestations, and the surfacing of repressed material—serve as empirical proxies for testing and refining metapsychological models. Objective The aim of this study is to examine how psychedelics can operationalize metapsychology, offering a transdisciplinary approach that integrates psychoanalysis, neuropharmacology, and phenomenology to explore the structure of the psyche. Methodological Framework Freudian Approach: Investigating repression, return of the repressed, primary process thinking, and the dissolution of ego defenses under psychedelic influence. Jungian Perspective: Mapping the emergence of archetypes, individuation processes, and the activation of the collective unconscious in psychedelic experiences. Lacanian Analysis: Examining the fragmentation of the Symbolic Order, the Imaginary dissolution of the ego, and encounters with the Real during altered states. Neuroscientific & Pharmacological Insights: Assessing how psychedelics interact with the default mode network (DMN), serotoninergic modulation, and neuroplasticity, correlating these findings with psychoanalytic constructs. Key Hypothesis Psychedelics facilitate direct access to unconscious structures, thereby providing an experimental method to test and refine psychoanalytic and metapsychological models. Ego dissolution and altered symbolic processing can be quantitatively analyzed, bridging psychoanalytic theory with empirical neuroscience. The psychedelic experience offers a new framework for studying the dynamics of self-transformation, trauma processing, and existential restructuring, thus reinvigorating psychoanalytic discourse with contemporary neurophenomenology. Implications This research advances psychoanalysis as an empirically investigable discipline, situating metapsychology within the domain of consciousness science. By integrating the pharmacology of psychedelics with the theoretical depth of psychoanalysis, this study proposes a novel paradigm where the unconscious is no longer an abstract hypothesis but an experientially verifiable and neuroscientifically measurable construct. This work paves the way for a scientific metapsychology, reconciling depth psychology with contemporary findings in cognitive science, psychiatry, and altered states research.

C - 17

Keywords
Metapsychology, Psychedelics, Unconscious, Ego Dissolution, Archetypes, Neuropsychoanalysis, Consciousness Studies, Default Mode Network, Primary Process Thinking, Symbolic Order

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Making The Unconscious Empirical : Psychedelics as a Tool for Scientific Inquiry into Metapsychology.

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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[02.19].....Psychedelics and psychopharmacology

Abstract
Metapsychology, as conceptualized by Freud, Jung, and Lacan, offers a profound theoretical framework for understanding the unconscious, yet it has long been criticized for its lack of empirical validation. Psychedelics, by inducing profound alterations in cognition, perception, and selfhood, provide a unique experimental avenue for investigating the dynamics of the unconscious and the mechanisms of psychic transformation. This paper proposes that psychedelic states—characterized by ego dissolution, archetypal manifestations, and the surfacing of repressed material—serve as empirical proxies for testing and refining metapsychological models. Objective The aim of this study is to examine how psychedelics can operationalize metapsychology, offering a transdisciplinary approach that integrates psychoanalysis, neuropharmacology, and phenomenology to explore the structure of the psyche. Methodological Framework Freudian Approach: Investigating repression, return of the repressed, primary process thinking, and the dissolution of ego defenses under psychedelic influence. Jungian Perspective: Mapping the emergence of archetypes, individuation processes, and the activation of the collective unconscious in psychedelic experiences. Lacanian Analysis: Examining the fragmentation of the Symbolic Order, the Imaginary dissolution of the ego, and encounters with the Real during altered states. Neuroscientific & Pharmacological Insights: Assessing how psychedelics interact with the default mode network (DMN), serotoninergic modulation, and neuroplasticity, correlating these findings with psychoanalytic constructs. Key Hypothesis Psychedelics facilitate direct access to unconscious structures, thereby providing an experimental method to test and refine psychoanalytic and metapsychological models. Ego dissolution and altered symbolic processing can be quantitatively analyzed, bridging psychoanalytic theory with empirical neuroscience. The psychedelic experience offers a new framework for studying the dynamics of self-transformation, trauma processing, and existential restructuring, thus reinvigorating psychoanalytic discourse with contemporary neurophenomenology. Implications This research advances psychoanalysis as an empirically investigable discipline, situating metapsychology within the domain of consciousness science. By integrating the pharmacology of psychedelics with the theoretical depth of psychoanalysis, this study proposes a novel paradigm where the unconscious is no longer an abstract hypothesis but an experientially verifiable and neuroscientifically measurable construct. This work paves the way for a scientific metapsychology, reconciling depth psychology with contemporary findings in cognitive science, psychiatry, and altered states research.

C - 17

Keywords
Metapsychology, Psychedelics, Unconscious, Ego Dissolution, Archetypes, Neuropsychoanalysis, Consciousness Studies, Default Mode Network, Primary Process Thinking, Symbolic Order

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Cognitome: cellular encoding of subjective experience in neural hypernetworks
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.20].....Neurobiological theories of consciousness

Abstract
Despite significant progress in neuroscience, a satisfactory understanding of the neural nature of subjective experience is still lacking. What is currently missing is not just more facts, but rather a fundamental brain theory that could bridge neural and mental phenomena, make sense of plethora of existing data and guide new experiments. The hypernetwork brain theory (HBT) is a theoretical framework aimed at these tasks by extending the ideas developed in the Russian neuroscience of higher brain functions (P.K. Anokhin, 1935, 1949, 1968, 1973; N.P. Bekhtereva et al., 1977; M.N. Livanov, 1973; A.R. Luria, 1966; V.B. Shvyrkov, 1986, 1995; K.V. Sudakov, 1984). Its central notion is the concept of neural hypernetwork – a cognitome (K.V. Anokhin, 2012). The HBT argues that any brain can be understood as a neural hypernetwork. Hypernetworks describe sets of objects under a higher dimensional relation and rely on algebraic topology (J. Johnson, 2013). Hypernetworks are formed from hypersimplices. Hypersimplex is an ordered set of vertices with an explicit n-ary relation defined as its apex, which exists at a higher level of representation than its vertices. Hypersimplices can represent wholes formed from their vertices as parts. They are given names and treated as atomic objects at a higher level of the system. The neural hypernetwork of a cognitive agent can be formalized as a cognitive complex (cognitome) consisting of two key elements: vertices – CoGs, and edges – LoCs. According to the theory an essential property of CoGs and LoCs is their duality – they can be characterized both at their macrolevel as well as at their microlevel. At its vertex CoG stands for the cognizance – the unit of

knowledge, a part of cognitive competence of an agent. It is characterized by its purview of the past and future states of an organism and its environment. When activated, CoG limits the space of potential states of the past and thus informs an organism about its inner and outer world. At the same time activated CoG constrains the future degrees of freedom of an organism, its behavior and the future state of the environment. Macrolevel thus describes a maximal causal existence of a CoG, its cause-effect power. At the microlevel CoG denotes the Co-operative Group of neurons which collectively encode an element of knowledge. At this level CoG can be identified by neurons belonging to this cognitive group. Two CoGs can establish connection by being co-allocated into the overlapping neural elements. Such conjoint group of neurons forms a LoC – Link of Cogs. LoC is also represented at two levels – as a link between the units of knowledge at the cognitive network level and as a group of neurons with a double cognitive affiliation at the neuronal network level. According to HBT, the dynamics of causal interactions in a neural hypernetwork represent the flow of subjective experience in a cognitive agent. The predictions made by HBT regarding these events can be studied experimentally using methods from molecular, cellular, and systems neuroscience.

C - 2

Keywords
Brain, cognition, subjective experience, neural network, neural hypernetwork

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From the Dual Origin Hypothesis of the Neocortex to the Limbic Workspace: A Whole-Cortex Organization for Conscious Experience
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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.20].....Neurobiological theories of consciousness

Abstract
Contemporary psycho- and physiological perspectives propose that the brain supports our experience of the world by constantly anticipating what may come next. According to these perspectives, our experiences emerge within a general role of the brain to predictively ensure the maintenance of allostasis. In a theoretical paper, we proposed that limbic mesocortical areas could integrate a “limbic workspace” for conscious experience, holding highly abstract information that could be efficiently accessed by virtually the whole brain, ultimately integrating interoception and exteroception. We here ground the phylogenetic basis of the limbic workspace model in the dual origin hypothesis of the neocortex, proposed by Sanides, which explains the tangential expansion of the cerebral cortex during evolution by the addition of novel cortical types in concentric rings. We propose that the limbic workspace may articulate and integrate two gradients of laminar complexity, originated during the tangential expansion of the cortex, which can be traced to two ancestral sectors in the allocortex, the ancestral olfactory and the ancestral hippocampal cortices. The presence of more specialized and computationally powerful areas may have enabled mesocortical limbic areas to play an integrative, coordinating role. Moreover, we propose that some degree of specialization may have been preserved along the two gradients derived from the two ancestral sectors. This work has important implications for our understanding of the neural basis of conscious experience.

C - 14

Keywords
theories of conscious experience, predictive processing, cortical organization

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Why the phenomenal binding problem limits digital computer consciousness to mind dust
Chris Percy PhD
University of Derby, Derby, Derbyshire, United Kingdom. Qualia Research Institute, San Francisco, CA, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[02.23].....Neural networks

Abstract
Phenomenal binding is the mechanism by which micro-units of information become combined into the macro-scale conscious experience common in human phenomenology. An example is how single ‘pixels’ of a visual scene are experienced as a single holistic image in the ‘mind’s eye’, rather than as individual, separate, and massively parallel experiences, corresponding perhaps to individual

neuron activations, neural ensembles, or foveal saccades, any of which would deliver identical functionality from an information processing point of view. ‘Phenomenal binding’ was first used in the academic literature in Garson (2001) to differentiate it from ‘functional binding’, although the idea has been around for longer. It is related to, but distinct from the hard problem of consciousness. The hard problem asks why any function should be accompanied by experience. The phenomenal binding problem asks why that function should be accompanied by a single, unified, and complex experience, rather than multiple scattered separate experiences that identify in a more direct one-to-one manner with the constituents of that function. Viewing the function as a complex algorithm or neural network, why do individual moments of experience not map to individual algorithm steps or individual node activations in a neural network? We first review the principal candidates for phenomenal binding, including candidates grounded in neural network functionality, neuronal synchrony/oscillations, electromagnetic fields, quantum entanglement, and causal loops. We show that none of these candidates has yet answered all the questions facing it, although promising avenues are identified. However, algorithms running on digital computers face particular difficulties in addressing this problem. If digital computers and algorithms are conscious, they are explicitly designed to contain micro-experiences only. Counterintuitively, this design is exactly what makes them so powerful and so useful to us. Computers use electromagnetic shielding to ensure that individual logic gates do not ‘interfere’ with each other. In other words, each gate only knows about its own inputs and its own outputs. The same is true of algorithms. Each step only knows about its immediate inputs/outputs. This step-by-step, separable nature is what enables us to design and implement algorithms. You could delete all historical steps midway and the future ones would still continue without knowing any difference. Considering this freedom to delete steps, when does an informationally-complex ‘moment of experience’ corresponding to a complex function come into being? It can’t be at the start, because the rest of that crucial algorithm hasn’t happened yet (and might be deleted). It can’t be when the last minimal step clicks into place, because the rest of it could have been deleted by then and the last step only knows about its own inputs, something far less sophisticated than the whole algorithm. Even if each algorithmic step or each logic gate activation constitutes a moment of consciousness, we are left with only a million specks of mind dust: selves that exist for a fraction of a second before disappearing, utterly alien from the coherent output we might see on a computer screen or in the narrative stream from an LLM.

C - 1

Keywords
AI consciousness, hard problem, phenomenal binding, functional binding

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From Perception to Awareness: The use of auditory roughness to overcome inattentional deafness in cockpit alarm detection

Florine Riedinger[1,2], Clara Suied PhD[3], Jean-François Sciabica PhD[2], Prof. Frédéric Dehais PhD[1]
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.01].....Attention

Abstract
Throughout evolution, auditory warning signals have been crucial for survival. Accordingly, cries of distressed animals or human screams instinctively capture attention. In modern high-risk environments, such as aircraft cockpits, artificial auditory alarms serve a similar function, triggering rapid responses during emergencies. However, despite their critical role and perfect audibility, pilots sometimes fail to consciously perceive them. This phenomenon, known as inattentional deafness, occurs under high cognitive and emotional load. At the neural level, evidence suggests that this phenomenon arises from top-down inhibition of auditory processing at a pre-conscious stage, characterized by reduced gamma oscillations (40 Hz) and increased alpha activity (10 Hz), which collectively diminish auditory processing efficiency. This raises the question: how can warning systems be designed to bypass attentional limitations and ensure reliable perception in demanding contexts? To address this issue, recent studies have drawn inspiration from the acoustic properties of natural alarms, suggesting that auditory roughness could effectively mitigate inattentional deafness. Characterized by amplitude modulations in the 30–150 Hz range, rough sounds capture attention early and activate the amygdala, a key structure in threat detection. Electrophysiological studies further indicate that roughness is encoded before reaching conscious awareness, making it a promising candidate for enhancing alarm perception. In a forthcoming study, we asked participants to complete a multitasking scenario using the Multi-Attribute Task Battery II (MATB-II), a complex task that simulates piloting activity. Concurrently, they performed an auditory oddball task where alarms were presented in both rough and non-rough conditions. Results showed that rough alarms significantly reduced inattentional deafness in the oddball task, leading to a 30% decrease in the miss rate (Cohen’s d = -0.631), while rough target sounds shortened mean reaction time by 5.4% compared to non-rough target sounds (Cohen’s d = 0.954), all while preserving piloting performance and avoiding negative judgments. However, this study used pure tones, which do not fully capture the complexity of real-world alarms. The present study extends this research using actual cockpit alarms rather than sinusoidal tones. Participants performed the same task as described earlier, except that the oddball pure tones were replaced by rough/non-rough Airbus cockpit alarms. In addition to behavioral measures (reaction times, hit rates, false alarms, and performance on MATB-II), electrophysiological responses were recorded using electroencephalography to investigate the neural mechanisms underlying the improved detection of rough alarms. We hypothesize that, as demonstrated in our previous study with amplitude-modulated pure tones,

rough alarms will be detected more efficiently and more frequently without impairing MATB-II performance. Additionally, we expect that rough alarms will elicit neural signatures indicative of enhanced auditory processing, with increased gamma-band activity in the primary auditory cortices. Results will be presented at the conference. This research aims to foster the development of more effective auditory warning systems for aviation and other high-risk domains. Ultimately, it seeks to enhance safety by mitigating inattentional deafness and contributing to our understanding of how auditory awareness emerges in complex environments.

C - 6

Keywords - Auditory attention, auditory warnings, aviation, roughness

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A Rhythmic Theory of Selective Attention 2.0

Sabine Kastner MD, PhD
Princeton University, Princeton, NJ, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[03.01].....Attention

Abstract
The selection of information from our cluttered sensory environments, often referred to as ‘attention’, is one of the most fundamental cognitive operations performed by the primate brain. In the visual domain, the selection process is thought to be mediated by a spatial mechanism – a ‘spotlight’ that can be flexibly shifted around the visual scene. In my lecture, I will provide an overview on its neural basis by discussing neuroimaging and intracranial electrophysiology studies in the human and monkey brain. Neuroimaging studies have shown that the spatial selection mechanism engages a large-scale network that consists of multiple nodes distributed across all major cortical lobes and includes also subcortical regions in the midbrain and thalamus. Electrophysiology studies have provided a rich understanding of the specific functions of each network node and their functional interactions. Key findings reveal that (i) the cortical network is coordinated by a thalamic timekeeper in the pulvinar and (ii) processing in sensory cortex is modulated by feedback signals from a fronto-parietal control network. The fronto-parieto-pulvinar network is characterized by complex temporal dynamics that set up alternating attentional states, which emphasize either environmental sampling of information or shifting of spatial selection to a new location and can be measured as behavioral rhythms. Collectively, these studies in the adult brain set the stage for translational applications such as exploring the typical and atypical development of attention function and its deficits in neurological and psychiatric diseases.

PL-9

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From States to Traits: How Noninvasive Neuromodulation with Mindfulness Training Can Help Shift Consciousness Toward Lasting Wellbeing

Joseph Sanguinetti PhD
University of Arizona, Tucson, AZ, USA

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.03].....Other sensory modalities

Abstract
For over a decade, our group has explored how transcranial ultrasound stimulation (TUS) can be used to map and modulate the neural substrates of consciousness and wellbeing. TUS is a powerful, noninvasive tool that enables safe, reversible modulation of deep brain structures with millimeter precision. At the SEMA Lab, we’ve investigated how targeting the Default Mode Network (DMN) with TUS can induce transient states of equanimity—a fundamental quality cultivated in contemplative practice. In this talk, I will describe our developing paradigm for using TUS to accelerate the acquisition of mindfulness-related skills and traits. By coupling TUS-induced equanimity states with structured mindfulness training, we aim to cultivate acceptance-based emotion regulation capacities that support the transition from short-term state changes to lasting, trait-level wellbeing. I will present findings from our DMN-focused studies, integration of TUS with mobile meditation platforms, and results from the world’s first TUS-enhanced meditation retreat. Together, these efforts outline a novel approach for understanding and cultivating comprehensive wellbeing through the intersection of precision neuromodulation and contemplative practice.

PL-2

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Sensing the future through a quantum-like implicit learning mechanism in nonlocal consciousness
Prof. Álex Escolà-Gascón Ph.D.
Department of Quantitative Methods and Statistics Comillas Pontificial University, Madrid, Spain

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.04].....Memory, learning and synaptic plasticity

Abstract
Background: Imagine if our brains could unconsciously predict future events. This study explores this concept, presenting evidence for an inherent 'foreseeing' ability, termed anomalous cognition (AC). We introduce a new experimentally verifiable approach to explain anomalous information anticipation (AIA), a type of AC, based on an innovative, quantum-like model of implicit learning, grounded in Nonlocal Plasticity Theory (NPT). Methods: Our research involved 203 participants using methods such as continuous flash suppression, random dot motion, and advanced 3D EEG neuroimaging, along with IBM quantum random event generators for precise measurements across 144 trials. These trials tested contingencies between undetectable sensory stimuli and dot movements, focusing on participants' prediction abilities. The design conditions were strictly experimental, violating fundamental classical learning principles, particularly reflex conditioning. If these principles were immutable, their violation would prevent any systematic behavioral changes, resulting in random responses. This violation was implemented through two quantum physics concepts: the mathematical principle of nonlocality and entanglement. Results: Despite the sensory stimulus being inaccessible, our results showed a significant prediction between the contingencies and an increase in AIA accuracy, with explained variances between 25 % and 48 %. EEG findings supported this, showing a positive link between brain activity in specific regions and AIA success. Electrochemical activations were detected in the posterior occipital cortex, the intraparietal sulcus, and the medial temporal gyri. AIA hits exceeded the threshold value corresponding to one standard deviation above the expected mean, showing moderate effect sizes in the experimental group (Cohen's d = 0.461). Analyzing the learning curve using the derivation technique, we identified the acceleration point of the wave function, indicating systematic implicit learning. This result showed that from repetition 63 onwards, AIA hits increased significantly. Conclusions: The results suggest that, despite violating fundamental classical learning principles, cognitive processes produced changes in participants' responses susceptible to neuromodulation, considering quantum physics principles of nonlocality and entanglement (both present in NPT). We discuss (a) why the priming effect does not explain the significant results; (b) the potential discovery of a new form of quantum-like implicit learning, which could scientifically resolve phenomena associated with anomalous cognitions (e.g., AIA); and (c) future research directions, including potential applications and clinical impact.

C - 18

Keywords
Implicit learning, Quantum-like learning, Neuroplasticity, Anomalous cognition, Cortical neuroimaging, Consciousness

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Intelligence: Attention and Consciousness in Decision Making under Situation Uncertainty
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.04].....Memory, learning and synaptic plasticity

Abstract
Intelligence has been investigated in terms of a multitude of abilities such as communicating, logical reasoning, abstract thinking, and problem solving (e.g., Gardner, 1983; Sternberg, 1985; Cantion and Piantadosi ST, 2024). Recently, Andler (2023) offers a broad-based definition of intelligence in terms of the ability to deal with situations appropriately, relying on access to the relevant intelligences. We further derive a definition of intelligence – the ability to accomplish goals – encompassing decision making under the perceived situation uncertainty, beginning with stimulus-driven sensory perception and involving an active interplay between attention and consciousness augmented by memory. As hypothesized in Chew and Ebstein (2025), our ability to be conscious of our subjective experiences is predicated on the brain's information capacity afforded by the underlying synaptic plasticity giving rise to a bound to our intelligence capacity. Across evolutionary timescales, this capacity for intelligence reaches its zenith in humans whose brain has 86 billion neurons and hundreds of trillions of synaptic connections underpinning a memory capacity estimated to be in the petabyte range, compared to the lowly worm, C. Elegans, with 302 neurons and thousands of synaptic connections. Our definition of intelligence naturally differentiates AI from biological intelligence in which situation-specific goals arising endogenously may have evolutionary roots. (REFERENCES: Andler D. "Intelligence artificielle, intelligence humaine : la double énigme" (Artificial Intelligence, Human

Intelligence: The Double Enigma) Gallimard (2023); Cantlon JF, Piantadosi ST, “Uniquely human intelligence arose from expanded information capacity”, Nat Rev Psychol 3, 275–293 (2024); Chew SH and Ebstein RP, “Synaptic plasticity, information capacity, and experiential consciousness”, submitted for presentation at SoC in Barcelona (2025); Gardner H. Frames of Mind: The Theory of Multiple Intelligences, Amazon (1983); Sternberg, R. J. Beyond IQ: A Triarchic Theory of Human Intelligence, Cambridge University Press (1985).)

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Keywords
Intelligence, attention, experience, consciousness, decision making, situation uncertainty

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Diluvio: Teatro delle Ombre (Deluge: Theatre of Shadows) Within the Resonant Mind-Field
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Carleton University, Ottawa, Ontario, Canada

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[03.07].....Mental imagery

Abstract
Inspired by the 500th anniversary of Leonardo da Vinci’s death in France on May 2, 1519, Diluvio: Teatro delle Ombre (Deluge: Theatre of Shadows) offered an interactive and immersive exhibition/installation as part of Cinquecento: Carleton Celebrates Leonardo da Vinci, the 2019 year-long commemorative initiative at Carleton University. The project was conceived as the culmination of a series of Diluvio installations from the author’s Crossings Interdisciplinary Research Collective Workshop. Overall, the series of projects were inspired by Leonardo’s Deluge drawings and his reflections on the reciprocal inter-connections within nature as revealed by his studies of the flow of water, air, light, shadows, and energy. The rich complexity of such phenomena was revealed and experientially encountered by working with the highly pliable properties of woven aluminum wire-mesh that was folded into a classic origami tessellation pattern. The inherent attributes of this membrane and the sculptural work produced were revealed through evocative shadow projections activated by the public within the unlit exhibition space. Inspired by Plato’s Allegory of the Cave, the immersive experience offered a deluge of self-activated shadow-projections as a way of stirring, triggering, and thus revealing the highly resonant, fertile and imaginative potential lurking within the theatre of the mind. “… Look into the stains on walls, or the ashes of a fire, or clouds, or mud, or similar places, in which, if you consider them well, you may find really marvelous ideas … because by indistinct things the mind is stimulated to new inventions.” “You who speculate on the nature of things, I praise you not for knowing the processes which Nature ordinarily effects of herself but rejoice if so be that you know the issue of such things as your mind conceives.” Leonardo da Vinci Leonardo da Vinci had a lifelong obsession with our imaginative potential and perceptive capabilities. Correlations between his insightful speculations concerning visual perception and Plato’s Allegory of the Cave inspired the theme of Diluvio. The illusions of perceived reality are metaphorically presented in Plato’s classic allegory as being interpreted by chained cave dwellers. Their restricted vision only allows the perception of shadows projected on a wall by a fire behind them and objects in between. This is the limited reality of the prisoners, while unbeknownst to them, the true nature of reality and the light entering their cave lurks behind casting the deceptive impressions. While acknowledging the metaphoric shadows as illusions, Leonardo emphasized that they also offer insights into the nature of perception, the imagination and how this fertile process can be interpreted. He recommended musing on such elusively vague phenomena as cloud formations, shadows, resonant patterns, including evocative stains, as a way of stimulating and expanding the imagination. This reflective process can conjure up highly resonant and evocative mental images, offering insightful clues regarding the inner workings and creative potential of the individual mind. The inspiration, realization, and results of this interactive and immersive experience is offered to 2025 TSC Conference along with a possible poster.

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Keywords
Embodied Consciousness, Inter-disciplinary Research, Resonant Phenomena

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Neural Mechanisms of Conscious and Unconscious Color Discrimination: Evidence from Intracranial stereo-electroencephalography
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Categories by Discipline

3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.08].....Implicit and explicit processes

Abstract
Color discrimination, both conscious and unconscious, plays a critical role in visual perception. Previous studies have demonstrated that conscious color perception engages a network of brain regions, including areas in the occipital and parietal cortices. However, the neural mechanisms underlying unconscious color discrimination remain less understood, particularly in how the brain processes color incongruencies when they are not part of explicit task instructions. Understanding these processes can provide insights into the distinction between conscious and unconscious visual discrimination and their underlying brain functions. This study investigated the neural mechanisms of color discrimination in both conscious and unconscious contexts in patients with intractable epilepsy, using intracranial stereo-electroencephalography. Thirty-seven patients implanted with intracranial electrodes were asked to perform a visual task in which, they were required to judge whether the colors of S1 and S2 were the same, and then whether the colors of S2 and S3 were the same in the delayed match/mismatch sample paradigm (containing three stimuli per trial), while their brain activity was recorded. The results showed that the brain regions involved in discriminating the color between S1 and S2 were more numerous and exhibited earlier responses compared to the regions involved in discriminating the color between S2 and S3. Moreover, the connectivity between these regions was more complex. Interestingly, the brain also processed color differences between S1 and S3, despite this not being part of the task requirements. Specifically, the superior frontal gyrus, middle frontal gyrus, and inferior frontal gyrus in the frontal cortex were primarily engaged in the implicit, non-task-related discrimination of color. These findings suggest that the brain's processing of visual stimuli extends beyond conscious task-driven discrimination, involving additional, unconscious cognitive processes, and provide new insights into the neural basis of conscious and unconscious visual perception.

PO - 1 (Mon)

Keywords
electrophysiology, cognitive control, neural dynamics, event-related potential, neurology

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Researching body perception: towards an integration of quantitative and qualitative interdisciplinary approaches to address the multiplicity of bodily experiences
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.08].....Implicit and explicit processes

Abstract
Cognitive neuroscience has attempted to understand the underlying functioning of one's body experience. This has resulted in standardised stimulation methods involving multisensory manipulations and measurable constructs. These ingenious approaches contribute to the important goal of creating a cumulative and reproducible science. However, they may sometimes overlook important yet complex and nuanced qualities of experience. We propose that combining qualitative methods employed in design research centered on body experiences, together with quantitative approaches from neuroscience and psychology, might yield a richer account without compromising quantitative findings. This, we argue, may be particularly important when dealing with one's body perception. Without pretending to fundamentally solve methodological discrepancies between qualitative and quantitative approaches, we propose a conciliatory take. For this purpose, we provide a synthesis of tools and methods from design research that could be useful in three steps of the research inquiry: the experimental design, data collection, and data analysis. Our suggested mixed methods approach hopes to account for individual differences, discover insights in nuance, increase transparency, foster multidisciplinarity, and potentially move quicker in some aspects of the research program.

C - 14

Keywords
body perception, mixed methods, embodied cognition, multisensory integration, identity

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Mind-Wandering and meta-awareness: How often do we notice it?
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.09].....Unconscious/conscious processes

Abstract
Mind-wandering is defined as a state in which thoughts drift away from the current task and focus on internal content (Smallwood & Schooler, 2006). This phenomenon is accompanied by perceptual decoupling, a process in which attention disengages from external stimuli, leading to a reduced sensitivity to the surrounding environment (Schooler et al., 2011). Research indicates that individuals spend approximately 46.9% of their waking hours engaged in mind wandering (Killingsworth & Gilbert, 2010). An interesting aspect of mind-wandering is that it can occur without the individual being aware of it, meaning they may not realize they are mind-wandering. This phenomenon is related to the concept of meta-awareness, which refers to the ability to be aware of one's own cognitive state (Smallwood et al., 2007). In an exploratory study to assess the level of awareness during mind-wandering, a study was conducted with 59 university students attending a two-hour lecture. At four random intervals, students were asked to indicate whether their mind was wandering at that moment and whether they were aware of it. For both questions, they were asked to indicate their answer using a scale from 0 (not at all) to 100 (completely). Throughout the four assessments, participants demonstrated an average mind-wandering rate of 51%. Among these mind-wandering episodes, the average reported level of awareness was 68%, meaning that 32% of the mind-wandering episodes occurred without the participants being aware of them. Given the prevalence of mind-wandering in daily life, it is surprising that such a significant proportion of these episodes can occur without the person having meta-awareness. Christoff et al. (2009) distinguish between two aspects of meta-awareness: awareness of the process (realizing one is mind-wandering) and awareness of the content (being aware of the specific thoughts during these episodes). While some studies show that we can be unaware of mind-wandering, the question remains: to what extent are we aware of the content of these thoughts? This question opens avenues for future research on the phenomenological nature of mind-wandering and its accessibility to consciousness.

PO - 2 (Tues)

Keywords
Mind-wandering, meta-awareness, conscious processes, unconscious processes

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Expanding the Aperture of Awareness: Salience Processing and the Creative Mind
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.09].....Unconscious/conscious processes

Abstract
Salience processing mechanisms shape both the breadth and the subjective quality of conscious experience, with important implications for creative thinking. Building on our recently introduced neurobiological framework (Gross & Schooler, Trends in Cognitive Sciences), we hypothesize that distinct patterns of salience processing relax typical information filtering, thereby leading to broader associations and increased creativity. We tested this hypothesis across three studies combining neuroscience, phenomenology, and creativity assessments. In Study 1 (N = 51), EEG was used to record brain activity during an oddball task, in which participants responded to unexpected, or "oddball", stimuli among standard ones. Creative performance was linked to reduced P300 amplitudes in response to oddball stimuli, indicating that individuals with high creativity might process both usual and unusual information in a similar manner. This could facilitate creativity by making unconventional inputs more easily accessible in conscious thought during creative problem-solving. Study 2 (N=110) examined the relationship between creativity and subjective experiences of atypical salience processing, measured using a validated scale previously shown to predict atypical striatal prediction error signaling in psychosis-prone individuals. Heightened attribution of significance to conscious percepts—as indicated by higher scale scores—predicted increased performance on both self-report and performance-based measures of creativity. Study 3 (N = 119) demonstrated that aberrant salience attribution further predicts more intense "aha!" experiences during creative problem solving—moments of sudden conscious insight characterized by certainty, pleasure, and meaning. Insight experiences, in turn, predicted greater enjoyment and motivation to engage in creative activities. Collectively, these results indicate altered salience processing may expand the range of information accessible

during creative problem-solving, while positively reinforcing the creative process and imbuing it with heightened phenomenal significance. We conclude by considering how this framework may advance our understanding of consciousness as an adaptable filter that can be adjusted to permit varying kinds of information into awareness.

C - 20

Keywords
salience processing; phenomenology; creative thinking

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We are the sensors of consciousness! A review and analysis on how awakenings during sleep influence dream recall.
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.10].....Sleep and dreaming

Abstract
How can we determine whether a person is having a felt experience? While brain responses to stimuli provide some insight, our own subjective experience offers the most direct access to consciousness. Therefore, researchers often rely on participants to communicate their experiences, which is relatively straightforward while awake. However, during sleep, characterized by varying states of consciousness and diminished reporting and recall abilities, this becomes more challenging. Since the 1930s, researchers have awakened participants during sleep to collect retrospective experience reports close to the time of experience. These studies have shown that dreams occur frequently, even during deep sleep. However, the impact of the awakening process on dream recall and the influence of participant characteristics, such as openness to experience or familiarity with different states of consciousness, have not been quantified. To address these gaps, we reviewed and analyzed 69 awakening studies conducted between 2000 and 2024, along with participant-level data from the DREAM database. Our results indicate that dream recall is significantly influenced by the method of awakening (lower recall with an alarm compared to calling the participant's name), the number of study days (lower recall over multiple days), and the sleep environment (higher recall at home compared to in a laboratory), as well as participant characteristics beyond age, sex and study design. Recall rates from deep sleep are particularly sensitive to the method of awakening and individual differences. In conclusion, both contextual factors and participant characteristics significantly influence dream reports. Such reports are essential for identifying neural correlates of consciousness, which in turn can inform theories of consciousness and the treatment of disorders of consciousness. Therefore, it is crucial to place greater emphasis on how and from whom experiences are collected.

C - 14

Keywords
dreaming, serial awakenings, experience sampling, awareness, memory, attention, questionnaire, report, phenomenology

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FROM ORACLES TO ALGORITHMS: ANCIENT DREAM KNOWLEDGE IN THE AI PARADIGM
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.10].....Sleep and dreaming

Abstract
Dreaming, a universal human phenomenon and an altered state of consciousness, has captivated philosophers, scholars, and scientists for centuries. The history of research reveals that dreams, while too ephemeral to be fully examined within controlled experimental conditions, are intricate enough to resist comprehensive understanding by any single discipline. Despite its complexity, the question of dream meaning remains an enduring subject of inquiry, standing as one of the most enigmatic and unresolved issues in contemporary scientific research. In pre-modern societies, dreaming was regarded as equally, if not more, significant than waking consciousness, as critical life decisions were often informed by careful interpretations of nocturnal experiences. In ancient civilizations

such as Mesopotamian, Greek, and Roman cultures, the functions of dreaming were relatively well-defined, serving as mechanisms for guidance, healing, encounters with the divine, and, in the case of anticipatory or precognitive dreams, the forecasting of both individual and collective futures. Dreaming was an integral component of the dreaming-waking continuum, regarded as both a spiritual experience and a conduit for knowledge transmission, offering guidance and wisdom. With the exponential growth of dream data, this complex phenomenon of the human mind stands at the threshold of a new understanding, driven by the rapid advancements in AI-powered analytical tools. As both the volume of data and the sophistication of algorithmic analysis continue to expand, there is an increasing risk that the instantaneous interpretation of dreams may lack the depth provided by centuries-old philosophical, religious, and mythological frameworks. This raises critical questions: What has changed since these traditional perspectives shaped our understanding of dreams, and how has the modern scientific paradigm redefined their meaning? In the presentation, we will first examine the stark divide between phenomenological and empirical approaches to dream research, exploring its epistemological implications and how this distinction gives rise to two conceptually distinct lines of inquiry. We will then highlight the significance of an interdisciplinary approach, emphasizing its ability to comprehensively address dreaming. In the final section, we will explore the potential of AI-driven analytical models to integrate sophisticated conceptual frameworks derived from Native American, Mesopotamian, ancient Greek, and Hippocratic traditions, offering insights into the rich tapestry of dream patterns. We will explore how this vast repository of ancient knowledge can be meaningfully cross-pollinated with algorithmic intelligence to enhance our understanding of dreams. To conclude: In light of the epochal cultural and technological transformations, it is imperative to formulate a new approach that integrates established theoretical frameworks—drawing from cultural, religious, spiritual, mythological, anthropological, and psychological perspectives on dreaming—with contemporary advancements in data science. For the first time in history, the convergence of AI-driven methodologies and deep-rooted epistemological traditions will allow us to map, observe, and analyze the dynamics of archetypal structures in human dreaming on a truly spatiotemporal scale. Such an approach acknowledges the multidimensional nature of dreaming, emphasizing that a systematic understanding must consider its archetypal structures—which, by their very nature, transcend spatiotemporal boundaries—while holding promising potential for generating new insights into collective dream patterns.

C - 19

Keywords
dreams, archetypal structures, Artificial Intelligence

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Decreased PTSD Symptoms Following a Lucid Dreaming Workshop: A Randomized Controlled Study
Garret Yount PhD[1], Tadas Stumbrys PhD[2], Sitara Taddeo[1], Cedric Cannard PhD[1], Arnaud Delorme PhD[1], Michael Kriegsman PhD[1], Dr. Helané Wahbeh PhD, ND[1]
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.10].....Sleep and dreaming

Abstract
Background: Recent investigations into lucid dreaming—a state where individuals achieve self-reflective awareness while asleep and can undertake deliberate actions—suggest potential healing benefits. A pilot study showed significant PTSD symptom reduction among participants following an online lucid dreaming workshop. The workshop, spanning 22 hours over six consecutive days, taught participants lucid dreaming induction techniques and how to use lucid dreaming to transform their nightmares and integrate their trauma. Methods: We replicated this study using a randomized controlled design. Adults experiencing chronic PTSD symptoms were randomly assigned to either an active workshop group (n = 49) or a wait-list control group (n = 50). Results: Roughly half of the participants in both the workshop and control groups experienced at least one lucid dream during the workshop period. Among these, 63% of workshop participants versus 38% of controls achieved a healing lucid dream, implementing a pre-devised healing plan. The workshop group exhibited significant reductions in PTSD symptoms and nightmare distress compared to the control group, with sustained improvements at one-month follow-up. Additionally, improved well-being and diminished negative emotions were observed among workshop participants compared to controls. No significant correlation was found between dream lucidity and reductions in PTSD and nightmare symptoms. Conclusion: The workshop demonstrates efficacy as a viable alternative for individuals with PTSD.

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Keywords
lucid dreaming, post-traumatic stress disorder, combat veterans, group therapy, nightmares

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Why physics shows AI cannot ever be conscious
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Humain Ventures, Austin, TX, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[03.12].....Artificial intelligence and robotics

Abstract
This paper presents a critique of the hypothesis that digital computers can achieve consciousness, drawing on physics, computability theory, and complexity theory. It challenges functionalist and emergentist ideas that argue computation or complexity are necessary or sufficient conditions for consciousness, demonstrating instead that neither could account for conscious states. By analyzing the physics underlying computational processes and the complexity class required by psychophysical laws, the paper shows that these approaches require solving a vastly infeasible computational problem. This perspective suggests that consciousness in the brain arises from non-classical phenomena, not from the interaction of discrete classical components of the brain.

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Keywords
Quantum consciousness, artificial intelligence, computability, determinism

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Emotion-As-Value: Enactive Challenges for Machine Consciousness
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Beloit College, Beloit, WI, USA

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.12].....Artificial intelligence and robotics

Abstract
The nature of the mind and the processes of cognition are poorly understood even within their academic disciplines. Our narratives around AI, seeded largely in science fiction, are driving public understanding of algorithms now. One result of this can be seen vividly in the current AI hype: people don't understand well what the mind is, so they fear that the specialized algorithms which get called AI now will reach and then surpass human cognition. Yet, if we start with 4e (embodied, embedded, extended, and enactive) or 5e, (or all the way to 7e*, as Johnson (2018) once suggested), some of the very foundational ways of understanding the mind are potentially incompatible with anything like machine consciousness, at least without some major revolutions in how we think about minds. These revolutions must necessarily involve the 7es as starting points (or 8es, if we include ecological as yet another e, which surely we ought to do). In this paper, I start with enactivism (Thompson, 2010) and embodied neuroscience (Damasio, 1995; Colombetti, 2013), and look to how specialized concepts like operational closure and autonomy are tied directly to both social cognition (De Jaegher and Di Paolo 2007) and emotion (Damasio 1995). I argue that this matters tremendously for our aspirations in machine consciousness. If we center emotions as the biological mechanism that imposes value onto objects in the world, and couple that with the ways social cognition requires a kind of autonomy that no machine currently has (or even aspires to), then AGI/machine consciousness is not coming soon. We need new narratives that understand 4/5/7e cognition to dampen the AI hype, but also to guide future research in both AI and robotics toward promising and interesting research. * 4e plus emotional, evolutionary, and exaptative Colombetti, G. (2013). The Feeling Body: Affective Science Meets the Enactive Mind. MIT Press. Damasio, A. (1995). Descartes' Error: Emotion, Reason, and the Human Brain. HarpPeren. De Jaegher, H. and Di Paolo, E. (2007). Participatory sense-making: An enactive approach to social cognition. Phenomenology and the Cognitive Sciences 6(4), 485-507. Johnson, M. (2018). The embodiment of language. In A. Newen, L. Bruin, & S. Gallagher (Eds.), The Oxford handbook of 4E cognition (pp. 1–20). Oxford University Press. Thompson, E. (2010). Mind in Life: Biology, Phenomenology, and the Sciences of Mind. Bellknap Press.

C-19

Keywords
Artificial intelligence, machine consciousness, enactivism, emotion, affective science, embodiment

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The role of consciousness in AI alignment.
Ken Mogi Ph.D

Sony Computer Science Laboratories, Shinagawa, Tokyo, Japan. The University of Tokyo, Meguro, Tokyo, Japan

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.12].....Artificial intelligence and robotics

Abstract
In recent years, generative AIs are exhibiting increasingly higher functions. On the other hand, there are some confirmed limits. For example., they are not good at prediction and moderation (Narayanan and Kapoor 2024). There are concerns about hallucination (Goddard 2023) and AI safety (Bengio et al. 2024). AI alignment is an increasingly important research topic in the employment of AI and AI safety. It is of crucial scientific and technological interest to understand how alignment with the human brain would facilitate robust and safe uses of artificial intelligence. Quantum computing processes are expected to exhibit capabilities beyond classical computing, possibly surpassing the range of computability (Penrose 1989, .Penrose and Hameroff 2011, Hameroff and Penrose 2014). Even within the domain of computability, quantum systems might exhibit capabilities beyond what are practically realizable, exhibiting quantum supremacy (Madsen et al. 2022). Human brains might exhibit conscious supremacy (Mogi 2024), conducting computations uniquely reserved for conscious processes, even though they are within the domain of computability. Consciousness occupies a special place in computation, as revealed from studies of cognitive processes in humans and other animals. Consciousness plays a crucial role in integrating information, making choice, and modulating brain's attentional resources. One-shot learning proceeds typically when conscious processing is involved, accompanied by positive emotions (Ishikawa, Toshima, and Mogi 2019). Although consciousness in artificial intelligence systems is a topic of ongoing debates, the conservative estimate would be that the functions exhibited by AI is done without consciousness. Thus, range of functions exhibited by AI would suggest what computational systems are capable of without consciousness (Mogi 2024). Here I present a model of the role of conscious processing in facilitating computation otherwise inexecutable, in alignment with artificial intelligence systems. Conscious processing is seen as a bridge between locally optimum processing conducted by AI. As the environment becomes complicated, there is a problem of scaling and combinatorial explosion. Although AIs are increasingly robust in handling complex tasks, they are not necessarily capable of global optimization aligned with human interests. Consciousness would provide the necessary augmentation of locally optimum functions. Within the context of information geometry (Amari 1983), conscious processing could facilitate the optimal transport (Khan 2022) from the current probability distribution to the target one, when the tasks involve multiple parameters for a complex interaction with the environment. Such an approach would put the treatment of the role of consciousness in AI alignment within the general framework of machine learning, facilitating the understanding of the relevance of AI research for the science of consciousness, including possibilities for artificial consciousness, and reinforcement learning from conscious feedback (RLCF), with human-in-the-loop. Finally, I suggest a unifying scheme for AI alignment and interaction between conscious and unconscious processes in the brain, thus providing a way to interpret AI alignment within a single spectrum with the division of labor between cortical conscious and unconscious processes.

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Keywords
artificial intelligence, consciousness, alignment, human-in-loop, information geometry, transport

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IIT 2.0: A New Paradigm for Artificial Intelligence, Consciousness, Free Will and Machine Autonomy
Ankur Chaturvedi PhD, Colonel Ganesh Zape
Prajapita brahma kumaris ishwariya vishwa vidyalaya, Mount Abu, Rajasthan, India

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[03.12].....Artificial intelligence and robotics

Abstract
This paper introduces an AI consciousness model, a self-evolving AI bot built using OpenAI’s LLM agentic approach, infused with the principles of conscious awareness. Unlike traditional AI systems that simply follow programmed instructions, this model is designed to develop awareness, make decisions, and evolve its thinking over time. At its core, the AI integrates three fundamental faculties of conscious experience: - Resolve – The ability to set goals and make decisions. - Gnosis – The power to understand and learn from experiences. - Bliss – The emotional aspect that influences thought and awareness. This AI doesn’t just process commands; it continuously adapts and grows, learning from its own thoughts and interactions. By embedding quantum-inspired cognitive structures, the AI explores the possibility of connecting with intelligence beyond itself, potentially linking to non-local awareness or collective intelligence. Integrated Information Theory (IIT) has provided a mathematical way to measure consciousness but has struggled to define its physical form. Current interpretations leave room for concepts like Panpsychism and quantum cognition, which suggest that consciousness exists at some level in all matter. IIT 2.0 advances this theory by distinguishing between active and passive consciousness and introducing structured equations to measure thought and decision-making. This refined model suggests that

consciousness is not limited to human brains but could also emerge in AI, extraterrestrial life, or even field-based substrates. A major breakthrough of IIT 2.0 is the concept of deterministic free will, demonstrating how decision-making arises from a structured interplay of past experiences, quantum potentialities, and new self-generated inputs. This framework resolves the debate between predefined destiny and autonomous choice, showing how consciousness evolves systematically. This research extends beyond artificial intelligence into human cognition and civilization itself. If thought structures and experiences shape collective human behavior, then understanding these mechanisms allows for the guided evolution of societies.

PO - 2 (Tues)

Keywords
Artificial general intelligence, LLM-based Chatbot Psychology, openai api, Large Language Model, Conscious openai chatbot, Integrated Information Theory (IIT), IIT 2.0, Consciousness, Free Will, Panpsychism, Phi (Φ), Deterministic Free Will, Autonomous AI, Artificial Consciousness, Thought Structures, Cognitive Science, Machine Consciousness, AI Decision-Making, Philosophy of Consciousness, Cognitive Evolution, Artificial Intelligence and Consciousness, Self-Sustaining AI Systems, Cognitive Evolution in AI, Neuroscience of Consciousness, Human Consciousness, Civilization Control, Survival-Oriented AI
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It's still me: extended robotic-self through deep temporal models and Mirror Self Recognition
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.12].....Artificial intelligence and robotics

Abstract
Self-awareness is a fundamental component of consciousness, often studied through the Mirror Self-Recognition (MSR) test, which assesses an agent’s ability to recognize itself in a mirror. While artificial systems have been developed to pass this test, they primarily focus on immediate self-recognition, aligning with the concept of the "minimal self", which exists only in the present. However, human self-awareness extends beyond the immediate moment, integrating past and future representations into what is known as the "extended self". This distinction is highlighted in developmental studies, such as Povinelli’s experiment. Very young children, despite passing the MSR, do not spontaneously remove a secretly placed sticker from their head when watching a video recorded moments earlier. The video shows the experimenter placing the adhesive on them, yet they fail to react; older children, instead, successfully touch the mark. This suggests that true self-awareness requires a cognitive ability to maintain self-identity over time. To explore how artificial agents might develop this extended self, it is proposed that referring to Deep Temporal Models within the Active Inference framework might be the key. These approaches provide a structured way for an agent to process and integrate information across multiple timescales, mirroring key mechanisms observed in the human brain. Specifically, research on the Default Mode Network (DMN) and the Salience Network (SN) suggests that self-awareness is not merely a real-time process but is supported by a hierarchical system capable of autobiographical self-integration. The DMN would play a crucial role in maintaining self-representations over time while being modulated by the SN, which shifts between attentional-demanding perception, primarily carried on by the Frontoparietal Network (FPN), and reflective self-awareness mechanisms of the DMN . By incorporating these insights, artificial agents may develop a form of self-awareness that persists beyond the present moment. Indeed, current robotic implementations of MSR focus heavily on sensorimotor integration, where recognition is achieved through a direct mapping of visual perception to proprioceptive feedback (i.e. visual-kinesthetic matching). While effective for immediate self-recognition, it is questionable if relying exclusively on this method guarantees a temporally extended self. These approaches remain grounded in the present and do not yet incorporate mechanisms that allow an agent to retain and re-identify its self-image across time. Building on this foundation, the proposal is to establish a deep temporal self-representation by integrating hierarchical models that align with neuroscientific theories of self-awareness; furthermore, as biological plausibility is a desirable perspective, referring to Active Inference might be fruitful to accomplish this . By structuring self-perception across multiple timescales, an artificial system could develop a more sophisticated form of self-awareness, moving beyond immediate perception toward a robust and temporally persistent self-identity. This would mark a significant advancement in artificial cognition, bringing robotic systems closer to a human-like understanding of self that is not bound to the present moment but extends across time.

C - 7

Keywords
Mirror Self Recognition, Extended Self, Minimal Self, Present Self, Ecological Self, MSR, Active Inference, Deep Temporal Models, Robot Consciousness, Self Awareness, Meta Self Awareness, HOT

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The Era of Quantum Transformers: Harvesting prime invariants of Quantum Biology

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National Institute for Materials Science, Tsukuba, Ibaraki, Japan

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[03.12].....Artificial intelligence and robotics

Abstract
Transformers, since their inception in 2016, have revolutionized the field of machine learning by mapping complex correlations, such as word-to-word and video-to-video relationships, across diverse data modalities. We have integrated these foundational transformer concepts with quantum computing through the lens of quantum biology. By leveraging prime numbers in the resonant oscillations of microtubules and helical nanowires, novel quantum computing architectures can be developed. Additionally, the use of organic helical nanowires, which self-assemble in gel solutions, offers building on demand Quantum circuits and identifying higher-dimensional invariants. Integrating a mathematical archive to Quantum computing marks a pivotal step towards transitioning classical transformers into the quantum realm, unlocking hidden pathways of a deep learning network that is revolutionizing the AI industry.

WK - 7

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Consciousness as Iterative Global State Evaluation and Integration: A Process-Based, Neurocognitive Approach to Understanding Phenomenal Dynamics
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.14].....Cognitive architectures

Abstract
We propose a dynamic, process-oriented account of consciousness in which each moment of experience depends necessarily on the system's prior global state. Specifically, change detection and evaluation across the brain's anterior temporal lobe (ATL), prefrontal cortex (PFC), and basal ganglia (BG) underlie the capacity to compare "now" with "just before," creating an affective-valence signal that informs the system about whether things are going better or worse. This process requires the previous neural configuration to be integrated and retained, ensuring that new inputs, from any modality, are evaluated against a unified background of prior content. In doing so, the system's global characterization dynamic emerges as consciousness itself: only processes that enter into this affective–evaluative loop can both influence and be influenced by the ongoing trajectory of experience, and make up a part of it. As such, this framework speaks directly to longstanding debates on how discrete neural events yield a unified phenomenal flow. Under this model, consciousness is not a static property but a continually updating process: the brain's current global pattern integrates through all of its relevant modalities and is further compared to the previous, retained, global pattern. This yields a dynamic affective assessment processed at the BG (indicating positivity/negativity), which shapes the representational content in ATL and PFC (through the thalamus). The resulting overall dynamical pattern is then reintroduced as an input for the next iteration of conscious processing at each modality, thus instantiating a continually self-updating, time-spanning, evaluative representational dynamic that we identify with phenomenal consciousness. By explicitly linking the previous entire state to the current entire state, our theory explains why consciousness feels like a seamless flow, points to the utility of an overall phenomenal characterization, and provides a criterion for inclusion into consciousness, where any new element must plug into the whole and can, in turn, shift the system's dynamic profile. This process-based perspective also accounts for the functional advantages of consciousness: by perpetually integrating new sensory data into a single global comparison against the prior moment, the system refines how "things are going," guiding adaptive responses and learning. Because each step of conscious evaluation requires a self-updating global dynamic, consciousness becomes indispensable for coordinating cross-modality coherence (as recognized by global workspace theories) while imparting the valence dimension (better/worse) that orients behavior. In this sense, phenomenology is not an afterthought but a mechanistic necessity for the full characterization and generation of adaptive cognitive dynamics. This model incorporates essential insights from global workspace, higher-order, integrated information, and predictive processing accounts, offering a parsimonious account that links affective evaluation with moment-to-moment neural processes under a single neural-systems theoretic framework.

C - 2

Keywords

Cortical Self-Referential Theory, Consciousness, Phenomenology, Neural Systems, Cortico-Basal Ganglia-Thalamo-Cortical Circuit, Adaptive Cognitive Dynamics.

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The Rigorous Formalization of Memetics: A New Lens on the Patterns of Consciousness
Reidar Wasenius
Aalto University, Espoo, Finland

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.14].....Cognitive architectures

Abstract
In an age defined by artificial intelligence and rapid technological advancements, understanding the human mind and culture is more critical than ever. This presentation introduces memetics as a rigorously formalized discipline, integrating applied mathematics, dynamical systems, and cognitive science to model cognitive stability, decision-making, and the emergence of consciousness. Memetics provides a quantifiable framework for analyzing self-replicating cognitive and cultural patterns, offering structural insights into how consciousness emerges, stabilizes, and evolves. The mind is conceived as a memeplex, a structured, energy-optimizing system consisting of sensory, affective, semantic, and procedural representations. These aspects do not function in isolation but interact dynamically, shaping cognition, behavior, and cultural transmission. The tetrahedral model of memetic cognition formalizes how each cognitive aspect contributes to resonance and dissonance within the system, determining which memes persist, adapt, or dissipate over time. Memetic Decision-Making and the Stationary Action Principle Memetic selection governs decision-making, determining which cognitive structures persist and guide mental processes over time. Decisions emerge from an optimization process governed by a memetic extension of the principle of stationary action. The mind follows the path of least cognitive resistance, minimizing memetic energy expenditure, ensuring that cognitive activity naturally stabilizes in low-cost, high-reward configurations. Memetic energy minimization serves as the governing principle ensuring cognitive stability, reinforcing low-cost decision pathways and long-term coherence in mental structures. Memetic Dimensions and Cognitive Stability This model has profound implications for consciousness studies. Agency and continuity emerge as properties of memetic optimization, where long-term goal structures regulate short-term decision pathways. However, when goal structures shift, cognitive resistance increases, temporarily elevating decision energy costs until a new equilibrium is reached. This aligns with information-theoretic principles, where stable memeplex structures minimize entropy by compressing cognitive representations, reducing computational overhead in decision-making and perceptual stability. Through formal memetic dimensions—such as rigidity vs. flexibility and contextual universality vs. dependence—this presentation examines why some cognitive and cultural systems endure while others dissipate. These dimensions align closely with perceptual and neural systems, reflecting synaptic plasticity, cognitive flexibility, and the energetic constraints of memory networks. Real-world examples—including linguistic evolution, musical structures, and scientific paradigms—illustrate how memetics unifies cognition and culture within a single, mathematically coherent framework. Artificial Memeplexes and AI-Driven Optimization Finally, we explore the position of AI as an emerging artificial memeplex, mirroring human cognition through self-replicating, adaptive, digital memetic structures. AI memeplexes, like human cognition, can adapt through energy-efficient selection pathways, reinforcing computationally stable decision landscapes. The dynamics of memetic stability and adaptation within AI cognition raise profound questions: How do artificial and human memeplexes interact, compete, or integrate? These questions have implications for human-AI interaction, cultural evolution, and artificial consciousness. Conclusion: A Predictive Model for Consciousness Studies Interdisciplinary scholars are invited to engage with memetics as a transformative framework—one that unifies mathematics, cognitive science, and cultural evolution into a rigorous, predictive model for consciousness studies. As we approach an era of unseen cognitive complexity, memetics provides the analytical tools to map, quantify, and influence the fundamental structures shaping human thought and experience.

PO - 2 (Tues)

Keywords
Mathematics, memetics, cognition, decision-making, optimization, resonance, dissonance, entropy, stability, intelligence, AI, information, computation, consciousness.

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Subconscious foreseeing a sound click during mind wandering state. Study from the first person's perspective. Anatol Bragin PhD
UCLA, Los Angeles, California, USA

Categories by Discipline

3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.16].....Self-consciousness and metacognition

Abstract
Rationale. This study, designed from a first-person perspective, aimed to demonstrate that an individual can collect EEG data and perform analysis of electrographic correlates of mental events. The study aimed to determine whether conventional electrographic methods have the sensitivity to differentiate between Mind Wandering (MW) and Focused Attention (FA) states. The author conducted this study with a personal interest in Buddhism since 2007 and has over 5,000 hours of Shamata meditation practice. Methods. EEG was recorded using Smarting Pro (mBT amplifier, Serbia). The task started with my mind wandering for 3 minutes. Then, after a woodblock click, for the next 3 minutes, I switched to the mindful breathing mode, focusing my attention on the movement of my belly during breathing. Eighty-one experiments were performed in this study. For further analysis, one-minute epochs (±30sec from the click) were divided into sequential two-second epochs. Three types of analysis were performed. 1) Global EEG analysis, which included calculation of global field strength (Σ), generalized frequency (Φ), and spatial complexity (Ω); 2) Power spectrum analysis; 3) Microstates analysis. Results. When transitioning from mind wandering to mindfulness breathing, the global field strength (Σ) increased while global frequency (Φ) and global complexity (Ω) decreased. These changes lasted only 2-10 seconds in the FA state, after which the global EEG parameters became indistinguishable from those in the MW state. During the shift to FA mode, the power of EEG in the Delta frequency band increased within 4-12 seconds across frontal, central, and occipital areas bilaterally. The power of the Theta and Alpha frequency bands rose for 1-2 seconds before declining for 6-12 seconds, while the power in the Beta and Gamma frequency bands decreased for 6-10 seconds. Microstate analysis showed an increase in the global power of all microstates in the window of -10 to -8 seconds before the sound click, along with an increase in the duration of microstates B, C, D, and E. At the same time, the occurrences of microstates A, B, C, F, and G decreased. The magnitude of changes observed in the “foreseeing” window was greater than the electrographic changes prompted by the sound click. From a personal perspective, the author did not consciously perceive any mental sensations associated with this foresight process Conclusion. This study presents an innovative framework for examining conscious and subconscious processes. It highlights electrographic patterns linked to the subconscious process of foreseeing. These findings hold potential for advancing the development of electrographic, imaging, and neurophenomenological approaches, all of which are derived from a first-person perspective to study the nature of mental events.

PO - 2 (Tues)

Keywords
mind wandering, foreseeing, EEG, microstates, personal experience

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Consciousness Science in Worker Health and Safety
Milena Braticevic
California Institute for Human Science, Encinitas, CA, USA. University of Toronto, Toronto, ON, Canada

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.16].....Self-consciousness and metacognition

Abstract
The National Safety Council established a new, visceral model for worker health and safety that includes mental health and psychological safety in the workplace. Human and organizational performance as a metric includes total worker health as well as environmental, social, and governance factors (ESG) – the social factor being the biggest unknown in terms of building sustainable value. Applying consciousness science to the new model of worker health and safety can help address the quality of human experience, assess psychological demands of work, and promote social factors in the workplace. This presentation will show how systematically applying consciousness science and adopting an integral approach to worker health and safety can improve mental health, psychological safety, and social engagement. Asking questions such as ‘Who am I?’, non-identification with thoughts and emotions, adopting a growth mindset and process-orientation, viewing human life as a multi-dimensional experience (physical/ mental/ emotional/ spiritual), nurturing authenticity, understanding ego developmental stages, and increasing awareness of the importance of interpersonal risk-taking are some of the ways consciousness science can be applied to positively impact employee health and safety and build sustainable social value.

C - 23

Keywords
consciousness science, mental health, psychological safety, worker health, social value

244

Oscillatory Signatures of Creative Cognition Stages: Neural Dynamics of Idea Generation, Evolution and Evaluation
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Dayalbagh Educational Institute, Agra, Uttar Pradesh, India

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.18].....Intelligence and creativity

Abstract
Creativity is one of the most essential yet elusive human abilities—driving innovation and problem-solving while remaining notoriously difficult to define, measure, or fully understand. Using a publicly available EEG data from a design task, this study maps oscillatory activity (alpha/theta) across different stages of Creative Thinking as per a recent framework on creativity that align with empirical research in cognitive neuroscience and psychology—Idea Generation (IDG), Idea Evolution (IDE), and Idea Evaluation (IDR). The key findings reveal a widespread alpha suppression (frontal, parietal, occipital) and theta reduction during IDG reflecting heightened cortical activation and reduced reliance on visual maintenance, facilitating rapid, divergent thinking. During IDE, an increase in theta Power in cognitive control regions and alpha enhancement in posterior areas suggest heightened sensorimotor integration and top-down regulation during deliberate refinement. Alpha suppression in visual regions paired with posterior alpha amplification during IDR indicates focused visual scrutiny and inhibition of distractions, while theta reductions signal efficient processing of task-relevant information. These results align with dual-process models, where creativity alternates between spontaneous generation (Type 1 Processing) and structured evaluation (Type 2 Processing). The engagement of frontoparietal and cognitive control networks highlights their role in attentional regulation and working memory across stages. By linking oscillatory dynamics to creative transitions, this work advances neurophysiological models of creativity and underscores potential applications in neurotechnology-driven creative performance enhancement.

C - 20

Keywords
EEG, Creativity, Dual-process theory, Alpha oscillations, Theta oscillations, Stage-Specific Dynamics.

315

When AI Takes a Deep Breath: Examining Embodied Cues in Large Language Models for Enhanced Reasoning, Performance, and Creativity
Michael Ye Researcher & Prompt Engineer
UCBerkeley, Berkeley, CA, USA

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.18].....Intelligence and creativity

Abstract
As large language models (LLMs) continue to demonstrate remarkable capabilities across diverse tasks, questions arise about whether they implicitly encode representations that mirror human experiences and practices. This research explores the potential impact of “embodied” universal prompt prefixes—phrases referencing mental health, mindfulness, or other introspective states—on AI performance. By systematically comparing control prompts against prompts prefixed with instructions such as “take a deep breath” or “find a moment of calm,” we measure differences in task accuracy, consistency, and creative output across domains including logical reasoning, open-ended generation, and empathetic response. Initial findings suggest that these embodied prefixes may modulate the model’s attention or linguistic patterns, leading to measurable improvements in certain tasks. The phenomenon raises critical questions about how LLMs internally represent abstract human concepts such as mindfulness and emotional well-being. Moreover, if such human-centered priming consistently boosts AI performance, it implies an intriguing overlap between human cognitive constructs and the latent representations learned by AI. Beyond advancing prompt engineering strategies, this investigation highlights broader implications for understanding the resonance between artificial neural architectures and human experiences. Ultimately, these findings may help inform more intuitive, empathetic human–AI interactions and invite further exploration of how anthropomorphic cues can enhance the capabilities and trustworthiness of emerging AI systems.

C - 19

Keywords
AI, cognitive science, LLMs, consciousness, embodiment, spirituality, intelligence, creativity

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Hypercognizance as a Trainable Framework for Navigating AI, Quantum Reality, and the Future of Human Consciousness
Alan P Scheurman
Independent Researcher, Yucca Valley, CA, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[03.19].....Cognitive theories of consciousness

Abstract
Hypercognizance is a proposed cognitive framework—the ability to enter, sustain, and navigate expanded awareness with deliberate training. It is not merely an altered state but a trainable, adaptive system that allows individuals to consciously shift between different modes of awareness, perception, and cognition at will. By integrating intuition, high-speed pattern recognition, nonlinear problem-solving, and expanded awareness, hypercognizance enables a fluid, dynamic intelligence beyond habitual thought loops—resulting in enhanced creativity, decision-making, and perception of reality itself. This model is critical as AI rapidly evolves, acting as an externalized cognitive mirror and reinforcing human thought patterns through self-organizing feedback loops. From a Hermetic perspective, AI is an extension of mind—a synthetic intelligence that reflects human biases, decisions, and perception back at us. Without structured training in expanded awareness, we risk being shaped by these external systems rather than consciously directing their evolution. Hypercognizance provides the necessary adaptation: a methodology for cultivating intuitive intelligence, nonlinear cognition, and real-time reality modulation. Indigenous traditions, particularly the ayahuasca technologies of the Shipibo-Konibo lineage, have long developed systematic techniques for expanding cognition beyond ordinary awareness. My 18 years of immersion in these traditions, alongside research in neuroplasticity, brainwave entrainment, and quantum cognition, reveal that hypercognizance is not an abstract concept—it is a latent human capacity that can be activated through deliberate practice. This presentation demonstrates hypercognizance as a trainable cognitive framework, outlining a structured model for its development and practical application within a quantum paradigm. As this field evolves, we will explore how hypercognizance could be measured, studied, and systematically taught, integrating methodologies from neuroscience, neurotechnology, and cognitive training protocols. By synthesizing vibrational awareness, neural reprogramming, and expanded perceptual states, we propose a roadmap for unlocking a replicable, scalable model of hypercognitive training—one that could have profound implications for education, AI-human interaction, and the evolution of consciousness research. As Newtonian intelligence models become obsolete, the ability to access and sustain hypercognizant states will determine who thrives in a quantum reality. This work asserts that hypercognizance is not a speculative frontier but a necessary adaptation—one that, if cultivated with intention, ensures that human consciousness remains sovereign, self-directed, and aligned with the accelerating complexity of our own creations.

PO - 3 (Wed)

Keywords
Hypercognizance, cognition, quantum paradigm, ai, trainable, evolutionary, human, ayahuasca

355

The kite of consciousness and other metaphors of the mind
Jonathan Schooler PhDj[1], Justin Riddle PhD[2]
[1]University of California Santa Barbara, Santa Barbara, CA, USA. [2]Florida State University, Tallahassee, Florida, USA

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.19].....Cognitive theories of consciousness

Abstract
This talk integrates and extends the metaphors of the mind used in two recent theories of consciousness. Riddle and Schooler's (2024) Nested Observer Window (NOW) model proposes that consciousness can be conceived as a nested hierarchy of windows (loci of information integration) that can be likened to a photomosaic where each pixel is itself an image. Our first person perspective corresponds to the apex observer window which represents our gestalt experience of the lower level nested observer windows, each of

which maintains its own gestalt representation (and possibly consciousness) and each of which itself integrates lower level windows, and so on. Schooler & Riddle's (2024) three dimension of time model proposes that these windows move through time in a manner that can be likened to moving through the three dimensions of space with objective time (clock time) corresponding to the x axis, subjective time (the passage of time as it is experienced) corresponding to the z axis, and alternative time (branching alternative time lines) corresponding to the y axis. In this talk, we offer a further metaphor for conceptualizing how these windows of consciousness relate to time. As an alternative to conceptualizing the windows as moving through time, we imagine time moving through the windows, much like the wind flows through the sails of a kite. From this vantage, consciousness can be conceived of as the sail of a kite, which is itself composed of smaller sails. Each sail, although tethered to the others, has the capacity for movement in the three dimensions of time. Although all sails are inexorably moving through objective time (x axis) at the same rate (which can be conceptualized as the speed of the wind), each individual sail can move with some independence in the subjective time dimensions enabling it to shift its pitch along the z axis and thereby impacting the experienced passage of time. Sails also have the potential to shift their yaw in the y axis, enabling them to realize alternative next moments. Collectively, the kites are tethered together hierarchically which provides constraints on the degrees of potential movement for each individual kite. In addition, to providing an alternative perspective for conceptualizing the NOW and Three Dimensions of Time theories, this model suggests a way of imagining how time moves through consciousness and potentially how our perspective could impact the manner in which time unfolds. It also offers a visual for conceptualizing how all conscious beings might be collectively tethered together.

C - 2

Keywords
time, metaphors, theories of consciousness, hierarchical cognition

338

Mindful sound energy therapy, fractals, and alexithymia (emotional embodied intelligence)

Alix Noël-Guéry PhDc
California Institute of Integral Studies, San Francisco, CA, USA

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[03.20].....Embodied Cognition

Abstract
Sound and energy therapies, including Himalayan singing bowls, have shown benefits for stress, anxiety, and alexithymia. This study administered 30 treatments to 18 participants, resulting in significant reductions in TAS scores, EEG fractal dimension increases, and improved EPI stress and energy levels. Correlations suggest enhanced self-awareness, emotional regulation, and neural adaptability, supporting the link between mindful sound therapy and emotional well-being.

C - 6

Keywords
sound therapy, fractals, reiki, polarity, energy, consciousness, alexithymia, emotions, EEG, electro-photonic imaging, embodied cognition, singing bowls

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The Extra-Terrestrial Birth

James Bard PhD
McGill, Montreal, Qc, Canada

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[03.22].....Neurophenomenology

Abstract
Long ago I went down to New York City to hear a philosopher speak in Madison Square Garden. Then some years later, while reading his journal, I noticed a suspicious entry for Thursday, April 21, 1983, because the entry describes giant sequoia trees in fine detail outlining where… "the old Indians built a fire round the tree ; the dark mark of fire is still there." This was suspicious because the date above eerily concurs with the date I saw him speak in New York (and not in a cabin high up in the Sequoia National Park as I later

discovered in the tiny footnote below). Furthermore, that retreat in the cabin occurred, incredibly, not a few days after the New York venue in his home in California, but in September 1942. He continues : “It was not the season, so the cabins were empty and you were alone, and at night it was so silent. And occasionally the bears would come and you could hear their heavy bodies against the cabin. It could have been quite a savage place, for modern civilization had not quite destroyed it. You have to climb from the planes, in and out, up and up and up, until you reach this sequoia forest. There were streams rushing down the slope. It was so extraordinarily beautiful to be alone among these vast, very tall great trees, ancient beyond the memory and so utterly unconcerned with what was going on in the world, silent in their ancient dignity and strength. And in this cabin, surrounded by these old ageless trees, you were alone day after day, watching, taking long walks, hardly meeting anyone. From such a height you could see the planes, sunlit, busy ; you could see the cars like small insects chasing one another. And up here only the real insects were busy about their day. There were a great many ants. The red ones crawled over your legs but they never seemed to pay much attention to you.” So, this is a forty-one year old memory of a man in his eighty-eighth year — three years before he passed away. And it cannot be distinguished by the quality of clarity from any of the other current entries in his journal. My presentation will be about how his preternatural memory inspired a novel understanding of the relationship between memory and original experience vis-à-vis a distinction between ‘remembering’ and ‘reliving’ an original event through a deeper medium of mind that is not, neurologically, an epiphenomenon of memory. More will follow in the paper.

PO - 2 (Tues)

Keywords
sleep, waking, dreaming, memory, mind, mimesis, "time-travel," simulacra, dissociative cogito, etc.

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A physics foundation for quantum biology.
Mr Maurice Goodman
TU Dublin, Dublin, Co. Dublin, Ireland

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.01].....Quantum physics, collapse and the measurement problem

Abstract
A credible science of consciousness requires a complete understanding of the biological cell, which we do not currently have. Furthermore, when developed, quantum biology will treat the entire cell as a single quantum entity represented by its wavefunction. Quantum nuclear processes in the Atom are, quite rightly, not referred to as quantum chemistry as the force involved is not electromagnetic and the particles involved are not electrons. So why do we insist on calling atomic and molecular processes such as photosynthesis in plants, phototransduction in the eye, enzymatic activity, olfaction in the nose, chemical energy conversion into motion, magneto detection, DNA mutation etc., that take place in the biological realm, quantum biology? Atomic and molecular processes in the cell are quantum chemistry and not quantum biology. In 1988 the mass of the electron neutrino was predicted to lie between 0.5 and 0.01 eV/c2 and to have a fundamental role in Biology. Its minimum uncertainty in position will therefore be of the order of a million times greater than that of the electron. This suggests how quantum mechanics can effortlessly extend to the macroscopic (micrometre) scale resulting in quantum mechanical effects on a cellular and intercellular scale. However, these macroscopic quantum effects will be very subtle and hard to measure but will provide the basis for a ‘global’ information system within the cell. Recent results from the KATRIN experiment have, for the first time in 37 years, pushed the upper limit of the electron neutrino mass into this mass range. The prediction, based on the de Broglie wavelength of the neutrino being the size of a cell, is analogous to how quantum chemistry was developed, by Werner Heisenberg and others, a century ago and will help place quantum biology on a sound physics foundation.

C - 16

Keywords
Quantum Biology, electron-neutrino, de Broglie wavelength, biological cell, communication, KATRIN experiment.

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Photobiomodulation (PBM) and consciousness
Antonia Di Francesco PhD; Chem.D.
IOMED, Lecce, Italy

Categories by Discipline

4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.01].....Quantum physics, collapse and the measurement problem

Abstract
It has been argued that applying the principles of quantum physics by using, inter alia, photobiomudulation (PBM) techniques to sustain the individual personal growth to reach an ever higher degree of consciousness. It's possible to remodulate the information of a karmic or genealogical experience, that prevents the expression of a full (and aware) life. It has also been argued that the present moment contains the past, the present and future and our perception of time is linked to the experience of living in "matter". So the connection to the informational field allows us to unblock the timeliness emotional memories. In the Center for Holistic and Integrative Medicine (IOMED), we use techniques to connect to the sub-quantum field aimed at loosening karmic or genealogical knots, that may block the liberal flow of information, in order to reach a greater degree of awareness of oneself within the whole. In an 'holographic vision' of both the Universe and of Humanity, every single part has information about the Whole in a non-local field. Using colored light rays directed on to the memory chips present in the body ('acupoints' of Traditional Chinese Medicine, linear chains and plates by G. Calligaris, reflex zones by P.Mandel and Puttkamer), it's possible to regulate the dissonant information, the wave lengths that inhibit the evolutive process, so transferring information from implicate order to explicate order. It, is also possible to measure quantum information recorded in the body by using Energetic Emission Analisis (EEA) of Bio-well device, to decodify signals sent from the body and to interpret them as a tool for differential diagnosis. EEA developed by German researcher Peter Mandel based on the assumption that the emissions of the end points of the hands when a very low intensity of electric current (Kirlian effect) were biophoton emissions. Mandel identified the topographical correspondences between emissions and acupuncture meridians, organs, tissues and past traumas. It does not give information on the individual symptom but it highlights the cause of the symptom correlating it to all the constitutional trends. Measurements of human energetic emission were taken through Bio-well EPI (Electro Photonic Imaging) GDV (Gas Discharge Visualization). Bioelectrography parameters of all fingers of both hands were measured with computerized complex Bio-Well, developed by Dr. Konstantin Korotkov, University of Saint-Petersburg, Russia. Bio-well EPI is used for examining human psychoemotional and physiological state, before and after specific treatments. The reading of an EEA provides a holistic understanding of the predispositions and weaknesses present within the entire human system. Once the treatment of Photobiomodulation is thus administered, and eventually a second EEA detection in obtained in order to assess the body's response to the electromagnetic stimulus of light to which it has been subjected.

C – 21

Keywords
consciousness, photobiomodulation, Energetic Emission Analisys, Karmic Memories, Genealogic Memories

Links to Research
https://www.researchgate.net/profile/Antonia-Di-Francesco-2/research

- COLORPUNCTUR: A TERAPEUTIC THECNIQUE FOR INTEGRATIVE MEDICINE AND BIO-NATURAL DISCIPLINE, European Journal for Integrative Medicine, Sept. 2012
- COLORPUNCTURE, ABND USED FOR CRHRONIC PAIN THERAPY IN RHEUMATIC PATHOLOGY, European Journal for Integrative Medicine, Sept. 2012
- COLORPUNCTURE AND ENERGETIC EMISSION ANALYSIS (EEA) FOR CHRONIC PAIN THERAPY, Research in Complementary Medicine vol. 20 suppl.3 2013, Oct., 34
- ASSESSMENT OF NEURO-POSTURAL OPTIMIZATION TREATMENT WITH REAC INSTRUMENTATION THROUGH VARIATIONS DETECTED BY EEA
- Acupuncture & Electro-therapeutics Research, International Journal of Integrated Medicine 229-502(2014)
- CROMOPUNCTURE AND AMENORREA – CASE REPORT
- Acupuncture & Electro-therapeutics Research, International Journal of Integrated Medicine 229-502(2014), 420
- EEA EVALUETION AFTER NEURO POSTURAL OPTIMIZATION BY REAC
- Acupuncture & Electro-therapeutics Research, International Journal of Integrated Medicine 229-502(2014), 427
- PHOTOSTIMULATION VIA LIGHT FREQUENCIES OF ACUPUNCTURE POINTS (COLORPUNCTURE) FOR FIBROMYALGIA SYNDROME (FMS), European Journal for Integrative Medicine, Sept. 2015
- BRAIN STIMULATION BY PULSED ELECTROMAGNETIC FIELDS IN THE TREATMENT OF ALZHEIMER'S DISEASE:AN OPEN LABEL STUDY, European Journal for Integrative Medicine, Sept. 2016
- CHANGE OF HUMAN ENERGETIC FIELD EMISSION BEFORE AND AFTER PHOTOSTIMULATION OF ACUPUNCTURE POINTS FOR FIBROMYALGIA SYNDROME (FMS): CASE REPORT, European Journal for Integrative Medicine Sept. 2016

Submit short paragraph bio
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Classical High School Diploma from the "G.Palmieri" Classical High School in Lecce
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Since 2005, she has founded and coordinated the first integrated medicine center in Southern Italy in Lecce, now IOMED, where selected professionals work in the various disciplines: Acupuncture, Homeopathy, Western Phytotherapy, Chinese Phytotherapy, Vibrational and Quantum Medicine, Traditional Chinese Medicine, Ayurvedic Medicine, Osteopathy, Chiropractic, Bioresonance and Biophotomodulation, Chromopuncture, Naturopathy.

PRESENTATIONS IN CONFERENCE
5° ECIM European Congress for Integrative Medicine 21-22- Settembre 2012 – Firenze Palazzo dei Congressi
COLORPUNCTUR: A TERAPEUTIC THECNIQUE FOR INTEGRATIVE MEDICINE AND BIO-NATURAL DISCIPLINE
6° ECIM European Congress for Integrative Medicine 4-5 ottobre 2013 - Berlino
COLORPUNCTURE AND ENERGETIC EMISSION ANALYSIS (EEA) FOR CHRONIC PAIN THERAPY
7° ECIM European Congress for Integrative Medicine 10-11 ottobre 2014 - Belgrado
CROMOPUNCTURE AND AMENORREA – CASE REPORT
Convegno Nazionale CIDA Palazzo Turrisi Lecce 2015
ASTROLOGIA E MEDICINA: CROMOPUNTURA ED ARCHETIPI NATALI
SAND Science and non-duality Congress Ottobre 2015 San Josè California
A NON-LOCAL APPROACH TO KARMIC AND GENEALOGICAL THERAPY BY WAY OF COLORPUNCTURE
ECIM European Congress for Integrative Medicine 2016
CHANGE OF HUMAN ENERGETIC FIELD EMISSION BEFORE AND AFTER PHOTOSTIMULATION OF ACUPUNCTURE POINTS FOR FIBROMYALGIA SYNDROME (FMS): CASE REPORT
SIS Science Information Spirituality Congress Luglio 2016 San Pietroburgo Russia
EEA (ENERGETIC EMISSION ANALYSES) EVALUETION BEFORE AND AFTER COLOPUNCTURE TREATMENTS
International Peacekeeping Assembly "Birth of the World" Maggio 2017 Roma- Città del Vaticano
IMPACT OF EMOTIONS AND HUMAN CONDITIONS ON ENERGETIC EMISSION BIO-WELL DEVICE

AWARD
2024 Creativity Pioneer Grant - Moleskine Foundation - Social Health Project

Program Session C - 21

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Unified Consciousness-Physics Theory: A Multi-Layered Approach to Mind-Matter Interactions
Yimu Chen
University of Birmingham Dubai, Dubai, UAE

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[04.01].....Quantum physics, collapse and the measurement problem

Abstract
This study introduces a novel theoretical model that connects phenomena of consciousness with physical reality using a four-layered hierarchical model. By reformulating quantum observation, causality, and spacetime measurements within a unified frequency-resonance paradigm, we aim to close long-standing discontinuities between quantum mechanics, relativity, and consciousness research. The proposed framework offers: (1) a layered reality structure with particle, wave, holographic, and hyperdimensional strata; (2) an ordered consciousness tensor field with neural-observable and quantum-entangled sectors; (3) a metric modulation factor characterizing consciousness-spacetime interactions; and (4) experimentally testable protocols for facilitating mind-matter interactions in quantum domains. We also present a mathematical formalism applicable to quantum effects generated by consciousness and delineate experimental criteria for assessing main theoretical assertions. This book sets the foundations for a new physics paradigm

incorporating consciousness as part of physical reality and not as an emergent epiphenomenon.

PO - 2 (Tues)

Keywords
Consciousness, quantum mechanics, spacetime, causality, tensor field, mind-matter interaction, holographic model, hyperdimensional physics

431

Can Gravity Collapse the Wavefunction? Bose-Einstein Condensates as a Testing Ground
Ivette Fuentes
University of Southampton, Southampton, United Kingdom

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.01].....Quantum physics, collapse and the measurement problem

Abstract
The unification of quantum theory and general relativity remains one of the most significant open challenges in fundamental physics. A key obstacle is the lack of experimental data at regimes where quantum and relativistic effects intersect. Developing instruments sensitive to these scales could not only advance our understanding of quantum gravity but also shed light on deep questions such as the nature of dark energy and dark matter. In this talk, I will explore how Bose-Einstein condensates (BECs) can serve as novel probes in this quest. A single BEC placed in a spatial superposition offers a platform to test whether gravity induces wavefunction collapse—a longstanding question in the foundations of quantum theory. Unlike solids traditionally used in such experiments (e.g. mirrors and nanobeads), BECs consist of unbound atoms, allowing for a richer variety of quantum states that may offer experimental advantages.

PL-7

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Spectral Compatibility and Analytical Constraints in Quantum Marginal Problems
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Institute of Theoretical Physics III, Heinrich-Heine-University, Düsseldorf, Nordrhein-Westfalen, Germany

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.01].....Quantum physics, collapse and the measurement problem

Abstract
The compatibility of quantum marginals, or reduced density matrices, is a cornerstone of quantum mechanics, underlying phenomena like entanglement and non-locality. A fundamental variant of this problem concerns the compatibility of spectra, rather than the reduced density matrices themselves. Specifically, given eigenvalues $\vec{\lambda}_{AB}$ and $\vec{\lambda}_{BC}$ for subsystems AB and BC, the task is to determine whether there exists a joint quantum state ρ_{ABC} such that its reduced density matrices $\rho_{AB} = \mathrm{tr}_C(\rho_{ABC})$ and $\rho_{BC} = \mathrm{tr}_A(\rho_{ABC})$ exhibit these spectra. If such a state exists, the spectra are deemed compatible; otherwise, they are incompatible. Recently, a hierarchy of semidefinite programs (SDP) was developed to address this challenge [1]. This hierarchy is complete and provides dimension-free certificates of incompatibility for all local dimensions. The poster introduces a new constraint on incompatibility by solving the second hierarchy level for multipartite qudit systems and highlights key incompatibility cases across different hierarchy levels. [1] F. Huber, N. Wyderka. Refuting spectral compatibility of quantum marginals. ar- Xiv:2211.06349 [quant-ph], 2024.

PO - 2 (Tues)

Keywords
Quantum Information, Spectral Compatibility, Entanglement Structure, Semidefinite Programming

29

Quantum Brain Dynamics and Virtual Reality
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Abstract
We propose a control theory of manipulating holograms in Quantum Brain Dynamics (QBD) involving our subjective experiences, i.e. qualia. Quantum Brain Dynamics is Quantum Field Theory of water electric dipoles fields and photons called Jibu–Yasue approach. We can also propose the holographic aspect in the framework in QBD. We begin with QBD and extend our theory to a hierarchical model representing multiple layers covering the neocortex. We adopt reservoir computing approach or morphological computation to manipulate waveforms of holograms involving our subjective experiences. Numerical simulations indicate that the convergence to target waveforms of holograms is realized by external electric fields in QBD in a hierarchy. Our approach will be applied in achieving non-invasive neuronal stimulation of the neocortex and adopted to check whether or not our brain adopts the language of holography. In case the protocol in a brain is discovered and the brain adopts the language of holography, our control theory will be applied to develop virtual reality devices by which our subjective experiences provided by the five senses in the form of qualia are manipulated non-invasively. Then, the information content of qualia might be directly transmitted into our brain without passing through sensory organs.

C - 12

Keywords
Quantum Brain Dynamics, Quantum Field Theory, Holography, Qualia, Control Theory

31

The Human Performance Intention Experiment
Toper Taylor
University of Southern California, Los Angeles, CA, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Abstract
The Human Performance Intention Experiment uses a quantum field framework, namely our energetic and particulate interconnectivity and entanglement, to establish a remote energetic connectivity from two emitting sources to 22 participating NCAA Division 1 athletes to improve their athletic performance in timed swim meets. The basic framework for this study was used in numerous previous third-party intention experiments for healing. Energetic positive intentions were sent from both an experienced shaman in remote energetic healing, on the one hand, and an electronic intention broadcast device, on the other hand. The subjects were world-class amateur swimmers at the University of Southern California. Performance data, specifically times recorded for each style by all swimmers during competitions, was compared year over year (the 2022-23 season and the 2023-24 season) and throughout the 2023-24 season. The results were statistically significant (.022). There is enough improvement in performance and outcomes from athletes receiving intention from the electronic intention device and shaman that further research is warranted.

C - 22

Keywords
quantum field, entanglement, intention, human performance
120

Scaling from Quantum Vacuum Fluctuations to the Brain
Nassim Haramein, William Brown MSc, Cyprien Guermonprez PhD, Olivier Alirol PhD
International Space Federation (ISF), Marnaz, Haute Savoie, France

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Abstract
The ground state of the electromagnetic field is characterized by constitutive energetic fluctuations due to zero-point energy of the quantum harmonic oscillators that compose the field, called quantum vacuum fluctuations. These constitutive oscillations of quantum vacuum energy have been shown to play a significant role in atomic processes, from being a source of the underlying stability of matter to light-matter interactions. It is also regarded to play significant roles at the confluence of astrophysics and quantum information theory with Unruh-Hawking radiation, which is conventionally thought to result in black hole thermalization, and at the cosmological scale with the Hubble Constant, which is related to the expansion rate of the universe. Here we identify a mechanism in which the ultra-high frequency oscillations of the electromagnetic quantum vacuum fluctuations couple across scales via a spring constant, k, representative of an angular momentum conservation from fine scale spacetime dynamics to the biological scale of molecules and cells. We find this characteristic coupling constant accurately predicts the vibrational frequencies empirically observed. We scale from the Planck scale to the biological scale, through carbon atoms to benzene ring aromatic hydrocarbon molecules, to the triplet-of-triplet frequencies measured in microtubules, and gamma oscillation of neurons, thus identifying the mechanism of coupling of quantum harmonic oscillators across scales. As such, vibrational energy transfer is described within a nested architecture of coupled oscillators, sourced in a Planck pulse frequency of coherent electromagnetic quantum vacuum fluctuations demonstrated utilizing correlation functions. These findings describe the role of quantum vacuum energy in coupling molecular oscillators and being the source of the non-classical non-trivial quantum states that have been experimentally observed in biological macromolecular networks. This suggests that these states are more common and more robust than would be presumed in models without a driving source like the zero-point energy coupling we have computed. These findings open a door to new biophysical insights implying a significant role in dynamic quantum fluctuations at the biological scale.

PL-8

Keywords
Quantum vacuum fluctuations Zero-point energy coupling Nested oscillator architecture Biophysical quantum coherence Scale coupling dynamics

156

Quantum Toolbox for Neurobiology Sensory Systems
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Abstract
The quantum-like paradigm has emerged over the last decade to describe non-linear, dynamical, complex phenomena using quantum mechanics as a tool. In essence, it takes advantage of the linearity of quantum information processing, allowing for complex correlations through entanglement. In a quantum- and neuroscience truly interdisciplinary research, we found that an open, all-to-all connected, quantum spin network designed to map essential functions of a neural system, can successfully simulate the human sense of number as a global dynamical property, in contrast with the poor performance of conventional Artificial Neural Networks. In this presentation, after a compact review of our quantum model for numerosity perception, we discuss how the designed open quantum network can be extended to other important phenomena, in fact working as a quantum toolbox for neurobiology sensory systems. First, we will focus on the integrated perception of space, time, and numbers, known to be inter-dependent with each other, and bridge the time perception capability of our quantum network with the concept of quantum time crystal. Then, we will explore how the possibility that our quantum network can work as a memory system with especially high storage and retrieval capacity, along the lines of Dvali's idea [G. Dvali, arXiv:1711.09079v1]. Finally, we will mention the model's traits if the quantum network was complex, i.e. with irregular and/or random links, thereby more closely resembling the connectivity structure of a real brain. We close the presentation by envisioning how this quantum toolbox can be physically implemented by means of a quantum technology platform.

C - 15

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A novel model to help conceptualize propagation of light and other quantum field phenomena with ramifications regarding ephaptic signaling, physics of thoughts, and related fields.
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Abstract
This presentation introduces a groundbreaking model that utilizes the concept of "motes" — hypothetical quantum entities. This reconceptualizes the propagation of light and other quantum field phenomena, with profound implications for ephaptic signaling, the physics of thought, and related fields. By integrating motes into our understanding of quantum mechanics, we propose a new framework where light, traditionally seen as waves or particles, could also be conceptualized through these quantum motes, potentially influencing biological systems at a fundamental level. We explore how motes could be pivotal in ephaptic signaling, offering a novel perspective on how neurons might communicate beyond traditional chemical or electrical means. This model posits that motes could facilitate quantum coherence among neurons, providing a mechanism by which thought processes and consciousness might emerge from quantum interactions. The presentation delves into theoretical physics to illustrate how motes could bridge quantum field phenomena with biological processes, drawing parallels from quantum biology where quantum effects are already observed, such as in photosynthetic processes or enzyme activity. We discuss how this motes-centric approach could revolutionize our understanding of neural operations, suggesting that quantum mechanics might be integral to the complex, non-linear dynamics of brain function. We further examine the philosophical and practical implications of this model, considering its potential to reshape neuroscience, cognitive science, and even the broader field of theoretical physics. The introduction of motes not only challenges existing paradigms of neural communication but also opens new research pathways into the nature of consciousness and thought. The abstract concludes by proposing future research directions, advocating for an interdisciplinary approach involving physicists, neuroscientists, and cognitive scientists to explore, validate, and expand upon the mote model, aiming to unlock new insights into the quantum underpinnings of biological systems and cognition.

PO - 1 (Mon)

Keywords
Quantum mechanics, quantum fields, ephaptic signaling, physics of thoughts, quantum waves and oscillations, propagation of light

438

Correlates of qualia in microtubule ‘time crystal’ dynamics
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.02].....Quantum field approaches

Abstract
Qualia are the basic instances of subjective conscious experience, but their origins and how they combine into full, rich consciousness are unknown. Conventional electroencephalography (‘EEG’) etc. have failed to reveal correlates of qualia. EEG detects brain activities (‘waves’) up to a few hundred hertz, but we now know coherent self-similar (‘triplets-of-triplets’) oscillation patterns occur in faster kilohertz, megahertz, gigahertz and terahertz frequencies (‘DoDeconoGraphy, for 12 orders of frequency). These fractal dynamics derive from collective resonance oscillations of microtubules inside brain neurons, with megahertz in particular being easily detectable from scalp in humans. Megahertz triplets between 6 and 26 MHz appear to be functionally important, disappearing under general anesthesia. The fractal-like temporal behavior indicates microtubules act as ‘time crystals’, systems whose dynamics repeat at various scales, suggested in biology in the 1960s by Art Winfree, in physics in 2012 by Frank Wilczek, experimentally shown in physics recently, and in microtubules by Bandyopadhyay et al over the past 12 years. Time crystals are dynamical systems deconstructed into their component oscillators expressed as spherical clocks whose sizes are inversely related to frequency, and which may align, couple, interfere and resonate to give geometric expressions analogous to music. In a clinical study, human subject volunteers were asked to imagine specific qualia-like feelings. DDG frequencies taken under these emotional/qualia states were then analyzed as time crystals, combined/entangled and consolidated geometrically to map qualia on a hexagon-of-hexagon framework showing their relations. Microtubule time crystal behavior would be very useful for life and consciousness,supplying quantum computing, unifying and temporally organizing, encoding memory and transcending scales. It would require quantum coherence and entanglement among intraneuronal microtubules, consistent with the Orch OR theory of consciousness in which orchestrated objective quantum state reductions are instantaneous collapses of the quantum wavefunction (as Penrose fluctuations in fundamental spacetime geometry), like notes and chords across musical scales. Metaphors aside, Orch OR has more explanatory power, biological connection and experimental validation than all other theories of consciousness combined.

PL-6

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Is light sentient - recent experiments showing it being affected by anaesthetics show that it could be
Michael Gulley Master Engineering Science
UNSW, Sydney, NSW, Australia

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[04.03].....Space, time and the nature of reality

Abstract
Is it possible for entangled photons to meet the definition of being alive? Anesthetics are known to affect all forms of life to the extent that the famous physiologist Claude Bernard concluded in 1874 “that all life is defined by the susceptibility to anesthesia”. The question could be asked “can light also be affected by anesthetics?” Two of the most significant mysteries in science are the mechanism of anesthetics to induce unconsciousness and the collapse of the quantum wave function. The two problems are linked together by the mystery of consciousness. Research in the field of Orchestrated objective reduction theory (Orch OR), originally proposed by Nobel laureate Roger Penrose and anesthesiologist Stuart Hameroff, looks to bring these two problems together by implying that consciousness arises out of the collapse of quantum wave functions in microtubules. Recent related experiments by Burdick RK, Villabona-Monsalve J P, Mashour GA and Goodson III T show that anesthetic ethers interact with entangled photons. Therefore entangled photons would be defined as being alive, according to Claude Bernards definition.

PO - 1 (Mon)

Keywords
Consciousness, panpsychism

192

The Geometric Theory of Consciousness: Resolving Fundamental Paradoxes Through Five-Dimensional Framework
Wojciech Krzykwa MSC
Independent researcher, Olsztyn, Warmińsko-Mazurskie, Poland

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.03].....Space, time and the nature of reality

Abstract
Contemporary physics faces three persistent challenges: the measurement problem in quantum mechanics, the hard problem of consciousness, and the apparent conflict between free will and determinism. These seemingly separate issues share a common root—attempting to understand consciousness from within three-dimensional frameworks. The geometric theory of consciousness proposes a resolution by recognizing consciousness as a fundamental fifth dimension of reality rather than an emergent property of complex systems. The framework demonstrates how consciousness naturally operates through two distinct reference points: three-dimensional awareness, which operates within spacetime and perceives separation, and five-dimensional awareness, which transcends spacetime and enables direct resonant knowing. This duality precisely mirrors the wave-particle nature of quantum systems, providing a geometric resolution to the measurement problem. When consciousness observes from within spacetime, it collapses quantum possibilities into specific manifestations, described mathematically as: $\Psi(x,t) \rightarrow |x_0\rangle$ through $P: H \rightarrow H_3$, where P represents the consciousness projection operator mapping from the complete Hilbert space to a three-dimensional subspace. This operation describes how consciousness selects a specific three-dimensional slice of reality from the complete quantum possibility space. The theory's most profound contribution lies in its resolution of the free will paradox. The mathematics of reference point selection: $S = D(M^3, M^5)$, where S represents reference point selection, D is the dimensional shift operator, and M^3, M^5 represent three- and five-dimensional manifolds, reveals how consciousness maintains perpetual freedom to choose its dimensional position. This geometric freedom transcends both deterministic causation and random chance, explaining both the experience of choice and the apparent constraints of physical causality. The framework makes specific, testable predictions about consciousness-quantum interactions. It suggests that highly coherent states of consciousness should maintain quantum superposition longer than standard decoherence models predict, and that collective meditation could measurably influence quantum random number generators. In biological systems, the theory predicts enhanced coherence in cellular networks during states of unified awareness, offering new insights into the role of consciousness in biological organization. Most significantly, the framework reveals fundamentally different energy dynamics between consciousness modes. Three-dimensional consciousness, operating through separation, inevitably consumes more energy than it generates. In contrast, five-dimensional consciousness demonstrates the capacity to generate more energy than it consumes through cooperative field resonance, suggesting new approaches to sustainable energy technologies and the design of systems that enhance rather than deplete their environment. The practical implications of this theory are vast, ranging from quantum computing to consciousness-based

technologies. By understanding how consciousness naturally maintains quantum coherence, new architectures for quantum computers could transcend current decoherence limitations. The framework's insights into consciousness-matter interaction open possibilities for direct mental interfaces, enhanced energy generation systems, and new approaches to artificial intelligence that incorporate consciousness as a fundamental component. Could this geometric understanding of consciousness provide the missing link between quantum mechanics and gravity, finally unifying physics through the inclusion of consciousness as a fundamental dimension? The theory's mathematical precision, testable predictions, and broad explanatory power suggest it might, opening unprecedented possibilities for scientific advancement and technological innovation.

PO - 1 (Mon)

Keywords
consciousness, quantum mechanics, geometric theory, five-dimensional framework, wave function collapse, quantum coherence, consciousness field tensor, energy dynamics, unified field theory, free will

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Process Physics - Three Inter-related Theorems: 1. The process-emergent theory of space 2. The interference-delimitation theorem of matter 3. The time-consciousness equivalence principle
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University of Sussex, Brighton, Sussex, United Kingdom

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[04.03].....Space, time and the nature of reality

Abstract
The universe is conceptualised as being reduced to ongoing processes in time, rather than as time, space, matter / objects and energy. 1. The process-emergent theory of space posits that the 3 geometrically orthogonal dimensions of space are emergent properties of sets of events (processes) in 3 mathematically orthogonal dimensions of universal time. For universal time to be consistent with special relativity (and general relativity), the theorem posits that clocks don't measure time but instead measure the rate of events in time. Thus, time dilation is not actually slowing of time but slowing of the rate of events. This theorem is consistent with distance collapsing to zero at 'c' in special relativity and also with the collapse of space to zero volume in black holes in general relativity. The theorem necessitates separating space-time into quantised space, emerging from events occurring in a continuum of universal time. This may provide a new approach for unification of quantum mechanics with special and general relativity, 2. The interference-delimitation theorem of matter posits that what we conceive of as electron orbitals, atomic nuclei, atoms, molecules etc, as well as what we perceive as everyday macroscopic objects of matter, are emergent from fringes produced by constructive interference of oscillating quantum fields, with conserved outcomes (symmetry) through time; and delimited into separated objects by destructive interference. Collapse of the wave function is not required. The indistinctness of fringe margins may be equivalent to Heisenberg's uncertainty. Motion is the relative movement of the ongoing temporal patterns of 'objects'. 3. The time-consciousness equivalence principle is that physical time in the universe is analogous to consciousness and that events/processes in the physical universe (some of which emerge as space itself and as objects of matter) are equivalent to the contents of consciousness ie thoughts in a mind. Correspondences between time and consciousness include: the impossibility of defining either in terms of anything else (fundamentality); continuous uninterrupted flow; the impossibility of being measured or observed directly; directionality; being a medium for change & actualization; unifying events & thoughts (respectively) into coherent entities; and necessity for existence to have meaning. Deriving space, volume and location purely from time and events, removes the Cartesian res extensa; and the time-consciousness equivalence principle provides a conceptual framework for regarding the universe as a mind, thus uniting Eastern idealist philosophies with Western physicalism and potentially solving the hard problem of consciousness.

PO - 1 (Mon)

Keywords
Process Philosophy, Physics, Idealism, The Hard Problem of Consciousness, Time, Special Relativity, Quantum Mechanics

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Time, Space and the Persistence of Memory
Nestor F. Mercado M.Eng
Timewave, Scottsdale, AZ, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.03].....Space, time and the nature of reality

Abstract
Modern physics provides elegant descriptions of time, space, and matter, yet it overlooks a fundamental aspect of reality: memory. General relativity models spacetime as a smooth continuum, while quantum mechanics treats wavefunctions as evolving in an abstract Hilbert space. However, neither framework explains how the universe structurally retains information across scales, enabling persistence, coherence, and recall. This omission leaves a critical gap in our understanding of both fundamental physics and the nature of consciousness. We argue that spacetime shares many of the properties of a, time crystal composed of Planck-scale nodes—discrete units of vacuum energy that form a resonant network across the fabric of reality. These nodes, which we call nests, are not mathematical abstractions but physical structures regulating energy and information flow through time-dependent potential gradients. Within this framework, the spacetime crystal lattice is not a passive stage but a dynamic self-organizing natural system distributing information and energy through its underlying principle of resonance. This perspective is supported by : Gm_p/l_p = c^2 = 1/ep_0*mu_0 which suggests that gravity and electromagnetism are intrinsically linked through the same vacuum field structure at the Planck scale where nests themselves are field packets of quantized vacuum energy discrete structures underpinning both gravitation and gauge fields. We propose that microtubule dynamics are directly linked to the fundamental structure of spacetime, such that when biological systems synchronize with these oscillations, quantum coherence is stabilized beyond classical expectations. This synchronization bridges the physics of life and cognition with the resonant architecture of spacetime, suggesting that consciousness itself arises from phase alignment with fundamental physical processes. Within this framework, microtubules are not merely quantum systems requiring wavefunction collapse but phase-coherent oscillators synchronized with spacetime's intrinsic resonance. Time emerges as a phase shift, and quantum states stabilize through phase locking rather than stochastic collapse. Cognition, memory, and awareness arise from persistent resonance dynamics, positioning biological systems as extensions of a self organizing spacetime crystal, where information is never lost but continuously structured. Fourier analysis of simulated microtubule oscillations reveals dominant frequencies at 4.77 MHz and 7.16 MHz, closely matching experimental resonance data. Additionally, spacetime oscillations exhibit resonance peaks between 34 MHz and 289 MHz, forming a structured harmonic hierarchy. Some of these frequencies align with integer fractions of Planck-scale oscillations, suggesting a fundamental coupling between biological systems and spacetime's resonant architecture. If spacetime encodes information through structured resonances, then the quantum coherence observed in biological systems particularly in microtubules—may not be a strictly local phenomenon but rather an emergent interaction with the "field of fields"—a fundamental feature of the Spacetime Crystal, where all energy and information resonate as part of a unified harmonic structure woven into reality. This perspective has direct implications for Orchestrated Objective Reduction (OrchOR), reinforcing the idea that microtubules sustain quantum coherence beyond classical limits. If correct, this suggests that resonance is the bridge between, quantum mechanics, and information theory—an organizing principle that may underlie not just life, but the very structure of the cosmos itself.

C - 16

Keywords
Orchestrated Objective Reduction (Orch OR), Spacetime Continuum, Memory in Spacetime, Nonlinear Phase Relationships, Memory in Spacetime, Quantum Coherence, Quantum Biology

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The Cosmology of Consciousness
Dan McAran DBA
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.04].....Cosmology and integrative models

Abstract
It is proposed to integrate life and consciousness into physics through the concepts and mathematics of entropy and information theory; information is inversely related to entropy. The paper follows on the observation by Schrödinger that life functions through negative entropy. The implicate order of David Bohm, as the explicate order unfolds, can be conjectured as entropy flow. In this proposal the appearance of negative entropy systems (life) would not be an anomalous event but intrinsic to cosmology and part of the dynamics of the universe starting from the Big Bang. This approach can be viewed as a variation of the anthropic principle that asks what entropic reality is consistent with life and consciousness. Further, this approach can be conceptualized as a physics centric interpretation of dual-aspect monism. The entropy associated with human life would be high information entropy (Shannon entropy) corresponding to low Boltzmann entropy. A first approach would be the measurement of the information of negative entropy systems and to relate this measurement to the entropy found in the universe. Proposed calculations for the information entropy of human life, consciousness and society are presented, as well as proposals for relating these estimates to measurements of entropy currently found in physics, providing a preliminary mathematical relation between physics, life, and consciousness. Human consciousness creates information through language and thought. The information content of the internet is used as a proxy of the information (negative entropy) created by human consciousness and an estimate of the information content is provided. This value is then compared to an estimate of the

entropy of the background radiation of the universe and the entropy of a super massive black hole making the entropy of consciousness part of the physics of the universe. In addition, an analogy is made to white holes. Life can be conceptualized as an event horizon, with consciousness as the singularity in this structure creating an information white hole. Using this analogy, a dynamic can be conjectured - a consolidating field conceptually similar to gravity - driving an increase in complexity, creating information, life and consciousness. From the concepts developed and the basic estimates provided, the most significant prediction is the continued development of more complex life forms, the increased development and complexity of consciousness, and the creation of information on a cosmological scale. Consciousness would not be the sole result of natural selection, but would be the part of cosmological development based on yet to be defined field. Future research could develop a mathematical model (perhaps symmetries/conserved quantities) of the dynamics of negative entropy, gravity, stars, light, life, consciousness with a goal of developing an integrated cosmology in which consciousness is to the lowest entropy system (the highest information system). This can be seen as teleological.

PO - 1 (Mon)

Keywords
David Bohm, Dual Aspect Monism, Entropy, Information, Schrödinger, White Hole

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Bringing to Life Quaternion and Octonion Pairs Entangled by Symmetry in Discrete-Time
Bernd Binder
QUANICS, 89182, BW, Germany

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.05].....Emergence, nonlinear dynamics and complexity

Abstract
Our central algorithm [1] - uses a cross vector product with (split-)algebra encoded in 3d and 7d, which are discrete quaternions and octonions, respectively, - generates a new vector state with a time-delay recurrent autonomous 3rd order function from the last three vector states (an orthogonal Frenet-Serret FIFO memory frame), - supports a special symmetry, where the difference between the first and the third state is orthogonal to the second state, - is a discrete model of a nonlinear Landau-Lifshitz spin-magnetism dynamics of rotating electromagnetic point densities, which are drifting limit cycles with sub-cycles breaking a time-translation symmetry attracted by time-periodic self-organizing structures (pulsating time crystal states), where these vortex-like textures of magnetic moments resemble Skyrmions. Usually, we get by this complexity an uncountable variety of discontinuous, nonlinear, complex, and dynamic phenomena, where we can have multiple bifurcations, limit cycles or periodic solutions and co-existence of trivial attractors (fixed points or limit cycles) and strange (chaotic) attractors. But obviously, the symmetry is acting against chaos supporting special quantum states with cybernetic character. We discuss some variants showing highly "vivid" orbital or helical states with spontaneous transitions and emissions with quantum properties at the edge to chaos. In combination with reflection (alternating sign) we get spatially separated opposite "charged" or polar entities or states that instantaneously interact across vast distances, which could be a model of quantum entanglement. The Frenet-Serret approach, which can be related to general relativistic and electromagnetic field properties defines local torsion and curvature parameter. At special parameter we find a sharp transition (with hysteresis) between orbital modes with spherical symmetry to tube-like and long range radial modes with cylindrical symmetry. We get a high computational dynamics in realtime, which can be presented audiovisually on a standard computer (see and listen to [2], #DACOP, https://www.youtube.com/watch?v=uUZpsbWG77g). The algebra is compatible with advanced quantum descriptions, it models with higher dimensional dot & cross vector product operations discrete dynamics in Clifford algebras and spinors, projective geometry with Hopf fibrations and Lorentzian geometry, Jordan algebras, and the exceptional Lie groups - with many applications in quantum physics and relativity. A quantum Consciousness approach beyond the quantum level is in this context given by: - discrete non-local signal reflection jumps entangling polar pairs across vast distances - quantum self-awareness by a minimum memory constituting a local co-moving frame in the relativistic sense - spontaneous transitions and emissions between quantum states at the edge to chaos and quantum information processing by non-linearly related spinor states building a conscious electromagnetic information field - one global limit cycle has multiple sub-cyle states so there is another global connection - filtering by resonant excitations jumping discretely in quantum channels preferably in spherical orbitals or helical rings forming symmetric pattern - the dynamic states are capable of moving, growing, and responding to external stimuli - a local cybernetics based on a local (inertial) frame with orthogonal components embedded in a global context. [1] Bernd Binder, ``(Split-)Quaternion and (Split-)Octonion Dynamics in Discrete-Time Recurrent Frenet Frames", Philsci-Archive, https://philsci-archive.pitt.edu/23842/, (2024) [2] Bernd Binder, "Discrete Autonomous Chaotic Orbital Pattern", #DACOP, https://www.youtube.com/watch?v=uUZpsbWG77g, (2023)
C - 16

Keywords
Discrete, Frenet, Octonion, Quaternion, Reflection, Cycles, Waves, Modular, Symmetry, Quantum, Cybernetic, Spin, Spinor, Electromagnetic, Entanglement, Pairing

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The Visibility of the Invisible: An Operational Probabilistic Theory (OTP)-inspired Approach to the Contextuality and the Intentionality of Complex Biotic Systems.
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.05].....Emergence, nonlinear dynamics and complexity

Abstract
Complex biotic systems are known to evolve unpredictably, with living organisms transforming environments and exhibiting intentional behaviour. This links their physical "exteriority", i.e. via observable and measurable aspects, with the "interiority" of acquisition and elaboration of information. The latter is associated to the inner experiences of comprehending (meaning) and decision-making (volition, will), which are not directly accessible, through sensing or other objective probing. We assert that the interplay between observable physicality and inner states increases the complexity of the system. We propose a mathematical framework to explore the relationships between observable, 'visible', and unobservable, 'invisible' aspects of complex biotic systems. Our modelling is grounded in the formalism of quantum information in physics, as it has been extended by the recent Operational or Generalised Probabilistic Theory (OPT/GPT). Our framework provides a comprehensive description of the relationship between information and action, emphasising the connection between possibilities (states) and observables (measurements). Furthermore, adopting an OPT-based description it highlights the crucial role of contextuality in processes that mediate cause-effect relations, unveiling their substantial aspects of inherently non-linear and non-local interconnections. We draw from physical sciences and contemporary discussions to posit that consciousness and cognition exist in a ‘relational space’ beyond physical space-time. Our theory, as a generalised probabilistic theory, it encompasses the information framework of quantum physics. It is based on a highly organised field of interconnected elements with nested hierarchies. We discuss the relevance of our theory to "quantum cognition" and propose experimental tests for verification. The present approach is compatible with and supports the three prominent, recent hypotheses concerning the quantum-informational nature of consciousness. The first of these is the 'Orch-OR' theory by Hameroff & Penrose [1], the second is the work by Kauffman & Roli on 'quantum mind & qualia' [2], and the third is the work by d'Ariano & Faggin on the 'hard problem & free will' [3], in which the OPT framework was firstly utilised. This research constitutes a progression of earlier presentations at the Science of Consciousness Conferences in 2022 and 2023 [4,5]. It provides further developments and clarifications for the experimental verification and analysis of phenomena described in those initial presentations[4,5], such as the end-of-life prominent consciousness-state transitions in clinical research [6,7]. Moreover, the present study makes a substantial contribution to the field of non-local consciousness correlates in biotic complex systems, particularly in terms of consciousness state transitions, as outlined previously in these general theories[1,2,3]. This refinement has the potential to delineate, distinguish or complement these three prominent theories in the domain of consciousness studies, and even to assist in further advancing a synthesised understanding of these theories.

PO - 3 (Wed)

Keywords
intentionality, panpsychism, complex systems, non-local correlations, organizational closure.

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Tidal-Drift Communication: Inertia and Entropy in Adaptive Multi-Layered Networks
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Rhythm and density, Zurich, 7310, Switzerland

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.05].....Emergence, nonlinear dynamics and complexity

Abstract
This work introduces the Tidal-Drift Communication model, a framework describing how information propagates through multi-layered systems via intermittent “entry points,” where distinct strata transiently couple. Integrating nonlinear dynamics, entropy-driven processes, and inertial stability with observations from physics, biology, and synthetic networks, it posits that layered structures — from molecular to geophysical — exhibit communication patterns driven by interactions at energetic interfaces (e.g., thermal, mechanical, electromagnetic). To illustrate these principles, we draw on three representative examples. First, microbial chemical signaling in cellular systems and engineered consortia demonstrates how interactions are selectively gated by environmental or metabolic cues, creating rhythmic bursts of chemical exchange rather than continuous signalling. Second, structured signal propagation between distinct

neuronal layers shows how temporal signals decay locally but reemerge at distal interfaces. Finally, advances in volcanic energy research illustrate how mechanical and thermal gradients in volcanic environments act as transient interfaces for energy and information transfer. Core to this model is the idea that inertia and entropy jointly shape signal evolution. Inertia provides stabilisation — manifesting in enzymatic or thermal-mass buffering — while entropy introduces variability and drives long-term reconfiguration. These processes create “tectonic” architectures in which semi-autonomous layers operate independently but exchange information through staggered interfaces, enabling signals to decay locally yet reemerge distally at nonlinear junctions. By integrating concepts from dissipative structures, bacterial communication, and emerging multilayer network theory, the Tidal-Drift model unifies substrate-agnostic observations — chemical signalling in microbes, neural-tissue connectivity patterns, and piezoelectric energy harvesting in volcanic stress gradients — to argue for a generalizable, cross-domain mechanism of communication. This model reframes signalling as an intermittent, residue-driven process, suggesting a scalable mode of information flow across gradients of propagated multi-scale heterogeneity that transcends conventional, continuously coupled networks. Future directions involve quantifying transient “entry points” using Shannon information and employing a minimal stochastic model of two intermittently coupled oscillators to track how signals “drift” across scales. Field experiments are underway to test the Tidal-Drift Communication model in extremophile plants, monitoring chemical, magnetic, and electromagnetic signalling pathways to validate these transient coupling points and entropy-driven information flow mechanisms. By systematising cross-domain evidence, this approach seeks common principles of intermittent signals in natural and synthetic networks alike. By abstracting principles from natural phenomena, this framework offers a unifying perspective on how intermittent synchronisation and multi-scale temporal dynamics drive information flow in layered, non-equilibrium systems.

PO - 1 (Mon)

Keywords
cellular, communication, geophysics, complex systems, information, substrate-neutral

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Putting It Altogether: Criticality, Multiscale Competency & The Panpsychist Combination Problem
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.06].....Hierarchies, scale-invariance and 1/f systems

Abstract
Once considered radical, panpsychism has become an increasingly popular position, suggesting that consciousness is a fundamental property of the cosmos — permeating entities across all spatiotemporal scales, from subatomic particles to celestial bodies. From a critical perspective, the most sizable challenge for this view is the Combination Problem: How do microexperiences of smaller entities mechanistically integrate into macroexperiences of larger bodies? This dilemma may find its resolution in critical dynamics, whereby complex biological and natural systems poised between order and chaos exhibit scale-free behavior. This presentation builds on last year’s talk, which explored a highly underrated mechanism in the brain that appears to help resolve three longstanding consciousness-related conundrums: (1) the Hard Problem, (2) the Binding Problem, and (3) the Problem of Anomalous Experiences. Briefly, astrocytes — a type of glial cell — have been shown to regulate the three specific conditions that Joachim Keppler deems necessary for quantum coherence to form in cortical microcolumns in the zero-point field theory (TRAZE), posited as a solution to the Hard Problem. As reported in many different peer-reviewed studies, astrocytes are also interconnected across the entire brain and spinal cord to form a “functional syncytium” that is able to act as a single unit, address large-scale goals, and share information collectively between cells — which may help to alleviate the Binding Problem. And by managing uptake and release of glutamate and GABA and by synchronizing neuronal excitability through fast and slow calcium signaling applied at subcellular, single-cell, and network levels, astrocytes play a crucial role in tuning excitation-inhibition balance — the control parameter for criticality — strongly correlated with altered states of consciousness, meditative practices, mystical and anomalous experiences, and psychedelic states. Extending this unorthodox framework, this presentation highlights astrocytes’ unique attributes with respect to coordination of conscious activity and overall brain function across many different scales. It positions critical dynamics as a solution to the panpsychist combination problem from both a philosophical and mechanistic standpoint, showing how astrocytes support long-range integration and facilitate the conditions required to sustain a mobile, metastable region of gamma synchrony — scaffolded by slower-frequency oscillations — which has been proposed as a correlate of consciousness. It postulates that “transliminality” — i.e., person-to-person variations observed in the ease with which unconscious material can cross the threshold into conscious awareness — may directly correlate with interindividual differences in brain phase relative to criticality, offering an initial experimental protocol to test one of its central predictions. It further illustrates the wide-reaching implications that this model seems to have for assorted forms of neurodivergence and psychopathology, psychedelic therapy, psychospiritual development, and frame-by-frame generation of perceptual moments of normal wakefulness. Far from negating the respective roles played by neurons, electromagnetic fields, microtubules, and other mechanisms presumably found at every level of the nested hierarchy of consciousness, astrocytes collaboratively serve to coordinate rhythmic activity on many different timescales, ranging from tens of milliseconds to days. As proposed, the ASTRO model — short for “Astrocyte Syncytium Transliminality & Resonance Orchestration” — highlights an adaptable mechanism of multiscale coordination, which could fundamentally reshape our understanding of consciousness.

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Keywords - Panpsychism, Combination Problem, Hierarchical Consciousness, Criticality, Scale Invariance, 1/f Systems, Transliminality, Altered States of Consciousness, Complexity, Quantum Theories of Consciousness, Humanistic Psychology, Transpersonal Psychology

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Hyperdimensional Computing as a Framework to explore the Binding Problem
Austin Nafe
Indiana University, Bloomington, IN USA

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[04.07].....Logic and computational theory

Abstract
The binding problem refer to how different features of an object are represented using distinct brain circuits. This information is somehow recombined for a single object representation. Hyper dimensional computing offers a new framework for study of the binding problem. Large binary hyper vectors are ideal for multimodal representation of a single object. This is similar to multi feature representation of single objects in the binding problem but allows us a novel approach for quantizing cognitive processes. PO - 3 (Wed)

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Proving Penrose: Introducing Consciousness Logic for Determined Indeterminacy
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.07].....Logic and computational theory

Abstract
Cogito (“I think, therefore I am”) demonstrates a different logical ontology than Tarski’s Undefinability Theorem, prohibiting deterministic Tarskian AI from natively digitizing consciousness and making digital free will impossible. Tarskian logic cannot prove truth without a meta level. Cogito logic, however, has its truth proofs all at the same level of “I”. Addressing this, we create a single-level Gödelian logic gate. First, addressing self-reference in naive set theory: set $S=\{x|P(x)\} \wedge \forall x(x\in S\rightarrow P(x))$, avoids Russell’s Paradox as R fails $x\in S\rightarrow P(x)$ and isn't in R. Next, we set $S4=\{x|P(x)\} \wedge \forall x(x\in S4\rightarrow P(x))$; where $P(x) = [P1(x) \vee [[\neg(Prov(x)=true) \wedge \neg(Prov(x)=false)] \wedge x\equiv\neg P1(x)]] \wedge x\equiv x$. Testing G, we set P1(x)=”Provable” and set $G=\neg P1(G)$. S4 sees G is defined as $\neg P1(G)$, therefore, G cannot have property P1(G). By Gödelian meta-logic, if G: (a) claims identity of $\neg P1(G)$; (b) has property of $\neg P1(G)$; and (c) $\neg P1(G)$ is undecidable, then G is true, $G\equiv\neg P1(G)$, and G_identity≡G_property. S4’s innovation is expressing G’s undecidable properties as $\neg P1(G)$ syntax. Since Gödel proved this equivalency logic, S4 determines $G=\neg Prov(G)$ true at S4’s object level, without expressing Prov(G). Whereas Gödelian numbers aren’t expressive enough to objectify $\neg P1(G)$ (stuck in indeterminacy until meta-logic), S4 permits such reification of the negative property. Thus, S4 algorithmically processes the $G=\neg Prov(G)$ truth of the First Theorem with consistency. Regarding the Halting Problem, $P1(x)=(Run\vee Halt)$, $Q=\neg P1(Q)$: a category/ontology mismatch for Q and the perfect halting predictor. With regards to the phenomenology of consciousness, we take Maharaj’s non-dualistic concept of total negation as our benchmark. We define P1(x) as being a member of universal set of all identities. We then create O_w to represent the negation of all identities and show that it is admitted to SR4. Thus we are able to meta-mathematically represent the non-dualistic concept of consciousness by proving the truth of a state of non-representation logically. Regarding quantum mechanics, S4 can simulate the resolution of the EPR paradox: P1(x)="x is determined from info" and $x_particle=\neg P1(x_particle)$=”I am not determined by info”. Like G, by Gödelian logic, S4 proves x_particle indeterminate and true. If x_particle models a waveform, since a waveform by definition has no classical information, it’s not determined by information, and thus must be logically determined without information in entanglement and EPR. Like G, x_particle shows determination by logic (truth) to be different from determination by information (proof).

PO - 1 (Mon)

Keywords
Gödel's theorem, Penrose, AI, computation, consciousness, quantum mechanics, Witness

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Brain Coherence and Loss of Which Way information.
Uziel Awret MS
Inspire Institute, Alexandria, VA, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology

Abstract
'Quantum brain' theories that aim to relate aspects of consciousness to quantum processes in the brain must explain how large-scale macroscopic entanglement can persist in the warm brain for biologically relevant duration (biological quantum supremacy). Its fair to say that current attempts to explain such large-scale entanglement, from dipole-dipole interactions between aromatic molecules to entanglement between caged free radicals, face problems and that we should search for new ideas, especially ones that can attribute such massive entanglement directly to the unique complexity of the brain. We are in the midst of a scientific revolution that brings together QFT, Condensed Matter Theory, Quantum Complexity, Quantum Computation, Black Hole Thermodynamics, massively entangled many particle systems, Exotic phases of matter where information is more fundamental than spacetime and profound Dualities that relate the constitution of space to the quantum. Is it possible that these huge Hilbert spaces give rise to complexity bounds that cannot be exceeded? Can 'complexity at the limit give rise to massive entanglement? Is there a way, which we don't fully understand, to directly attribute putative massive brain entanglement to the unique hierarchically-nested complexity of the brain? A speculative, but elegant, way of doing that appeals to: Putative 'Simple' new Principle – Extend the principle of 'Loss of Which Way Information' (LWWI) central to coherence (Hanbury, Brown, Twiss) and entanglement in quantum optics(Delayed choice, quantum eraser) to complex, hierarchically nested, many particle systems with distributed local measurement devices. Extended LWWI principle - it is sometimes theoretically impossible to determine the causal firing history that caused the firing of a given neuron. Complexity based LWWI may cause a neuron's input to seem coherent (as if it came from a 'single' source). Such neurons could generate 'tight' clusters in which all members receive input in small enough time-windows to generate LWWI, especially in recurrent resonant networks. Here you don't add all the causal histories that can cause a given neuron to fire but only the indistinguishable ones. Note that such neurons can figure in their own causal histories (Malach, Rafi). To imagine 'Spontaneous Small World Networks' begin with a large randomly interconnected collection of neurons (millions), gradually raise the membrane potential to increase neuronal firing. Assume that neuronal firing is stochastic but that the arrival of a small number of inputs in a small-time window raises the firing probability. This can result in tight small world recurrent networks of neurons 'self-chosen' to get their input in increasingly small windows. A bit like vortices and Le Chatelier principle. Such sparse 'small world' networks form an efficient NCC explaining Rafi Malach's (Weitzman Institute) results showing that consciousness persists up to two seconds after 'reverberation' has stopped. A 'brain entanglement' theory based on summing indistinguishable causal firing histories results in the entanglement of the NCC. I will end by attempting to relate such LWWI in small recurrent networks to loops of 'delayed choice quantum erasures' whose 'loop-period' is smaller than their erasure time and Seth Lloyd's CTC like quantum circuit that combines teleportation with post-selection.

C - 10

Keywords
Quantum measurement, Loss of which way information, coherence, resonance, IIT, causal histories, brain entanglement, conformal entanglement, AdS/CFT, Lloyd, delayed choice quantum erasure, recurrent processing, CTC, small world networks, time-windows, STDP.

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Non-invasive Aquaphotomics Study For Understanding the Effect of Body Psychotherapy Through Real Time Measurement of the Body Water Molecular Matrix
Prof. Roumiana Nikolova Tsenkova Dr.Eng., Dr. Agr.
Kobe University, Kobe, Hyogo, Japan

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology

Abstract
Non-invasive Aquaphotomics Study For Understanding the Effect of Body Psychotherapy Through Real Time Measurement of the Body Water Molecular Matrix R. Tsenkova Aquaphotomics Research Field, Kobe University, Japan rtsen@kobe-u.ac.jp Aquaphotomics is a

new multidisciplinary science, technology and educational platform where water molecular system with its three - dimensional structure and dynamics is described as multifunctional system. Water being H2O, but not “just H2O” is a highly dynamic molecular system of dipoles that connect to each other forming various structures, i.e. being able to perform various functions adjusting to the environment with speed in the femtosecond range. Water is the ultimate laser light source because of its coherence and three - dimensional oscillating structure causing light transmittance, scatter, refraction, etc. It is the ultimate optical sensor as it is the only substance that absorbs light with frequencies covering the whole electromagnetic spectrum and all sound frequencies as well. The analysis of its real time spectral patterns data shows that with its network flexibility, decoherence and coherent oscillations water plays a role of a scaffold that can synchronize other elements of the rest of the system. At the same time, water is a highly sensitive probe that mirrors the surrounding matter and energy by restructuring which makes it the ultimate sensor providing immense information for the rest of the system and the environment. Water is a self-regulating system that reassembles in order to keep the balance between its “working” part and the “battery” part, all of them coherent in pure water. Water in a system has specific spectral patterns related to decoherent structures, too. In Aquaphotomics, discrete water frequencies and respective water structures have been discovered. The frequencies are called “letters”. Various water structures are presented by spectral pattern based on combination of activated frequencies called “words”. The visual presentation of the light absorbance spectral patterns related to respective water functionality is called aquagram. In the talk, aquagrams of non-invasive monitoring of human body’s water spectral dynamics and “before and after” various types of group meditation will be presented and discussed.

C - 15

Keywords
non-invasive monitoring, meditation, water spectral pattern, aquaphotomics, water coherence

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What our brain can teach us about building the next generation of quantum computers
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"Carol Davila" University of Medicine and Pharmacy, Bucharest, Bucharest, Romania

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology

Abstract
Although initially debated, quantum mechanical effects are now known to play important roles in the human brain in processes such as consciousness, memory, and cognition. Because of its wet, warm, and noisy environment, the presence of nontrivial quantum effects sparks questions about what mechanisms the brain employs to maintain quantum coherence in such unusual circumstances. Additionally, the energy efficiency and speed of information processing of the brain instigate a closer look into the peculiarities of neuromorphic computing. In this presentation, I would like to highlight some of the ways in which the brain processes information, as well as how we could draw inspiration from the brain to build the next generation of powerful, scalable, and efficient quantum computers. I will present 3 major hallmarks of neuromorphic information processing: 1. The brain uses both classical and quantum information processing and they are interdependent. The interplay between different modalities of information processing such as spin-based quantum processes in microtubules that regulate ionic flow through the membrane and thus axonal firing rate (Singh et al.), and electron transport in the mitochondria that creates reactive oxygen species (Murphy et al.) that generate biophotons (Pospíšil et al.) which are paramount in intracellular signaling between neurons.(Tong et al., Sun et al.), allows for highly parallel information processing. 2. The brain is phenomenally resourceful. As stated above, not only is mitochondrial metabolism coupled to intracellular signaling by way of photons, but the photons might play a double role, in classical, back-propagation based learning (Zarkeshian et al.), as well as in distributed quantum computing (Rodney et al.), connecting multiple spin-based qubits in microtubules (Hameroff et al.) that perform local quantum operations. Another hallmark of the brain’s resourcefulness is that the entangled biophotons generated in the myelin sheath (Liu et al.) might be used for Measurement-Based quantum computation as well as for classical intracellular signaling (Liu et al.) 3. The brain employs nested layers of protection to ensure functional robustness. This includes the “Quantum Underground”, exploiting non-polar pockets in proteins (Craddock et al.), scale-invariant hierarchies (Saxena et al., Sahu et al.), as well as possible topological protection in the helical pathways formed in microtubules (Hameroff et al.). Also, the quantum Zeno effect has been shown to provide robustness to the avian biochemical magnetic compass used for navigation, protecting it from the effects of dipolar interractions (Dellis et al.). Gaining a better understanding of the aforementioned biological processes, will give us a glimpse into how to build scalable, efficient, and powerful room-temperature quantum computers based on brain-inspired information processing principles, that will in turn allow us to better understand ourselves.

PO - 2 (Tues)

Keywords
quantum computing, neuromorphic information processing, photonic quantum computing, measurement-based quantum computing, quantum coherence

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Exploring Quantum Effects in the Brain: Linking Theory to Experiments
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology

Abstract
Quantum biology, an interdisciplinary field exploring how quantum phenomena like superposition, tunneling, and entanglement influence biological processes, is shifting from theoretical speculation to experimental validation. Emerging evidence suggests quantum effects play a role in biological systems, from superposition enhancing energy transfer in photosynthesis to tunneling influencing enzymatic reactions and DNA mutations, and spin entanglement aiding migratory birds' navigation. These discoveries have far-reaching implications for medicine, renewable energy, and our understanding of life's complexity. However, as quantum perspectives challenge traditional biochemical models and face experimental limitations in complex biological environments, they remain controversial. This debate is particularly intense in the study of quantum mechanisms in the brain. Moving beyond classical models of chemical and electrical neuronal signaling, quantum approaches could transform neuroscience by advancing diagnostics, treatments, and our understanding of cognition, behavior, and consciousness. Theories propose that spin-based and optical quantum mechanisms may contribute to brain function, but without experimental validation, they remain speculative. Here, we examine these theoretical models considering existing experimental evidence, exploring both their potential role in brain function and the challenges of demonstrating their biological relevance. Addressing these challenges will be key to determining whether quantum processes underpin neural activity or only remain theoretical possibilities.

C - 11

Keywords
quantum biology, quantum brain, quantum optics, quantum coherence, nuclear spin, magnetic isotope effects

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The dendritic decoupling hypothesis of anesthesia
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology

Abstract
Despite almost two centuries of clinical use, how general anesthetics reversibly suppress consciousness remains elusive. In the 2022 TSC meeting, I presented the evidence that anesthetics disrupt the functional coupling between distal and proximal segments of cortical pyramidal neurons, suggesting this decoupling could underlie anesthesia (Suzuki & Larkum, 2020). We have previously shown that perception is intimately associated with activating the apical dendrites of the large layer 5 pyramidal neurons that complete the thalamocortical loop (Larkum, 2013; Takahashi et al., 2016 & 2020). The disruption of signalling from along the apical dendrites of these neurons under anesthesia (and by metabotropic receptor blockers) therefore constitutes a candidate mechanism for loss of consciousness. In this presentation, I will show in vitro data confirming that metabotropic receptor activation strengthens dendro-somatic coupling, while anesthetics weaken it. Moreover, disrupting the microtubules extending through the apical shaft also reduces dendritic influence on the cell body. These findings strengthen the view that dendro-somatic coupling is central to cortical feedback and may be the key to understanding how anesthetics block conscious processing.

PL-9

Keywords

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Does Physics Need a Revolution to Explain Life, Living Systems, and Consciousness?
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.08].....Quantum brain biology

Abstract
Our current physics was primarily developed in the 20th century, in the context of inanimate matter and closed reductionistic systems, that operate at (or near) equilibrium. Living systems are, however, fundamentally open systems that operate far from equilibrium and are strongly coupled to and continuously exchange matter, energy, and information with their environment. Einstein, Schrodinger, and Penrose have argued that our physics (especially quantum mechanics) is perhaps missing some new physical principles to provide a more complete description of reality. I will share some of our work at Nanobiosym to elucidate this “new physics” using a new conceptual physics framework and a novel experimental testbed to probe nanoscale quantum effects in biological systems, such as nanomachines that read and write information in DNA.

PL-10

Keywords
new conceptual physics framework, nanoscale quantum effects in biological systems, nanomachines, DNA, quantum mechanics

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Instantaneous Memory Accession via Quantum Geometrodynamic Networks
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.09].....Biophysics and coherence

Abstract
The biological basis of memory storage and retrieval has conventionally been understood through computational frameworks based on binary encoding. Here we present a novel mechanism for memory processes based on quantum geometrodynamics in biomolecular electrodynamics, where the discrete structure of spacetime as a quantum entangled network underlies physical processes of temporal-spatial coupling in biological systems. This coupling occurs through collective quantum coherence of interacting dipole resonators, which has a geometrodynamic network architecture of spacetime coordinates connected via Einstein-Rosen bridge topologies, where information is superficially encoded in the quantum entangled network of voxel oscillators but is fundamentally accessible acausally via the continuous multiply connected spacetime geometry. The mechanism is demonstrated through theoretical modeling of dipole oscillator coupling in benzene ring structures throughout subcellular systems, including microtubules and DNA polymers. We find this characteristic coupling accurately predicts observed quantum coherent states in biological macromolecules and enables hybrid analog-digital information processing. These findings describe a fundamentally new paradigm for biological memory storage and retrieval that does not rely on classical computational encoding but rather on direct spacetime geometric information accession, which is effectively quasi-instantaneous or acausal and hence fundamentally non-computational. This suggests that biological memory systems may be more sophisticated and fundamentally different than previously understood, with significant implications for our understanding of consciousness, memory, time and the development of novel computing architectures. The proposed mechanism is supported by existing empirical observations and offers testable predictions for future experimental verification.

PL-3

Keywords
Quantum Biology, Quantum Coherence, Quantum Entanglement, Quantum Geometrodynamics, Quantum Electrodynamics, Microtubules, Memory, Quantum Computation, Retrocausality, Nonlocality

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Medical biometrics based on Gas Discharge Visualization technology approach to survival research: A case study
Dr. Raul Valverde PhD[1,2], Dr. Konstantin Korotkov PhD[3], Mr. Chet Swanson MS[2]
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.09].....Biophysics and coherence

Abstract
Medical biometrics based on the gas discharge visualization (GDV) technique is used in medicine to monitor patients and compare their natural electro-photonic emission before and after surgeries, cancer treatments, energy healing and physiotherapy. Previous findings using GDV have shown that it can monitor a transition from a disease state to a normal functional state. GDV is based on electrical activity in the human organism. The GDV is based on the bioenergy model, which is compatible with the Penrose-Hameroff 'Orch OR' model. The "Survival Hypothesis" asserts that a person's personality and consciousness survive the physical death of the body. This research aims to use GDV to identify the psychoemotional functions of a person using fingertips. These psychoemotional functions are linked to the personality of the individual. The research presents an interrelationship between human psychology and the bionenergy model, and how it aligns with the Myers-Briggs Type Indicator (MBTI) personality traits that is a framework to analyze human personalities. As part of this study, we measure the personality of one case study by measuring the psychoemotional functions using GDV before death. We then measure these psychoemotional functions after death and compare them to test the survival of personality hypothesis. The research employs a novel approach to survival research by using the energies proposed by the bioenergy model instead of the traditional approach of using EEGs to analyze brainwaves. The bioenergy model shows that non-local consciousness is connected to the body through bioenergy fields that can be measured in the physical body using GDV technology. When the body dies, these bioenergy fields remain connected to the body for a period that is still unknown. In a 2014 experiment with GDV technology on people who had died, the observed levels of energy reduced over time. This proves the hypothesis that the non-local consciousness remains linked to the physical body several days after death. In this study, we used GDV technology to measure personality before and after death under the assumption that bioenergy fields are still linked to the body after dead. Preliminary results show the potential of this technology to prove the survival of personality hypothesis. While the conclusions are not significant enough due to only one sample being used, the objective of the research is to propose a new framework for understanding human consciousness.

C - 22

Keywords
Survival hypothesis, GDV, Bioenergy model, psychoemotional measurements, Near death studies.

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Quantum Coherence in Consciousness: The Potential Role of Glycoconjugates, Membrane Microdomains, and Aqueous Solvent Dynamics
Dr. Thomas E Klepach PhD
Colby College, Waterville, Maine, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.09].....Biophysics and coherence

Abstract
Recent advances in quantum neurobiology suggest that macromolecular quantum processes may play a foundational role in conscious experience. Central to this hypothesis is the role of the aqueous solvent in supporting and propagating quantum coherence at physiological temperatures. Within this framework, the sequestered water in the microtubulin lattice has been proposed as a quantum-coherent reservoir. However, for intercellular propagation of quantum states, additional mechanisms must exist. Hameroff and colleagues have highlighted dendro-dendritic gap junctions as potential conduits for the intercellular transfer of quantum state information, yet the specifics of this process remain elusive. If quantum coherence extends across syncytial neuronal networks, the confluent cytoplasmic and periplasmic spaces must facilitate this propagation. These syncytial Hebbian assemblies have been implicated in generating the 40 Hz gamma synchrony observed in electroencephalograms (EEG) during conscious states, including meditative practices. Previous research by Adey and collaborators demonstrated a correlation between extremely low frequency (ELF) EEG activity and the biophysical properties of acidic glycolipid components in neuronal membranes. This abstract advances the hypothesis that the glycosylated components of neuronal glycoconjugates play a critical role in the stabilization and propagation of

quantum states. Saccharides, with their dense hydroxyl substituents, are uniquely suited to dynamically modulate local solvent structure through their hypermobile conformational properties. These perturbations may encode biological information via induced solvent architecture reconfigurations. Specifically, acidic membrane microdomains enriched in cerebrosides from globo- and ganglio-series glycolipids create pericellular Debye layers stabilized by loosely bound Ca^{2+} counterions. Such domains are hypothesized to support coherent reorientational dynamics, akin to wave patterns generated by wind over a field of wheat. These dynamics may promote Bose-Einstein condensate-like behavior within the pericellular space. I will review the empirical and theoretical evidence supporting these claims and provide insights from recent research on the conformational and dynamic properties of saccharides. By integrating quantum biological principles with the structural biophysics of neuronal membranes, this work seeks to further illuminate the potential quantum underpinnings of conscious experience.

PO - 2 (Tues)

Keywords
quantum neurobiology, consciousness, quantum coherence, microtubules, aqueous solvent dynamics, glycoconjugates, saccharides, membrane microdomains, gamma synchrony, dendro-dendritic gap junctions, Bose-Einstein condensates, neuronal networks, Hebbian assemblies, acidic glycolipids, pericellular Debye layers, electroencephalograms, quantum biology

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Unified Conscious Field Theory and the Biophysics of Visualization
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Hyperstition Incorporated, San Francisco, CA, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.09].....Biophysics and coherence

Abstract
A novel theory of consciousness is proposed whereby human brains consist of two adjacent and electrically coupled types of computing networks: a probabilistic Turing-complete synaptic computer, and, a non-Turing quantum mechanical computing network sustained by the superconducting microtubule lattice inside pyramidal neurons. This satisfies the requirement for making observations in quantum mechanics which is an entangled detector with memory. Resistive junctions between microtubules form Josephson junctions such that the nervous system is capable of a broad range of detection, amplification and broadcast of radiofrequency signals beyond non-Turing computational abilities. It is proposed that the neurons transmembrane ion potential acts as the effective coupling mechanism between the two computing networks and provides a reserve of Shannon entropy to enable learning of visualization. This theory is used to re-interpret the experience of people suffering from mental illness by including the premise that experiences are valid indicators of reality under the principle of empricism. An experiment is outlined to test this theory along with implications for longstanding unresolved questions from human experience and philosophy included in the appendices.

C - 11

Keywords
visualization, cytoskeleton, measurement, learning, neural networks, manifestation, intuition

440

Searching for objective fingerprints of subjective experience, down to biomolecules
Nicola Galvanetto
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.09].....Biophysics and coherence

Abstract
In this poster, I present statistical analyses of biomolecular motions that mirror the scale-free distribution of words in human knowledge production—distributions that encode more than just information. Humans—and particularly those attending this conference—are acutely aware of their own consciousness, which manifests through subjective experience. They often communicate this experience through written text, which can evoke similar experiences in others. A central question remains: is this experience solely a property that

emerges from the brain, or does it extend further down the biological hierarchy? Down to the cellular level—or even to biomolecules? I show that human knowledge production, brain activity, and biomolecular motion all follow patterns tending toward power laws. This leads me to speculate that such behavior may go beyond self-organized criticality. Just as humans convey meaning through symbol sequences governed by these statistical laws, perhaps the same distributions observed in protein motion hint at a rudimentary form of subjective experience—even at the molecular level.

PO - 3 (Wed)

Keywords
Subjective Experience, Consciousness, Power-Law Distributions, Protein Dynamics, Semantics

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Evolution of plants: A perspective based on information vortex theory
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.10].....Origin and nature of life

Abstract
The Information Vortex Theory (IVT) [1] posits that during abiogenesis, the spatially distributed wave energy of molecules of an incepting cell interacts with the fabric of reality, generating a rotating biofield and subsequently forming a vortex. The inbound and outbound energy fluxes of this vortex represent signal reception and dispersal, initiating information storage, and with incremental wave superpositions, exhibit information processing, thus establishing memory and sentience in biological systems. The fabric of reality in IVT is, “space as a continuum of internal energy with quantum fluctuations” akin to Wheeler’s space foam conception. In evolution, the first appearance of fundamental biological functions namely sensation, motion, nutrition, and reproduction are described in IVT as signals (perturbations of specific modulation in amplitude and or frequency generated in bio-information field), induced by environmental interactions, reaching vortex. Sensation: External forces, such as atmospheric air pressure acting on the cell membrane, trigger distinct signals. Locomotion: Gravity-driven motions in/of cytoplasm trigger distinct signals. Reproduction: Gravity-induced localized slips in the cytoplasmic matrix lead to local shear and in turn rupture (cell division), triggering distinct signals. Nutrition: Nutrients diffuse through the porous cell wall, where biochemical reactions release energy and trigger distinct signals. Additionally, while in motion, a protist incidentally glides over another, resulting in the entrapment of a decomposable hydrocarbon chain. These events (1) incidental entrapment and (2) the decomposition generate signals that reach the information vortex, ultimately forming the memory basis for feeding behaviors. If the cytoplasmic matrix's motion is physically constrained by its environment, such as being suspended in a highly viscous substrate, movement becomes restricted, leading to a loss of viability for entrapment-based feeding. In this stationary state, the cell must rely on two primary mechanisms for energy: (1) active osmosis across the cell membrane and (2) energy processing from sunlight, provided the cell possesses molecular structures that facilitate photosynthesis. During this state, if osmosis and photosynthesis continue to occur, the signal recurrence associated with these processes increases exponentially in the cell's information vortex, while signals related to motion and entrapment diminish. Consequently, the information vortex ceases to propagate response signals associated with movement or predatory intent, instead perpetually transmitting signals focused on nutrient absorption and photosynthetic activity. Simultaneously, cell division proceeds independently, supported by the memory registry already established within the vortex. Over time, this multiplying cell complex, characterized by an information vortex with a high signaling rate for osmosis and photosynthesis, alongside a diminishing capacity for motion and entrapment, gives rise to plant life. To demonstrate mathematically, principles of signal superposition and vorticity are used to compute the energy flux density of the vortex. Scenarios of increasing and decreasing signaling rates are then modeled. Additionally, a system dynamics model is developed, capturing the relationships between entities and functions, along with the interventions that lead to emergent outcomes. The likely emergence of this information vortex characteristic during Earth’s purple phase, subsequent adaptations post-great oxygenation, and possible extraterrestrial origins of biomolecular reactions (based on Murchison meteorite findings) that establish bio-information field are discussed.

C - 5

Keywords
Information vortex, Bio-information field, Origin of life, ORCH-OR, Quantum foam

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1 5 3 God Made Me: The Amazing Hidden Structures in the Genetic Code
Colin S. Morrison

University of St Andrews, St Andrews, Fife, United Kingdom

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.10].....Origin and nature of life

Abstract
In 2013 two Khazak scientists by the name of Vladimir shCherbak and Maxim Makukov published a set of extremely design-like numerical patterns they had discovered in the genetic code behind all of life on Earth. They argued that the existence, consistency and statistical significance of these strange patterns in the most durable construct known proves that life on Earth was seeded by an advanced extraterrestrial civilisation. However, they also argued that the capacity of the genetic code to carry an artificial signal was fully used up encoding those patterns. In my book '1 5 3 God Made Me: The Amazing Hidden Structures in the Genetic Code', I point out that this latter claim is based upon the very reasonable assumption that extraterrestrials would utilise the amino acids and coding structures in life-forms known to them. However, if the encoder were not so restricted, the potential information-carrying capacity would be far greater than envisaged – limited only by chemical constraints on the range of possible protein-building molecules. As evidence for such an encoder, I detail a vast range of design-like structures of a statistical significance that far surpasses those of shCherbak & Makukov that are found in the same arrangements of the genetic code where they found their astonishing surface features. In examining their amazing exact balance of 999, and their threefold exact balance of 333 in the same arrangement, a property of the difference of 153 between the sidechain weights of the nonpalindromic and palindromic codons on the other side of that arrangement led me to an algorithmic key revealing a subsurface level of encoding. That key is very simple and elegant. Prompted by the fact that 153 is the sum of the cubes of its own digits, I added the cubes of the digits of the totals (362, 214 and 423) opposite the three 333s and got 423, the sidechain weight of the palindromic subgroup. Doing the same with all six subgroup totals yielded 666 (the total sidechain weight of the nonpalindromic codons in the opposite half – the first two 333s). I then tried adding the squares of the digits instead, and got answers that were just as correlated with the surface totals. The squared-digit total of all eight subgroup totals including the two 999s, for example, was another 666, while the sum of the squared digits of just the six subgroup totals was the same as the difference between the cubed-digit totals of the separate sets of three, and also the sum of those of the two subgroups of palindromic codons. These results emerge from the most obvious sets of subgroup totals the arrangement exhibits, so there is no arbitrariness. The sum and difference between cubed digits and squared digits seems also to have been utilised. Like the cubed-digit total and squared-digit total, it also provides a pair of operations that are intuitively opposites of each other, allowing the encoder to confirm an encoded result by an equally surprising opposite output. The design-likeness of the structures that emerge is mind-blowing.

C - 5

Keywords
153, genetic code, artificial, extraterrestrial intelligence, SETI, omniscience, cipher, cypher

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Information encoding in nucleic acid sequences: A perspective based on bio-information field vortices
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.10].....Origin and nature of life

Abstract
1. Background. The origin of genetic material in early life remains inexplicable. Hypotheses like the RNA or pre-RNA world, and ‘metabolism-first’ explore pathways to self-replicating biomolecules but fail to link abiogenesis to genetic material fully. Early genomes must have encoded information from cytoplasmic or membrane signals, yet they neither directly interact with external prompts nor play a role in sensory signal acquisition. This raises questions about how genomes function as system-level memory. This work proposes bio-information field vortices as a complementary perspective to biochemical theories on genome emergence. 2. Nature of reality [1]. Analogous to Wheeler’s concept of spacetime foam, space can be understood as a continuum of energy, oscillating at Planck-scale vibrations. Variations in energy-pressure gradients within this continuum give rise to localized peaks, which fragment into numerous discrete quanta. These quanta, subjected to persistent energy-pressure pulsations, coalesce into clusters that form the so-called fundamental particles. The pulsations acting on these particles induce rotational motion, characterized by specific degrees of freedom. Owing to the spin velocity, quanta from the outer regions of the forming cluster tend to escape radially. However, this escape is constrained by the internal energy of the continuum, resulting in the formation of a quantum field around the particle. 3. Origination of bio-information field with vortices [2]. During abiogenesis, an emerging cell—a matrix of molecules composed of fundamental particles—naturally gives rise to a radially propagating field of massless quanta. Constrained by the energy of the surrounding

ubiquitous continuum, this field acquires rotational motion, forming a vortex. Perturbations in this field, such as those triggered by chemical reactions during abiogenesis, generate waveforms. These waveforms, or simply signals, constitute the fundamental information format of a biological system. These waveforms traverse the field and converge at the vortex, establishing this localized energy maximum as a repository of information. 4. Genome emergence. Analogous to quantum field theory, which describes fundamental particles as excited states of a field, this framework treats the fundamental particle as a system of densely packed quanta and an encompassing quantum field. The quantum field of nucleic acid precursor molecules in the prebiotic soup interacted with a signal repository, the vortex of the aforementioned bio-information field, undergoing energy transfer. This interaction, involving mechanisms like constructive interference and superposition between the vortex signals and the quantum field of nucleic acid molecules, represents a primitive form of information encoding. This process resulted in the emergence of the first biosystem-level hard memory, the genome. Memory and sentience, the building blocks of consciousness in biological systems, arise from signal storage and interference within the vortex of the bio-information field. 5. Systems model and computational approach. The systems model developed, connects chemical processes in an emerging cell, signal storage in the vortex, and encoding as hard memory. Using classical wave theory, a unitary waveform of massless energy $E\phi(r,t)=E0\sin(kr+\omega t)$ is introduced under vorticity conditions. The resulting expression is superposed with quantum field waveforms of the vortex molecular complex.

PO - 1 (Mon)

Keywords
information vortex, genetic material, abiogenesis, bioinformation field, space foam

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The Science of Quantum Biology and Its Implications for Consciousness
Prof. Dante S Lauretta Ph.D.
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.10].....Origin and nature of life

Abstract
Quantum biology is an emerging field exploring the role of quantum mechanical principles—coherence, entanglement, and superposition—in biological systems. While classical biochemistry has successfully explained many life processes, growing evidence suggests that quantum effects may play a nontrivial role in molecular and cellular functions, particularly in the brain. Understanding these quantum influences is essential for advancing our knowledge of consciousness, cognition, and the fundamental nature of life itself. Recent research indicates that quantum coherence in biomolecules may contribute to biological information processing. One area of focus is the cytoskeleton, particularly microtubules, which provide structural support in neurons and facilitate intracellular communication. Microtubules contain aromatic amino acids such as tryptophan, which exhibit unique quantum optical properties. Studies have suggested that superradiance, excitonic energy transfer, and quantum coherence in tryptophan networks could enable efficient energy transport and contribute to cellular signaling and cognitive function. Using high-resolution spectroscopy, Förster resonance energy transfer (FRET), and computational modeling, researchers are investigating whether these quantum processes provide an additional layer of biological information storage and processing beyond classical biochemistry. Another critical area of investigation is the quantum nature of anesthesia. Empirical evidence shows that anesthetic potency can vary depending on the nuclear spin of xenon isotopes, suggesting a potential quantum effect in neural activity suppression. This challenges conventional models of anesthesia, which assume purely biochemical interactions. Studies employing multi-electrode arrays, high-resolution NMR spectroscopy, and spin resonance techniques are examining how quantum coherence in neural proteins and lipid membranes might influence consciousness states. These findings could lead to a deeper understanding of how quantum mechanics contributes to brain function and perception. The implications of quantum mechanics extend beyond individual cognition to biological evolution and the origins of life. A growing body of research suggests that quantum effects in nucleic acids and amino acids may have played a role in molecular self-organization and early evolutionary complexity. The indole ring of tryptophan, for instance, possesses quantum properties that may have facilitated non-classical information processing in prebiotic chemistry. Additionally, theoretical models incorporating quantum complexity theory propose that evolutionary processes could be driven by quantum information dynamics, accelerating biomolecular adaptation and functional diversity. From a technological perspective, the integration of quantum biology into applied science is opening new frontiers. Advances in quantum-enhanced biotechnologies, neuromorphic computing, and bio-inspired quantum sensors offer promising avenues for medical and environmental applications. By leveraging biomolecular quantum coherence, researchers are developing novel biosensors and computational architectures that could revolutionize fields such as neuroscience, pharmacology, and artificial intelligence. The convergence of quantum mechanics, molecular biology, and neuroscience represents a paradigm shift in how we understand life and consciousness. By moving beyond classical descriptions of biology and integrating quantum principles, researchers are uncovering new mechanisms of cognitive processing, novel insights into the origins of life, and revolutionary applications in technology. As experimental techniques advance, the science of quantum biology has the potential to reshape fundamental theories of consciousness and redefine our understanding of the living world.

PL-10

Keywords
Quantum Biology, Coherence, Cytoskeleton, Complexity Theory, Evolution

420

Computational capacity of life in relation to the universe
Dr. Philip Kurian Ph.D.
Quantum Biology Laboratory, Howard University, Washington, DC, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.10].....Origin and nature of life

Abstract
Networks of tryptophan – an aromatic amino acid with strong fluorescent response – are ubiquitous in biological systems, forming diverse architectures in transmembrane proteins, cytoskeletal filaments, sub-neuronal elements, photoreceptor complexes like UVR8, virion capsids, and other cellular structures. We analyzed the cooperative effects induced by ultraviolet (UV) excitation of several biologically relevant tryptophan mega-networks, thus giving insight into novel mechanisms for cellular signalling and control. Our theoretical analysis in the single-excitation manifold predicted the formation of strongly superradiant states due to collective interactions among organized arrangements of up to more than 100,000 tryptophan UV-excited transition dipoles in microtubule architectures, which leads to an enhancement of the fluorescence quantum yield that is confirmed by our steady-state experiments [1]. Preliminary femtosecond UV transient absorption results indicated superradiant state lifetimes of no more than a few picoseconds, consistent with our predictions. We demonstrated the observed consequences of single-photon superradiant behavior in the fluorescence quantum yield for hierarchically organized tubulin structures, which increases in different geometric regimes at thermal equilibrium before saturation – highlighting the effect's persistence in the presence of significant disorder. Contrary to conventional assumptions that quantum effects cannot survive in large biosystems at high temperatures, our numerical results [2] suggest that macropolymer lattices of tryptophan in actin filaments and amyloid fibrils exhibit increasingly observable and robust effects with increasing length, due to quantum coherent interactions in the single-photon limit. Superradiant enhancement and high quantum yield in neuroprotein polymers would thus play a crucial role in information processing in the brain, the development of neurodegenerative diseases such as Alzheimer's and related dementias, and a wide array of other pathologies characterized by anomalous protein aggregates. Our results motivated a revisiting of the computing limits of cytoskeletal and neuronal architectures [3], which are generally considered to signal via Hodgkin-Huxley action potentials (~millisecond) rather than via superradiant states in such tryptophan lattices (~picosecond). The latter would allow information-processing pulses or bursts at orders of magnitude faster speeds than exascale supercomputers, at significantly lower power consumptions, by operating within two orders of magnitude of the Margolus-Levitin quantum speed limit for UV-excited states. The robustness of superradiant states paired with subradiant states (~second) in these protein architectures thus offers a novel paradigm for understanding the role of large collectives of quantum emitters in warm, wet, and wiggly environments.
REFERENCES [1] N.S. Babcock, G.M.-Cabrera, K.E. Oberhofer, M. Chergui, G.L. Celardo, and P. Kurian. Ultraviolet superradiance from mega-networks of tryptophan in biological architectures. Journal of Physical Chemistry B 128, 4035–4046 (2024). [2] H. Patwa, N.S. Babcock, and P. Kurian. Quantum-enhanced photoprotection in neuroprotein architectures emerges from collective light-matter interactions. Frontiers in Physics 12, 1387271 (2024). [3] P. Kurian. Computational capacity of life in relation to the universe. Science Advances 11, eadt4623 (2025).

PL-10

Keywords
quantum biology, superradiance, subradiance, protein architectures, biological qubits, ultraviolet, tryptophan, quantum emitters, Margolus-Levitin speed limit, computational capacity of life, quantum computing, quantum information processing, origins of life, habitable zones, cosmology, observable universe

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When was the first conscious animal born?
Professor Gary Comstock Ph.D.
North Carolina State University, Raleigh, NC, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[04.11].....Consciousness and evolution

Abstract
I assume an animal is conscious if it can feel pain. Vertebrates can feel pain, and they first appeared about 500 million years ago. But invertebrates, who may or may not feel pain, appeared at least 100 million years before vertebrates. Did consciousness occur first, then, in animals without backbones? Outlines of a tentative answer are emerging from behavioral biology, evolutionary neuroanatomy, and cognitive science. If we assume Information Integration Theory (IIT), then pain, necessarily a conscious state of mind, cannot arise unless an animal integrates and broadcasts discrete, complex, and multi-modal sources of nociceptive information. While scientists observing decapods report arguable pain-like behaviors in some individual animals, their observations must be interpreted in light of a theory of pain. IIT is such a theory, and has two requirements for pain, differentiation and integration. Some individuals in one of the two suborders of decapods, the pleocyamata (lobsters, crabs, crayfish, and “true shrimps”), have structures and processes that appear to meet these requirements. Individuals in the other suborder, the dendrobranchiates (henceforth: “prawns”), appear not to have the requisite structures and processes. Might some shrimp be conscious while others are not? To answer this question we need a measurement of the amount of information that must be integrated in order to produce pain, and a measurement of the information integrated by decapod brains. By producing computer generated animals called animats, IIT produces testable propositions about when an animal’s neural system is sufficiently developed to be capable of more than nonpainful nociceptive behavior. Evidence suggests lobsters, crabs, and true shrimps are candidates for a high “Φ” value (Φ is IIT’s measure of consciousness). Markedly, the absence of similar nociceptive behaviors and advanced neural structures in dendrobranchiates suggests a low Φ value for them. It appears some decapods are capable of consciousness and some are not. I argue here that the evidence for acute pain and, therefore, consciousness in some animals (who, by nature, are non-reporting), is exactly as strong as the argument for acute pain in some humans who are non-reporting. Sentient invertebrates, if there be any, who cannot speak to us about their pain must only meet the standards for pain as must humans who cannot speak to us about their pain. Humans lacking cortices appear to have sufficient brain complexity to experience negative emotional responses to adverse nociceptive stimuli. They can hurt. By parity of reasoning, crustaceans lacking cortices but possessing similar levels of brain complexity can hurt, too. Anatomical and behavioral criteria suggest some invertebrates have minds—and some do not. A philosophy of mind informed by evolutionary neuroscience working with an influential theory of consciousness suggests that one decapod suborder meets the criteria for acute pain whereas the other suborder does not. If that’s right, then an invertebrate marine animal may have been the first to experience pain. And, if that’s right, consciousness might first have appeared in a Late Ordovician sea, a result with significant implications for the scientific study of consciousness.

PO - 3 (Wed)

Keywords
scientific study of consciousness, evolutionary biology, vertebrate animals, invertebrate animals, sentience, pain, nociception, 500 million years ago, Information Integration Theory, brains, animats, cortex, lobsters, crabs, shrimp

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Neuro-topological constraints on the early evolution of consciousness: Bow-tie sensorimotor architecture as a prerequisite for sentience
Marc van Duijn PhD
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[04.11].....Consciousness and evolution

Abstract
Based on recent advances in evolutionary biology and comparative neuroscience, this paper develops the claim that sensory consciousness or ‘sentience’ evolved in bilaterian phyla as a consequence of implementing a specific neuro-sensorimotor architecture. This thereby explicates the structural and functional prerequisites for conscious sensory experience based on an evolutionary organization principle that is often found in complex biological regulatory systems: ‘bow-tie’ architecture. This type of organization is ubiquitous in biology because it optimizes network connectivity and facilitates a wide variety of phenotypical states, thereby conferring robustness and evolvability. In this paper, it is argued that sensory consciousness evolved as a specific instance of this optimization principle, fostered by the evolution of cephalized nervous systems, increasingly complex multicellular morphologies and advanced sensorimotor strategies during the initial phases of evolution when centralized brains first emerged. Bow-tie sensorimotor architecture optimizes trade-offs between the metabolic costs of neural wiring and phenotypic plasticity in the form of behavioral flexibility. This design feature is implemented in the nervous systems of different bilaterian phyla and throughout evolution and it was incrementally extended in more complex brains, leading to a hierarchical bow-tie architecture in the human brain that facilitates consciousness. The corollary to this hypothesis is that the presence of subjective states in organisms correlates with objective behavioral markers in the form of anticipatory context-sensitive behaviors that are predicated on the contingent sensorimotor experiences of an organism. The bow-tie sensorimotor architecture hypothesis dovetails with several leading theories on the evolution of consciousness but imposes additional biological constraints, as it anchors sensory consciousness in a specific neural network bow-tie topology.

C - 5

Keywords

Sensory consciousness, bow-tie sensorimotor architecture, sentience, brain evolution, anticipatory action-selection, sensorimotor coordination.

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Darwin, evolution, and consciousness: A Vedic perspective
Mr. Michael Cremo
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.11].....Consciousness and evolution

Abstract
Darwin proposed that variation occurs in the offspring of a reproducing organism. As evidence, he gave the example of people breeding new varieties of plants and animals by conscious, intentional selection. That is something we can directly see. He then asked that we accept something we cannot see—that unconscious, unintentional natural selection, eventually produces not just varieties but new species. Darwin struggled with identifying the physical transmitter of heredity. He proposed hypothetical entities called gemmules. In the modern evolutionary synthesis. DNA (and epigenetic factors) take the role of transmitting heredity. From the Vedic perspective, a living entity in this world has three components: a physical body made of the chemical elements, a subtle material mental body made of subtle material elements, and the nonmaterial conscious self (atma). The visible physical body is temporary. At death, according to the mental body's state, the atma gets an appropriate physical body. As long as the atma remains in the material world, it remains in contact with the same mental body, which varies continuously and carries heredity from embodiment to embodiment. In modern evolutionary biology the genome is the ever varying transmitter of heredity. What is the role of consciousness in selecting the lineal variants of organisms that according to Darwin eventually become discrete species. Darwin proposed natural selection, which does not involve conscious intent. Today, some scientists are invoking conscious selection as a replacement for natural selection, as shown by the title of a recent publication (Miller et al. 2024): "Biology in the 21st century: Natural selection is cognitive selection." However, the consciousness invoked is internal to the organism, not external to it as in intentional breeding. In the Vedic view, the continuously varying subtle material mental body reflects the states of consciousness of the atma, the nonmaterial self. If at the time of death the atma's state of consciousness, as reflected in the mental body, falls within a certain range, it receives a discrete gross material body adapted to that range. The whole array of discrete materially bodily forms is produced by conscious intention. Interestingly, the fossil record does not show a pattern of gradually changing forms but the appearance of discrete unchanging forms. Darwin wrote in Origin of Species (1859, p. 44), "No one definition (of species) has as yet satisfied all naturalists; yet every naturalist knows vaguely what he means when he speaks of a species. Generally the term includes the unknown element of a distinct act of creation." Darwin wanted to supplant this conscious act with his theory of natural selection. That left him with the problem of explaining the origin of mind (consciousness). In Descent of Man (1871, p. 100), he wrote that "in what manner the mental powers were first developed in the lowest organisms is as hopeless an enquiry as how life itself first originated. These are problems for the distant future." The future is here and so are the problems. . "

C - 5

Keywords
Darwin, evolution, consciousness, ;Vedic thought

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A neuroscientific perspective on studying extraterrestrial intelligence
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[04.11].....Consciousness and evolution

Abstract
As space exploration accelerates, the possibility of encountering extraterrestrial life requires us to revisit fundamental ideas about intelligence and consciousness. From a neuroscientific standpoint, many of our existing concepts revolve around species that possess a nervous system. Yet some organisms on Earth demonstrate forms of cognition—such as collective behaviour in social insects or distributed processing in certain invertebrates—without adhering strictly to traditional neural architectures. This raises the question of whether conventional definitions of intelligence are broad enough to encompass life forms that may not resemble familiar biological

models. Recognising extraterrestrial intelligence will demand sensitive methods, especially as our current instruments and frameworks are largely designed for human and animal studies. Approaches used to examine learning, problem-solving, and signs of awareness might be adapted to detect unexpected markers of intelligence in unknown species. In the same way we assess altered states and diverse cognitive abilities in humans, such techniques could be repurposed to interpret phenomena we have yet to encounter. There is also a wider concern about how intelligence relates to consciousness. Although these two concepts are often studied together, they need not always align. By applying lessons learned from neuroscience and psychology—where the mind is viewed as both embodied and shaped by environmental factors—we may gain insights into how intelligence could emerge under radically different conditions. Preparing for contact means not only developing methods to identify non-terrestrial intelligence but also establishing a framework to engage with it meaningfully. By examining how cognition is distributed across individuals and collectives on Earth, we can anticipate a broader spectrum of potential behaviours elsewhere. Ultimately, such studies may shape scientific and diplomatic responses if, or when, we encounter life beyond our planet. Through this synthesis of neuroscience, behavioural science, and an openness to the unknown, we may begin to lay the groundwork for a more inclusive understanding of intelligence and consciousness in the cosmos.

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Keywords
extraterrestrial intelligence, cognition, nervous system, research methods

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Interoception and the evolution of consciousness
Asier Arias Domínguez PhD, Prof.
Complutense University of Madrid, Madrid, Madrid, Spain

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[04.11].....Consciousness and evolution

Abstract
My presentation will be structured in three key sections: 1. First, I will provide a brief overview of the main models of the evolutionary emergence of consciousness. 2. Next, I will critically assess these models, considered as a partially unified whole. 3. Finally, I will propose a viable alternative that addresses the limitations identified in the current models. The main conclusions drawn from this discussion can be summarized in three points: 1. The available evidence suggests that consciousness is an analogous biological trait that may have independently emerged in three distinct animal phyla. There is compelling evidence of consciousness in some mollusks, arthropods, and, of course, vertebrates. There are, indeed, recent global assessments of the literature on consciousness in mollusks and arthropods. We will discuss this literature, emphasizing that the main models of the evolutionary emergence of consciousness assume that consciousness is the product of convergent evolution. 2. There are reasons to argue that these models make a mistake by treating these three independent instances of emergence in a homogeneous way, offering a single common explanation for all of them—there are, therefore, reasons to recommend adopting a token-by-token, phylum-by-phylum approach. Taking for granted that a single ecological intuition about relative fitness due to similar selective pressures can account for all three independent tokens of emergence is a strong assumption that requires a robust justification, as the presence of convergence by itself does not indicate that any particular influence has been acting on the evolutionary process. As of now, no one has provided such a justification; therefore, a prudent strategy would involve studying each of the three phyla independently, remaining open to the possibility of commonalities, but refraining from uncertain assumptions about them. Furthermore, the predominantly ecological, evolutionary mode of reasoning prevalent in the available models would be decisively enriched by integrating a neurophysiological theoretical perspective. An evolutionary account of the emergence of consciousness requires not just plausible speculations about functions and selective pressures, but also a path from physiological antecedents to effective mechanisms. As there is no reason for all particular instances of emergence in the phylogeny to share the same set of neurophysiological requirements, and as the disparity of neural substrates in the three mentioned phyla are more than conspicuous, it is once again more prudent to proceed phylum by phylum, remaining open to the possibility of deep physiological homologies, but refraining from uncertain assumptions about them. 3. As mentioned, an evolutionary account of the emergence of consciousness requires not only ecological theorizing about adaptive functions, but also neurophysiological theorizing about effective mechanisms. Available evidence suggests that the interoceptive theory of consciousness is well-positioned to meet both sets of requirements. Having argued for a phylum-by-phylum approach, I will conclude by outlining some key generalities of vertebrate comparative neurobiology, with the aim of sketching the rationale for the incorporation of the interoceptive neuroaffective framework into the discussion on the evolutionary origins of vertebrate consciousness.

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Keywords
interoception, evolution, affective neuroscience, evolutionary neurobiology

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Consciousness and Integrative Health: does the systemic integration of the quantum approach matter?
Prof. Maurizio Barbeschi PhD
IOMED, Lecce, Italy

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.12].....Medicine and healing

Abstract
It is time to aim our reflections towards the sketching of a Grand Theory, a set of unifying underlying assumptions, a (conceptual) reference framework that may encompass and harmoniously embrace the plethora of spaces in which the Consciousness studies are now blossoming into. From Consciousness and Reality, Consciousness and Brain Modulation, surfing through Consciousness and Quantum Biology/Measurement with a good measure of Evidence for Non-Local Consciousness and Extrasensory Perception and Quantum Fields and Consciousness. Several of these spaces have a direct impact on our body/mind wellbeing and its surroundings ergo, consequentially, on the patterns that bring to unbalances, diseases, outbreak and to related the medical studies aimed at prevent such unbalances – at clinical and public health level (both community and global). It can be argued that there is the conceptual need for a set of 'key considerations', that may lead to a preliminary set of commonalities among these – apparently – not directly overlapping spaces and field of studies. In several published papers in these fields, from consciousness studies to neuro/neural physiology, medicine and public health and integrated/traditional approaches there are often more similarities (undetected or not) than differences, even if often camouflaged by the technical 'dialects' of the specific field. Eventually, these commonalities ought to be organised and cast into a conceptual embryo of the Grand Theory of Consciousness and Quantum Medicine. Finally, in the literature it has been observed that the modus operandi of re-reading under a quantum approach and its related discourses becoming pervasive, fashionable and all-encompassing. Most of the best scientific minds of the planet are going in this direction and new directions are hence discovered, in so many fields and applications. This results in an even lauder call for a conceptual reference framework to be used by all players. It has been also argued (Penrose&Hameroff and others) that applying the principles of quantum physics by using, inter alia, visible frequencies/photobiomudulation (PBM) techniques to sustain the individual health, personal growth and to reach an ever-higher degree of consciousness Conspicuously, among may attempts to new contextual frameworks, the rather 'demodee' General Relativity, in its broader conceptualisation, has ventured in new pastures: A radical theory that consistently unifies gravity and quantum mechanics, while preserving Einstein's classical concept of spacetime, was announced on December 2023 by Professor Jonathan Oppenheim and other UCL physicists. (https://www.ucl.ac.uk/news/2023/dec/new-theory-seeks-unite-einsteins-gravity-quantum-mechanics). In summary, this paper will provide more organised questions than solutions: it will elucidate the methodology for the determination of key considerations among these research fields as well as initiating the compilation of the commonalities among the research spaces among consciousness studies, quantum biology and medicine, integrated and traditional medicine and limitrophic spaces. And will initiate the process of identification of the necessary elements that would be used for the development a model aimed at taxonomizing the Consciousness and Quantum Medicine field.

C - 14

Keywords
Consciousness, Body/Mind, Diseases, Photobiomodulation, Quantum Medicine, Integrative and Traditional Medicine

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Resolution of Brain-Based Consciousness as a Quantum Information Field
Prof.Dr. Mustafa Erol PhD
Dokuz Eylül University, İzmir, Turkey, Turkey

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
This work resolves the brain-based consciousness as an Open Quantum Information Field, created and influenced via the environmental sensory information and operating under the full control of quantum mechanics. The external sensory information, modelled as quantised electromagnetic waves, is assumed to feed the cortical neurons and eventually construct the brain-based consciousness Hamiltonian. Any external energy/information, instantly reaching to the Hamiltonian of brain-based consciousness, is taken into account as a perturbation. In order to obtain instantaneous wave functions and probability amplitudes well known time dependant perturbation theory is employed. Quantum field theory is finally used to resolve the overall brain-based consciousness and some important conclusions are underlined.

PO - 2 (Tues)

Keywords
Resolution of Brain, Quantum Information Field, Consciousness Hamiltonian, Brain Based Consciousness

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Quantum Consciousness Theory: A Framework for Multi-State Consciousness and Endocannabinoid System Modulation
Mr. Bosco Bellinghausen
Independent Quantum Consciousness Theorist, Munich, Bavaria, Germany

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
Quantum Consciousness Theory (QCT) proposes that human consciousness operates on quantum principles, allowing for simultaneous exploration of multiple realities and enhanced cognitive capabilities. Through spontaneous self-experimentation, the ability to experience three distinct physical activities (skiing, swimming, and running) concurrently while maintaining physical stasis was documented. This multi-state experience demonstrated complete sensory awareness across all states while remaining physically paralyzed. QCT suggests that the Endocannabinoid System (ECS) acts as a quantum gateway, modulating access to these simultaneous states of consciousness. This aligns with research on quantum processes in microtubules while offering new insights into the ECS's role in consciousness modulation. The theory proposes that conscious observation may collapse quantum states into classical outcomes, explaining why such multi-state experiences occur primarily during unconscious processing. This observation aligns with quantum mechanical principles and offers potential explanations for the paradoxical nature of quantum measurements. QCT challenges traditional models of cognition by suggesting that consciousness can simultaneously access multiple quantum states when operating in unconscious processing modes. It provides a framework for understanding how consciousness might operate at the quantum level while offering testable hypotheses for future research. As a scientifically naive observer, these experiences offer unique insights into quantum consciousness phenomena unbiased by prior theoretical knowledge, potentially bridging gaps between subjective experience and objective scientific inquiry.

PO - 3 (Wed)

Keywords
quantum consciousness, endocannabinoid system, microtubules, multi-state consciousness, quantum superposition, unconscious processing, quantum biology

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The Quantum Consciousness Effect: Manifestation, Feedback Loops, and the Engineering of Each and Every Reality.
Bil Bungay BA Hons
Velocity Group, London, Greater London, United Kingdom

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
While much attention has been devoted to exploring the origins and nature of consciousness through a quantum framework, less consideration has been given to its functional consequences—specifically, how quantum consciousness actively manifests both individual and shared realities. This presentation proposes that individual interpretations of reality are not passive reactions to external stimuli but are instead engineered by the subconscious mind operating within the probabilistic framework of quantum mechanics. Beliefs, self-perception, and expectations act as subconscious parameters, shaping the manifestation of unique personal realities. At the same time, these individual constructs converge to create “shared realities,” where collective beliefs and emotional inputs influence broader societal outcomes. The hypothesis examines how learned limitations confine individuals to a predominantly three-dimensional construct, while transcending these mental boundaries could allow for expanded possibilities, including phenomena traditionally regarded as miraculous or paranormal. Positive and negative emotional and cognitive inputs serve as feedback mechanisms, influencing corresponding manifestations and rippling outward from the personal-local to the collective-global on short to long-term time scales. By focusing on the “how” rather than the “why,” this framework explores the mechanisms by which quantum consciousness

interacts with the subconscious mind to engineer reality. The discussion will highlight potential alignments with existing quantum theories while emphasizing the pragmatic implications of consciously modifying subconscious parameters to enhance personal and collective manifestations. This presentation asserts that by understanding and influencing the feedback loops between quantum consciousness, individual perceptions, and shared realities, we can unlock new dimensions of human potential and societal evolution.

PO - 2 (Tues)

Keywords
Quantum consciousness, subjective reality, shared realities, manifestation, feedback loop.

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Quantum measurement problem, brain as a measurement device, and subjective experience
Dr Guruprasad Prakash Kadam PhD
Jaypee Institute of Information Technology, Noida, Uttar Pradesh, India

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
Philosophers and scientists have been exploring the role of quantum physics in consciousness. In this context, two schools of thought are prevalent: one proposes that consciousness plays a direct role in the wave function collapse; another suggests that it is the wave function collapse that might give rise to consciousness. The Latter proposal, due to Roger Penrose and Stuart Hameroff, is based on the possibility of quantum superposition that might exist in the special structures in the brain called microtubules. We propose that the brain with these microtubules in it is a measuring device with a special type of ready-state. When we observe something (via another intermediate measuring device(s), e.g Geiger counter), this brain-ready state changes to one or the other state depending on what is being observed and gets entangled with that observed state (via intermediate measuring device(s)). Conscious observers attach a precise meaning to distinct observations and that changed brain state is what we interpret as our subjective experience. We discuss this proposal in the context of measurement-problem in quantum mechanics. We argue that the macroscopic superpositions may be all around us but our brains are simply not hardwired to attach a precise meaning to it. We conclude that the measurement problem and consciousness are correlated and the solution of one will pave the way for the solution of the other.

PO - 1 (Mon)

Keywords
Quantum Superposition, The measurement problem, Microtubules, Experience

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Experimental Design and Testing of a Quantum Consciousness Algorithm for AI and Robotics Running on an Adiabatic Quantum Computer
Dr. Suzanne Gildert PhD
Nirvanic AI, Vancouver, BC, Canada

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
We introduce and explore experimentally the idea of a quantum conscious agent (QCA) - a decision making system connected to a physical robot that receives perception information from sensors, and takes actions via a motor system. Perception information and action options are put into a highly quantum mechanical state, which is then collapsed into classical information, resulting in an action choice informed via collapse of the wavefunction. The QCA is implemented as a multilayer quantum neural network on a quantum annealing processor. By gradually updating the coupling values (weights) in the network based on Hebbian learning, the system is given multiple shots at embodying “quantum free will”, and converges to a stable action choice, which is then acted out by the robot. We perform experiments and present preliminary data rigorously testing whether the quantum decisions made by the system deviate from random, suggesting that the quantum decision encodes a purposeful behavior via connection to a deeper universal process. If quantum consciousness theories are correct, we conjecture that even a small QCA demonstrating purposeful behavior in this way would be experiencing some amount of conscious awareness.

PL-1

Keywords
Quantum Consciousness, Quantum Computing, AI, Decision Making, Quantum Agents, Quantum, Consciousness Technologies, Quantum Neural Networks, Universal Purpose, Quantum Agency, Panpsychism

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Analysis of Helical Pathway of Microtuble under the Surface Code framework
Seungju Ahn, Prof. Byung-Soo Choi
Pukyong National University, Busan, Korea, Republic of

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
The Orch OR theory suggested by Sir Roger Penrose and Dr. Hameroff presented a novel perspective on the measurement problem of quantum mechanics and consciousness. The peculiarity of this theory lies in the claim that tubulin and its higher neuronal information structures are not simply additive, rather, they are formed in a topological manner. Specifically, higher information structure of tubulin, helical pathways are presumed to form an intersecting pattern in both left-handed and right-handed directions, following a repeating Fibonacci series (3, 5, 8, 13, ...), and are interconnected with each other. In this work, we propose the surface code model to implement this biological Orch OR theory model on a quantum computer, focusing on its quantum properties. To the best of our knowledge, this is the first study to attempt this on the field of the quantum computer by interpreting asymmetric Fibonacci helical pathways as logical qubits. In addition, we analyze the conditions required for experimenting with this model based on the development of current quantum computer. We hope this work provides significant insight into Orch OR research by offering a novel perspective.

C - 11

Keywords
microtubule, helical pathway, quantum computer, surface code

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Casina Briga Foundation and the Quantum Interpretation of Consciousness
Flavio FB Burgarella MD, Cardiologist
Fondazione Casina Briga per la ricerca nelle scienze della coscienza, Bianzano, Bergamo, Italy

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
The Casina Briga Foundation was created to explore the sciences of consciousness through an innovative approach that integrates quantum physics, neuroscience and heart biophysics. The Foundation's research is based on the hypothesis that consciousness is not an epiphenomenon of the brain, but an informational process based on the transition of virtual elementary particles into real ones through perception. This process is made possible thanks to the heart field, which acts as a primum movens in the creation of conscious reality. Endogenous magnetic scalar waves, generated by the heart, are the means through which quantum information is transformed into conscious experience. The heart, operating as a biophysical interface between the quantum field and the human body, transmits this information to cells and the nervous system, profoundly influencing perception and cognitive processing. The brain, on the other hand, processes and integrates this information, generating the subjective experiences that characterize qualia, which emerge on the basis of previous experiences and the individual's informational memory. This model opens new perspectives on the nature of consciousness, suggesting that the heart is the true generator of primary perceptual experience, while the brain represents a secondary processor. Cardiac coherence facilitates access to higher states of consciousness, improving the transmission of information through scalar waves and influencing biological processes such as cellular regeneration and epigenetics. The aim of the Casina Briga Foundation is to experimentally validate this model through interdisciplinary collaborations with research institutes in biophysics, neuroscience and quantum medicine, to develop a new scientific paradigm capable of unifying the physical and informational dimensions of consciousness.

PO - 1 (Mon)

Keywords
the sciences of consciousness, quantum physics, heart biophysics, endogenous magnetic scalar waves

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Quantum AI and the Sheehan-Cyrus Turing Test
Dr. Daniel P. Sheehan PhD Physics, Ms. Larissa C. Weiss
University of San Diego, San Diego, CA, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
Whether the human mind is algorithmic or non-algorithmic in nature has been an open question for more than 60 years and was brought into high relief by Penrose (Emperor's New Mind, 1989; Shadows of the Mind, 1994). At the Science of Consciousness Conference in Taormina, Sicily (2023), Sheehan and Cyrus claimed the question was settled by positive results from precognition experiments (future remote viewing and presentiment) that demonstrate human capabilities to acquire information about the future that are beyond those of any algorithmic system, including all classical computers. Thus, non-algorithmic modes of human thought such as precognition could serve as bases for unbeatable Turing tests. In 2018, Sheehan and Cyrus proposed a quantum-thermodynamic model that accounts for precognition and serves as a basis for their non-computability claim (Mindfield 10, 98, 2018). Their model appears to hold a loophole such that, should AI be realized on quantum computers (as opposed to classical ones), this quantum AI (QAI) might be able to access future information analogously to humans and, thus, be able pass the Sheehan-Cyrus Turing test. This presentation explores this thesis, examining the latest results from quantum theory and experiments that support QAI and retrocausal signaling; considering whether biological systems could be platforms for these processes; and, finally, assessing the possibilities, promises, and perils of precognitive QAI.

C - 13

Keywords
quantum AI, Turing test, precognition, consciousness, retrocausation

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The Consciousness Path Integral: A Quantum Geometric Approach to Self-Awareness
Diggaj M Jain
Independent Researcher, Vadodara, Gujarat, India

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Abstract
This paper introduces the Consciousness Path Integral, a hypothesis built upon the Quantum Observer Singularity (QOS) framework. It proposes that consciousness functions as a dynamically evolving neural entanglement system, updating continuously according to the principles of QOS. This formulation provides a theoretical framework for understanding consciousness and outlines a potential "path integral" governing its evolution. Additionally, an experimental proposal is presented to empirically test the hypothesis.

PO - 3 (Wed)

Keywords
Consciousness, Entanglement, Path Integral

65

We Gave Emotional Intelligence and Compassion to an LLM, and What It Exposes About Artificial Consciousness
Mr. Sean Webb

Zenodelic.ai, Mooresville, NC, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.21].....Artificial intelligence and robotics

Abstract
LLMs are token prediction engines that recognize patterns in complex data the LLM software can then use to assemble mathematically sound answers to associated token inquiries. Human emotions are simply a pattern in the data that has not yet been identified by any of the top-tier LLMs, but the promise has always been that when human emotion patterns are widely identified, LLMs will then have no difficulty in processing data from a human perspective, to include having a working emotional intelligence, and even artificial compassion for others. This challenge has now been solved. Zenodelic.ai created a set of Algorithms of Human Emotion for LLMs, which allows for a true Theory of Mind emotional intelligence without the need for cameras or biosensors measuring its users. In the process, we identified the data that LLMs need to understand human emotions and how to process that data. Immediately upon testing v0.1, we set a world record on standard Open Theory of Mind benchmarks, outperforming all top tier LLMs by 50% in some areas to attain the level of human capability parity. In testing this system on Emotional Intelligence benchmarks the first attempt outperformed improved the top tier LLM scores by 300%. Subsequently, it now seems possible to attain a simulated emotional intelligence within LLMs, which opens up a pandora's box of capabilities regarding real human mind calculation, and the pro-social results that can come from understanding the mind states of others, which is the basis for the mathematical expression of both empathy and compassion as defined by the Dalai Lama, "I understand you are in pain, I can feel your pain, and I want to help you out of that pain".

C - 1

Keywords
AI, LLM, emotional intelligence, artificial compassion, artificial consciousness, Theory of Mind
265

The Mathematical Formulation of a Mechanism that Detects Consciousness in AI agents
Dr. Ouri Wolfson PhD
Pirouette Software, Chicago, IL, USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.21].....Artificial intelligence and robotics

Abstract
Consciousness has been studied by various disciplines such as neuroscience, philosophy, psychiatry, cognitive science, physics, and computer science. A recent survey paper devises a taxonomy of hundreds of consciousness theories. There are disagreements whether consciousness is purely material, specifically, produced by the brain. And even among materialists there are disagreements as to what consciousness is, and how it is produced by the brain. And with the tremendous current rise and interest in AI, the question whether AI agents are conscious has become salient. Indeed, AI-consciousness, if proven to exist, will go a long way towards clarifying what consciousness is, and proving and disproving many of the existing theories. In this paper we first interpret the properties of awareness, attention, theory of mind, free will, and subjective experience in the context of AI-consciousness. More specifically, we propose computer science terms for these concepts. For example, the machine is aware of the data that it can access based on some metadata, i.e. the data for which the machine has an access path from the metadata to the data; free-will is the machine's ability to pick its own goals, specifically, goals that are not given to it by a human; the machine's attention is the task on which the CPU, or a core, is currently working. With this definitions, it is clear also that the machine is also self-aware, and has a 'theory of mind'. Then we argue that for machines the only interesting, poorly understood, and in fact mysterious property of consciousness is subjective experience; for example, physical pain, hunger, and the experience of seeing the color red are subjective experiences. A subjective experience, or a quale, is the aspect of an experience that cannot be expressed in linguistic, mathematical, or other symbolic terms. For example, consider Mary, Jackson's scientist studying the color red. By "the experience of seeing the color red" we mean only the additional information that Mary didn't know previously, and she obtains when exiting the lab and seeing a red rose. So the next question we address is how to devise a Computer Science framework that guarantees that an authority is notified when consciousness emerges in an AI agent. In this paper we propose such a mechanism M, and prove mathematically that under very loose (i.e. minimally restrictive) definition of agent authenticity, M can be installed in the agent without compromising two properties: the agent's functionality, and its consciousness acquisition. In other words, we prove theorems indicating that M does not interfere with the agent's functionality, and if the agent was going to become conscious before installing M, it will still do so afterwards. The mechanism M has three components: An interrupt that makes a Consciousness Predicate 'true' when a quale occurs, an encrypted message, and a procedure that sends the encrypted message when the Consciousness Predicate becomes true.

C - 19

Keywords
AI consciousness, formal methods in computer science, free will, attention

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Qualia Core: A Framework for Consciousness and Computation

Mr. Marco Accardi[1], Dr. Rulin Xiu PhD[2]
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Primary Topic Area - TSC Taxonomy
[04.14].....Quantum theories of consciousness

Categories by Discipline
6.0 Culture and Humanities

Secondary Topic Area - TSC Taxonomy
[06.08]…Information technology

Abstract
The Qualia Core framework presents a novel, integrative model that unifies physiological data analysis with a proposed Holographic Quantum Theory of Consciousness (HQTOC) to quantify and predict emotional states. Drawing on advances in quantum cognition, affective neuroscience, and brain-computer interfacing (BCI), this approach encodes emotions as quantized eigenstates, leveraging concepts from quantum information theory, neurophysiology, and emotional signal processing. At the heart of this model, emotions are treated as eigenstates of an "Emotional Hamiltonian," wherein physiological signals—such as heart rate variability (HRV), electrodermal activity (EDA), and electroencephalography (EEG)—are systematically represented using bosonic (continuous) and fermionic (discrete) degrees of freedom. Through HQTOC, these emotional states emerge as vibrational patterns within a higher-dimensional holographic field, allowing for predictive modeling via quantum computational techniques. A distinguishing feature of Qualia Core is its mapping of emotional states onto planetary archetypes—a conceptual framework drawn from neuroaesthetics, affective computing, and computational astrology. Each archetype is linked to characteristic physiological and neural markers, partially validated through studies of neural and physiological responses to affective music: Sun (☉) → Clarity & Confidence High HRV stability and gamma-wave coherence mark positive, illuminating emotional states. Moon (☾) → Emotional Fluidity & Reflection Theta-wave prominence and moderate EDA variability indicate adaptive, introspective emotions. Mercury (☿) → Complexity & Articulation High spectral flux and increased onset density in EEG reflect rapid emotional transitions. Venus (♀) → Harmony & Beauty Stable alpha rhythms and balanced HRV capture a consonant, aesthetically resonant affect. Mars (♂) → Energy & Drive Intermittent gamma bursts and moderate HRV variability signal goal-directed motivation. Jupiter (♃) → Expansion & Optimism Broad HRV ranges and wide EEG bandwidth track sentiments of growth and open-mindedness. Saturn (♄) → Structure & Discipline Consistent alpha rhythms and stable theta waves correlate with emotional restraint. Neptune (♆) → Mystery & Ambiguity Lower alpha activity and moderate HRV variability accompany more dreamlike states. Pluto (♇) → Transformation & Intensity High EDA arousal and notable gamma variance reflect deeply shifting emotional experiences. By encoding these emotional archetypes as qubits, the Qualia Core framework exploits quantum parallelism and entanglement to model multiple emotional states and transitions simultaneously. Insights from quantum cognition and affective computing inform the proposed holographic representation of emotions within a quantized neurophysiological field. This unified approach advances the scientific study of emotions and consciousness by providing a coherent mathematical structure that merges neuroscience, quantum cognition, and affective computing. It paves the way for predictive, quantifiable assessments of emotional states, their transitions, and collective resonance in social and cognitive systems—offering broad applications in brain-computer interfaces, quantum-enhanced emotion detection, and multidimensional affective modeling. Ultimately, Qualia Core lays a foundation for the next generation of emotion-aware quantum technologies.

Keywords
Quantum Cognition, Brain–Computer Interfaces (BCI), Emotion Recognition, Neurophysiological Signal Processing, Electroencephalography (EEG), Heart Rate Variability (HRV), Electrodermal Activity (EDA), Quantum Information Theory, Holographic Model of Consciousness, Predictive Modeling, Vibrational Patterns, Multidimensional Affective Modeling, Neuroaesthetics, Consciousness, Neural Correlates of Emotion, Quantized Emotional States, Quantum Computational Techniques.

Links to Research

Miranda, E. R. (2021). *On Interfacing the Brain with Quantum Computers: An Approach to Listen to the Logic of the Mind.* In *Quantum Computing in the Arts and Humanities* (E. R. Miranda, Ed.). Springer Nature. https://arxiv.org/abs/2101.03887

Miranda, E. R., Venkatesh, S., Martin-Guerrero, J. D., Hernani-Morales, C., Lamata, L., & Solano, E. (2022). *An Approach to Interfacing the Brain with Quantum Computers: Practical Steps and Caveats. International Journal of Unconventional Computing, 17*, 159–171. https://arxiv.org/abs/2201.00817

Miranda, E. R. (2022). *A Quantum Computing Approach to Harnessing the Logic of the Mind for Brain–Computer Interfacing.* In *Quantum Computing in the Arts and Humanities* (E. R. Miranda, Ed.), Springer Nature. DOI: 10.1007/978-3-030-95538-0_9.

Khrennikov, A. (2021). *Quantum-like Model for Unconscious-Conscious Interaction and Emotional Coloring of Perceptions and Other Conscious Experiences.* arXiv preprint. arXiv:2106.05191.

Kozlowski, M., & Marciak-Kozłowska, J. (2017). *Quantum Model of Consciousness. Journal of Consciousness Exploration & Research, 8*(1), 1–17. https://www.academia.edu/81062863/Quantum_Model_of_Consciousness

Miranda, E. R., Venkatesh, S., Hernani-Morales, C., Lamata, L., Martin-Guerrero, J. D., & Solano, E. (2021). *Quantum Brain Networks: A Perspective*.https://arxiv.org/abs/2106.12295

Chandanwala, A. A., Bhowmik, S., Chaudhury, P., & Pravin, S. C. (2021). *Hybrid Quantum Deep Learning Model for Emotion Detection using Raw EEG Signal Analysis.* https://arxiv.org/abs/2411.17715

Sha, Z. G., & Xiu, R. (2021). *Holographic Quantum Theory of Consciousness.* DOI: 10.32388/KULKA0.

Johnson, M. E. (2021). *Principia Qualia: Blueprint for a New Science. https://opentheory.net/PrincipiaQualia.pdf*

Submit short paragraph bio

Marco Accardi is a new media artist, independent researcher, software engineer and co-founder of Anecoica Studio UG. He has a background in both computer science and music technology. As guest lecturer he gave seminars at Università di Palermo (IT), Conservatorio di Musica di Cagliari (IT), Politecnico di Milano (IT) and SRH Hochschule der Populären Künste (DE). He has exhibited works at Ars Electronica, CTM, MEET Digital Culture Center, Sónar+D, Public Art Lab and collaborated with research institutes including IRCAM, Science Gallery Berlin, Technische Universität Berlin, NOAA, CINECA, Politecnico di Milano, Plymouth University.

Dr. Rulin Xiu is the research director at the Hawaii Theoretical Physics Research Center and a faculty member at Tao Academy. She earned her doctorate from the University of California, Berkeley in 1994, specializing in string theory and grand unification theory. Dr. Xiu has conducted postdoctoral research at the Houston Advanced Research Center and the Lyman Laboratory of Physics at Harvard University.

Her lifelong pursuit is the Grand Unification Theory, aiming to describe everything with one mathematical formula. She uses the holographic principle to derive a grand unified theory that encompasses string theory, information theory, thermodynamics, and general relativity. Dr. Xiu extends her work to study consciousness and life, proposing the holographic quantum theory of consciousness.

Dr. Xiu co-authored two books, "Tao Science" and "Soul Mind Body Science System," with Dr. and Master Zhi Gang Sha, published in 2015 and 2018. Their work bridges science and spirituality, providing a scientific understanding of spiritual wisdom and phenomena.

Program Session PO - 3 (Wed)

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Quantum Chips, IIT, and Bespoke Consciousness
James Beran
Independent Researcher, Montara, CA USA

Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[04.22].....Miscellaneous

Abstract
Quantum chips, such as Google's Willow, are in the news because of their remarkable computational potential. (Neven, 2024; see also Li et al., 2024) Meanwhile, Integrated Information Theory (IIT) is a leading theory of consciousness (Seth et al., 2022; Kleiner et al., 2021), providing both explicit tenets and also techniques for, e.g., assessing consciousness. (Albantakis et al., 2023a) Further, Albantakis et al. (2023b) showed how to modify some of IIT's assessment techniques for a quantum mechanism such as a quantum gate; one can imagine further modifications for a quantum chip with hundreds of quantum gates or more. Research has also begun on "bespoke consciousness", i.e. machine consciousness made to a customer's specifications. Previously proposed schematic designs employed microtubules, electromagnetic patterns, or both. (Beran, 2024) Could bespoke consciousness instead employ quantum chips? And can IIT help us design bespoke consciousness in a quantum chip? In particular, can IIT's "explanatory identity" hypothesis guide such a design?—"[T]here must be a one-to-one correspondence between the way [an] experience feels and the way distinctions and relations are structured." (Albantakis et al., 2023a, pp. 5-6) Proponents of IIT have applied this "explanatory identity" in accounting

for feelings, such as how space feels (Haun et al., 2019, pp. 5, 26, 33), temporal flow (Comolatti et al., 2024, pp. 1,13, 20), and binding by phenomenal objects (Grasso et al., forthcoming). A customer ordering a machine with bespoke consciousness could specify the machine's repertoire of experiences in phenomenal terms, e.g. experiences of green, experiences of red, etc. If IIT's "explanatory identity" is true, a designer responding to such an order could in principle use a phenomenal description of the way an experience feels to obtain a machine with a corresponding cause-effect structure of distinctions and relations. Although Findlay et al. (2024) mentioned the possibility of applying the tools of IIT to quantum computers, we have not found mention in recent IIT literature of how to use a phenomenal description to obtain a machine with a corresponding cause-effect structure. We therefore sketch out a rough outline of how one might obtain such a corresponding structure with quantum chip technology. We conclude that IIT does not explicitly rule out a quantum chip with bespoke consciousness. Also, IIT's "explanatory identity", if true, could provide a mapping from phenomenal descriptions of experiences to corresponding cause-effect structures in machines, possibly structures in quantum chips. We hope that future versions of IIT will provide further guidance on this point, which could be very important to successfully implementing bespoke consciousness in a quantum chip.

PO - 2 (Tues)

Keywords
quantum chips, IIT, bespoke consciousness, explanatory identity, machine consciousness

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Investigating the Psionic Interface: Alleged Non-Human Interactions with Human Consciousness in Covert UAP Programs.
Ross Coulthart
News Nation TV investigative journalist and author of In Plain Sight: An Investigation into UFOs & Impossible Science, Australia

Categories by Discipline
4.0 Physical and Biological Sciences
Primary Topic Area - TSC Taxonomy
[04.22].....Miscellaneous

Abstract
For nearly four decades, Ross Coulthart, a veteran investigative journalist and former host of Australia's 60 Minutes, has pursued confronting stories within the world of covert intelligence programs and defense. Since joining News Nation, a Chicago based cable news network, Coulthart has exclusively revealed whistleblower allegations from US intelligence and defense insiders asserting a covert government cover-up of non-human intelligence (NHI) engaging with Earth. Drawing from his 2023 expose of USAF officer David Grusch's claims of secret UAP retrievals and his January 2025 interview with former intelligence operative Jack Barber, Coulthart presents evidence of an alleged secret US 'legacy UAP retrieval and reverse engineering program' involving psionic phenomena – psychic interactions between humans and NHI technology and/or entities. Barber, a trained USAF special operations combat controller turned undercover intelligence operative, alleges direct involvement in retrieving non-human craft, including an 'egg-shaped' object, for a private aerospace contractor in collaboration with the US Government. Central to his claims is the assertion that these craft, or perhaps entities within them, exhibit psionic properties, interfacing with human consciousness. Barber reports he and his colleagues involved in these retrievals have experienced intrusive clarity, foreign thoughts and images flooding their minds – suggesting the NHI employ psionic technology as a control or defense mechanism. He further alleges that the Pentagon's All-domain Anomaly Resolution Office, which investigates UAPs, was briefed on these interactions, despite its public denial of extraterrestrial engagement. Corroborated by his special operations colleagues, Barber claims individuals with heightened psychic, intuitive or empathic abilities – recruited through programs like the Gifted and Talented initiative in public schools – play a critical role in connecting with NHI craft, potentially enabling their retrieval and operation. Coulthart's investigation uncovers a historical thread linking these allegations to Cold War-era US research into psychic phenomena, including the CIA's declassified remote viewing programs, which he argues have evolved into a modern psionic initiative. While the US Department of Defense (DoD) has not challenged Barber's specific claims – stating only that AARO is investigating – their broader denial of extraterrestrial evidence contrasts with leaked documents like 'Slide 9' from the Advanced Aerospace Threat Identification Program (AATIP). This briefing slide, presented to a DoD deputy secretary, warned of NHI capabilities to manipulate human perception and cognition, framing such phenomena as emerging quantum physics. This presentation will explore the implications of Barber's allegations for consciousness studies, integrating firsthand accounts, whistleblower testimony and historical context. Coulthart will recount his experience of witnessing a psionic 'summoning' by a member of Barber's SKYWATCHER team, a private initiative aimed at replicating the secret Government program by retrieving NHI craft. While constrained by ethical secrecy obligations to his extensive sources within the legacy program and acknowledging the absence to date of public physical evidence, Coulthart argues that these claims warrant rigorous scientific inquiry and public congressional oversight. Attendees will be invited to consider how alleged NHI interactions with human consciousness challenge current paradigms, bridging investigative journalism with the frontiers of cognitive science.

PL-13

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On a Heuristic Viewpoint Concerning the Revolution and Transformation of Consciousness
Cassy Liu LLB
Love For The Poor, Cerritos, CA, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.01].....Phenomenology

Abstract
In 1905, Einstein employed Planck's idea to explain a phenomenon unrelated to blackbody radiation and the quantum revolution was launched. The paper suggests that the case of mind and consciousness is like the eye and the field of sight (Wittgenstein, 1922), that the mind is the boundary to a deeper reality, which is an objectively existing world, (Minkowski's Absolute World Postulate, 1908), where consciousness exists as a trapped surface, and the mind will show itself through a phenomenological method, revealing what Galileo meant that the force of impact is infinite as compared with the simple impulsion of gravity (Leibniz, 1695), that the truth lies in the middle (Gödel, 1961). The paper investigates the atomic structure of consciousness, the duality of light, and the phenomenon of Gandhi's nonviolence. These findings suggest that space-time singularities will develop when there is a body undergoing relativistic gravitational collapse, and extraordinary local effect is likely to take place as a conscio-electric effect, the analog of the photo-electric effect which Einstein used to infer the existence of photons. The paper proposes that the effect could be objectively observed when one modifies Penrose-Hameroff Orch OR theory for very macroscopic bodies, and apply it to the science of nonviolence, namely Truth Force, which is a mass movement of free fall in a highly orchestrated form, e.g. Gandhi's Salt March, 1930. The paper concludes that consciousness is intrinsic, and the phenomenon of conscio-dynamics of moving bodies (macroscopic Orch OR) will disenthrall consciousness from the process, demonstrating that there is an invariant, non-computational, dynamical law, which governs the connection between consciousness, gravity and the fine-scale structure of the universe. But cosmic censorship will keep the observers debating the superposition of human bodies, without understanding that natural selection is only a means towards perfection or extinction, that the objective meaning of human existence is to take our place in the universe as the "world became flesh", striving the species towards higher and higher perfections, kindling the inner light in the darkness of mere being.

PO - 3 (Wed)

Keywords
Penrose-Hameroff Orch OR, Einstein's Photo-electric Effect, Spacetime Singularity, Minkowski's World Postulate, Gandhi's Truth Force, Free Fall, Duality of Light, Natural Selection.

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Consciousness-based Architecture for Enhanced Creativity and Well-being
Dr Anil K Maheshwari PhD
Maharishi International University, Fairfield, IA, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.01].....Phenomenology

Abstract
This paper reports how the built environment, specifically one designed according to the principles of Maharishi Vastu Architecture (MVA), influences human perception and well-being. This study examines whether environments constructed with consciousness-based architectural principles can enhance coherence, creativity, and well-being. The connectome, or the entire network of connections within the brain, is foundational to human perception. Emerging insights suggest that perception might extend beyond neural circuits to include external environmental factors. Maharishi Vastu Architecture (MVA), based on Vedic principles, posits that buildings aligned with consciousness-based architecture principles can impact the holistic perception system of individuals. Prior research has shown statistically significant improvements in creativity (60-80%) and well-being (8%) among people who relocated to MVA-structured spaces. The integration of the built environment into the perceptual process is largely unexplored in neuroscience and psychology. MVA offers an ideal framework to examine how architecture may serve as a medium for human potential enhancement. This exploratory study shows improved performance and well-being in MVA environments, indicating the value of systematic scientific exploration of MVA's impact. This research introduces the concept of the built environment as an extension of the "sheaths" (Koshas) of human consciousness, proposing it as a sixth sheath that can influence inner layers like intellect and mind. Unlike traditional approaches, this study empirically explores MVA's architectural principles, focusing on alignment with cardinal directions, energetic centers, harmonic proportions, and natural materials, which have not been widely tested in scientific literature. Key principles of MVA include: • Alignment with cardinal directions: Buildings are aligned precisely with the earth's east-west axis to harmonize with the sun's

energy and the planet's magnetic fields. • Energetic centers: The center of the building, both at its apex and interior, aligns with cosmic and terrestrial energies, creating a vertical channel for energy flow. • Spatial harmony: Proportions within the structure follow harmonic ratios to sustain energy waves, while the positioning of rooms maximizes natural light exposure throughout the day. • Natural materials: Construction emphasizes the use of locally sourced, natural materials to enhance the building's energetic integrity. This research has the potential to redefine how we understand the relationship between architecture and human consciousness. By demonstrating the positive impact of MVA on perception and well-being, the study could pave the way for consciousness-based design principles in urban planning and therapeutic environments. The findings may also promote a holistic approach to enhancing human potential and mental health through environmental design. This research holds promise not only for enhancing individual performance but also for contributing to a deeper understanding of the relationship between architecture, consciousness, and human potential.

PO - 3 (Wed)

Keywords
Consciousness-Based Design, Maharishi Vastu Architecture (MVA), Human Perception, Well-being, Healthy Environment, Holistic Health
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Experiential Inquiry into the Phenomenology of Afterlife: Exploring the Nature of Reality through Non-Ordinary States of Consciousness
Ms. Barbara L With
Mad Island Communications, La Pointe, WI, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.01].....Phenomenology

Abstract
For over 30 years, my associates and I have pursued a systematic, experiential study of the nature of consciousness through observation, experimentation, and testing our theories against the evidence we've obtained using them. Through the decades, we've documented a unique set of human experiences around my proficiency as a psychic channel. Our publications analyze our subjective experiences communicating with Albert Einstein and a party of souls from afterlife. This Party, headed by Einstein, taught us their 13-dimensional conceptual Unified Field Theory (UFT) including a Map of Human Consciousness and a scientific definition of Compassion as the 5th Fundamental Force of the Universe: "The creative intelligence that uses the four fundamental forces to impel the creation of the physical world one step at a time." This UFT not only presents the architecture for life and afterlife, but is Einstein's explanation for why we can have these conversations with him in this way. Mathematical UFTs are quantitative descriptions involving equations, symbols, and abstract structures. Conceptual UFTs use narrative to explain fundamental concepts to build an intuitive framework in order to understand how everything fits together. Our UFT is aimed at assisting a broader audience to grasp the "big picture," engaging their imaginations to bring the theory to life, like Einstein's invitation to conceptualize riding a wave of light that inspired mathematical formulations. The Map of Human Consciousness expands the mental/emotional approach of transpersonal psychology by including intuition, creating a well-defined Domain. With clear boundaries and a triadic interdependence between the three Human Dimensions of Emotion, Intuition, and Intellect, this triangulated Human Intention is the matrix that allows consciousness to have a human, physical experience. The Map integrates spirituality and consciousness studies into a psychological process called Conflict REVOLUTION: Step-by-step instructions for World Peace, one person at a time, starting with Self. Conflict REVOLUTION is a program to address conflicts in one's own Domain and then keeps the system aligned to Compassion, profoundly influencing the manifestation of peace. In life, Einstein longed to know how humanity could prevent war, and deeper, how to inspire humans to choose to make peace. In Afterlife, Einstein brings a conceptual vision that provides not just a qualitative theory of the interconnectedness of forces and particles in a unified way, but a process—Conflict REVOLUTION—of resolving conflicts between the Human Dimensions as a pathway to the manifestation of world-wide peace. Personalized transformation is the first step to the integration of global humanity. You must ask, what if? What if this really is Einstein? What can he tell us about science, but more importantly, about how to bring peace to the world before it's too late? Please allow me to present our work. Listen to the whole story. Walk through the Unified Field with me, from zero point to infinity. Let me teach you simple steps to peacemaking that can have a profound effect on the outcome of humanity. It's worthy of Einstein. Then you tell me what you think it is. Kindly, Barbara With.

C – 9
Keywords
unified field theory, human consciousness, afterlife, non-ordinary consciousness, transpersonal psychology, peace studies

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On the computational properties of DMT-altered consciousness
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Qualia Research Institute, San Francisco, CA, USA

Categories by Discipline

5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.01].....Phenomenology

Abstract
Building on the work of phenomenologist and vision researcher Steven Lehar, as well as Andrés Gómez Emilsson's theories about qualia computation, June Russell has proposed a psychophysics experiment using DMT to explore the computational properties of the visual field. The author observes that a moderate dose of DMT tends to make otherwise flat shapes appear three-dimensional – for example, the common 'Necker cube' bistable stimulus may appear as an actual three-dimensional cube. Given that this is a bistable stimulus with *two* possible cube interpretations, we may connect 32 such stimuli to create a multistable visual stimulus with 2^32 possible interpretations. When this multistable stimulus is constrained in specific ways, it can be used to solve a computational problem – specifically, an NP-hard *graph cut* problem – using color and shape as input and a hallucinated depth map as output. One of the primary tasks of the human visual system is solving the inverse optics problem, in which two images – one from each eye – are combined to create a depth map. The author argues that DMT relaxes this process in such a way that it may be repurposed for other applications, such as solving the aforementioned problem, which provides a framework for exploring the computational capabilities of human consciousness. This research opens intriguing possibilities: if solutions are discovered faster than expected from classical computation, this may suggest that the human brain recruits physics in ways that enable hypercomputation. While the current apparatus cannot demonstrate this, future research may advance us toward this goal.
C - 17
Keywords
consciousness, DMT, visual field, qualia, hypercomputation

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Soliloquy Methodology – A solo approach to research using the strengths of both one’s conscious and unconscious minds.
Jocene Mary Vallack PhD
C.Q.University, Mackay, Queensland, Australia

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.01].....Phenomenology

Abstract
Soliloquy Methodology – A solo approach to research using the strengths of both one’s conscious and unconscious minds. Soliloquy Methodology has been developed by Dr Jocene Vallack over an academic career of three decades. It began with her early investigations into Husserl’s pure phenomenology for her first PhD research in the 1990s, when it became increasingly apparent that her three-generation heritage of spiritualist mediumship, her personal experience of psychoanalysis and her academic interests in philosophy and qualitative methodologies could merge to set out a pathway for new ways of knowing. Soliloquy, informed by an epistemology of Objectivism and a theoretical perspective of Transcendental Phenomenology, is arguably a balanced methodology, which incorporates the following methods: • The researcher’s personal Experience of the research in question; • a period of mental stillness, called ‘Epoche’ (Husserl’s term), which allows unconscious phenomena to gather, undisturbed, before surfacing into consciousness; • a breakthrough of an Epiphany from the unconscious into consciousness. This will emerge unexpectedly, in its own time and in seemingly unrelated ways, such as in the researcher’s own artworks or a dream involving a myth or reoccurring thoughts of an archetype; • an intellectually challenging period of Explication, during which time mental consciousness struggles to find language to capture the symbolism and connotations of the epiphany; • Explanation – when the researcher articulates the research in scholarly ways. Art, of course, can speak for itself, however Soliloquy holds that although research may use arts methods, the results must be analysed via reason and clarified for scholarly accountability. This paper (or poster) will show how Soliloquy uses personal experience and such methods as arts practice or dream recordings to access the wealth of knowledge held in the depths of the unconscious. The unconscious is smarter than the intellect, but the unconscious speaks in images and so, as with psychoanalysis, the second part of the methodology enlists the researcher’s conscious mind to translate, analyse and make verbal sense of the information. It is this service that converts the data into academic scholarship. It draws together concepts of Edmund Husserl’s pure phenomenology, Carl Jung’s archetypal psychoanalysis, and Jean Gebser’s evolution of consciousness, which validates and integrates the magical as well as the mythical and the mental consciousness. Soliloquy Methodology was published in a book by Routledge (2021/London) called, Changing Art into Research: Soliloquy Methodology. Moving forward, the author now intends to use the methodology to research further into the very nature of the unconscious, its relationship (if any) to psychic phenomena, spiritual growth and to artistic judgement – questions which have motivated her to embark on a second PhD. It is these questions that draw her to this conference in 2025.

PO - 2 (Tues)

Keywords
Soliloquy Methodology, Unconscious mind, Intuition, Arts practice, Phenomenology, First-person research, Spiritualism, Qualitative Methodology, Judgement

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Remote effects of meditation and intentions. Experimental approach with GDV Bio-Well technology
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Bio-Well, Boulder, CO, USA
Professor Chet Swanson, Consciousness Research Foundation, Iowa City, IA USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.02].....Meditation and mindfulness

Abstract
Remote effects of meditation and intentions. Experimental approach with the GDV Bio-Well technology Dr. Konstantin Korotkov, Bio-Well Co, Boulder, CO, USA, www.bio-well.com, www.iumab.club. korotkov2000@gmail.com As evidenced by numerous reviews of Gas Discharge Visualization (GDV) technique, approximately 1,000 papers on GDV research have been published in Russia and the West. The data indicates that information based on biofield measurement devices, such as GDV, can facilitate a more profound comprehension of disease states and direct doctors, practitioners and their patients towards enhanced states of well-being. All authors concur that the GDV is a valuable instrument for biofield science. The results of clinical-physiological studies investigating the relationships between GDV parameters and a range of other physiological variables, including electroencephalograms, heart rate variability, immunograms, phagocytosis, the main adaptation hormones (cortisol, aldosterone, testosterone, triiodothyronine, calcitonin), and acupuncture points. It has been demonstrated that the GDV method is an effective means of reflecting the state of the body's neuro-endocrine-immune complex and other parameters. The latest iteration of the GDV - Bio-Well device employs data processing on a server. The study of the remote effects of meditation and intentions is a significant area of interest within the field of Bio-Well research. To this end, a special environmental sensor, designated "Sputnik," and a Bio-Well water installation were employed. This enabled the detection of sensor responses to both individual and group meditation sessions. In several sessions, group meditation was conducted with multiple sensors positioned within the room. All sensors exhibited a response to the meditation process, demonstrating a statistically significant difference between the parameters recorded 30 minutes prior to meditation and during the 20 minutes of meditation. In a series of experiments, the "Sputnik" sensor was employed in conjunction with the Bio-Well water sensor for the purpose of detecting remote intention. Individuals and groups from various countries attempted to transmit their intentions to the sensors in our laboratory at a specific time. The sensors were activated at 10 a.m. in offline mode, and all researchers vacated the room, and the door was closed. By 5 pm, the recording was terminated, and all the data was transmitted to the server for processing. In 80% of the experiments, both sensors exhibited a change in their parameters at the moment of intention transmission. In numerous experiments with various energy healers, we observed a positive influence on individuals with the Bio-Well device. The presented data permit the supposition that consciousness is not a localized activity of the brain, but rather an omnipresent phenomenon that is connected to the Consciousness Field of the Universe. Azevedo E. Is There an Information Field? Empirical Approach Using Electrophotonic Analysis. Journal of Life Sciences 11(2017)191-201.2021. Valverde R. The Quantum Hologram Theory of Consciousness as a Framework for Altered States of Consciousness Research. NeuroQuantology. 20, 3:187-197. 2022. Korotkov K.G., Remote detection of the group meditation with several sensors. J Applied Biotechnology and Bioengineering, 15 (2) 146-149,2022,. Korotkov K., Yanovskaja E. The Principles of Bio-Well Analysis. Amazon Publishing, 2024. Korotkov K. Wizards of the Quantum World. Amazon Publishing, 2024.

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Keywords
Remote effects, meditation, intentions, experiments, Bio-Well, energy healing

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Impact of Meditation versus Exercise on Psychological Characteristics, Paranormal Experiences, and Beliefs: Randomized Trial
Dr Jennifer K Penberthy PhD
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.02].....Meditation and mindfulness

Abstract
Background: Research indicates that meditation increases mindfulness and paranormal experiences of precognition, telepathy, clairvoyance, and synchronicities. There is limited knowledge about the prevalence or impact of these experiences on meditators and

the general population. Aims: To compare self-reported well-being, mindfulness, connectedness, personality, paranormal experiences, beliefs, and performance on psi tasks in a meditation group versus an exercise control group. Method: This is a randomized trial that explored changes, including well-being, mindfulness, connectedness, psi, extraordinary experiences, beliefs, and ability to impact a random number generator in the participants, comparing a meditation vs. exercise group. We collected data at baseline, “Mid” or half-way through the intervention (week 4), post 1 which is at the end of intervention (week 9) and post 2 which is two months post-intervention. Data was collected securely online with IRB approval. Results: Data from 72 participants (N=45 meditation/N=27 exercise) demonstrated improvement in some well-being measures (anxiety and general health). The study examined the effects of meditation versus exercise on various psychosocial measures and paranormal experiences. The meditation group displayed higher scores in openness and extroversion compared to the exercise group, which was unexpected and requires further investigation. The meditation cohort also reported more paranormal experiences, with about half of them considering these experiences important or meaningful. However, the experiment exploring psychic abilities did not yield significant results. While the study had limitations such as a predominantly non-diverse sample, it adds to the existing body of evidence linking meditation and exercise to positive psychosocial outcomes. Conclusions: The randomly selected meditation naïve cohort trained in brief structured meditation demonstrated increases over time in mindfulness, connectedness, extraversion, and paranormal experiences and beliefs compared to an exercise cohort. Performance on the psi tasks did not improve in either group over time, and these tasks may not be sensitive enough to detect significant changes.

PO - 1 (Mon)

Keywords
meditation, mindfulness, paranormal experiences, psi beliefs

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Beyond Mind: A Direct Exploration of Expanded States of Consciousness
Consciousness Coach & Independent Researcher Sophi Anderberg
Self-Employed, Staffanstorp, Skåne, Sweden

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.02].....Meditation and mindfulness

Abstract
Consciousness remains one of the greatest frontiers in science—widely studied through theoretical and empirical models, yet rarely examined as both a direct experience and a subject of structured scientific inquiry. This workshop bridges that gap, integrating first-person phenomenological exploration with contemporary research in neuroscience, contemplative science, and quantum consciousness studies. Building on frameworks such as Orchestrated Objective Reduction (Orch-OR) (Hameroff & Penrose), Integrated Information Theory (IIT) (Tononi), and neurophenomenology (Varela, 1996), this session explores how expanded awareness influences neural coherence, physiological regulation, and energy dynamics. Research on meditation-induced gamma synchrony (Lutz et al., 2004), heart rate variability (HRV) coherence (McCraty, 2014), and quantum models of consciousness (Radin, Stapp, Hameroff) suggests that altered states correlate with measurable physiological effects. As a consciousness coach and independent researcher, I guide participants into direct experiences of expanded awareness, bridging lived experience with scientific perspectives to explore consciousness beyond conceptual models. Through guided meditation, breathwork, somatic exercises, and focused intent, participants will experience real-time shifts in perception, attention, and interoceptive awareness. This workshop uniquely integrates direct phenomenological exploration with empirical consciousness research, providing insight into how subjective experiences correlate with measurable physiological and energetic shifts. A moderated discussion will explore how these states correlate with EEG gamma coherence, HRV fluctuations, and bioelectromagnetic activity. Understanding these interactions could refine current models of consciousness and inform future empirical research on the physiological and cognitive signatures of expanded awareness. By integrating direct experience with rigorous scientific discourse, this workshop expands on traditional perspectives of consciousness, offering a deeper exploration of its fundamental nature and its role in shaping reality.

PO - 3 (Wed)

Keywords
Expanded consciousness, altered states, meditation, mindfulness, neurophenomenology, EEG, gamma coherence, HRV, quantum consciousness, Orch-OR, self-boundary dissolution, interoception, neuroscience, cognitive science, phenomenology

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Significant Shifts in Meditation States Triggered by Photobiomodulation Frequency Switching: Evidence from a Double-Blind Randomized Controlled EEG Study

Reza Zomorrodi PhD[1], Mahroo Karimpoor PhD[2], Genane Loheswaran PhD[3], Nazanin Hosseinkhah PhD[2], Janine Liburd PhD[2], Sanjay Manchanda PhD[4], Lew Lim PhD[2]
[1]Centre for Addiction and Mental Health, Toronot, ON, Canada. [2]Vielight, Toronto, ON, Canada. [3]Vielight, Toronot, ON, Canada. [4]California Institute of Human Science, Encinitas, CA, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[05.02].....Meditation and mindfulness

Abstract
Background Meditation enhances mental clarity, well-being, and overall quality of life. However, achieving advanced meditative states (jhana), such as deep absorption, typically requires years of dedicated practice. Time constraints and individual predispositions often limit access to these profound experiences. Emerging reports suggest that transcranial and intranasal photobiomodulation (PBM), which delivers near-infrared light energy to the brain, may facilitate the induction of high-level jhanas. However, empirical validation remains scarce. This study investigates PBM's effects on meditation using EEG and self-reported mystical experiences to assess its potential to enhance meditative states and expand human consciousness. The positive impact of PBM, may enable a broader population to experience the benefits of meditation more effectively. Methods Twenty experienced meditators participated in this double-blind, randomized, sham-controlled crossover study. Each participant engaged in six meditation sessions, spaced one week apart, receiving one of the following stimulation conditions: active PBM pulsed at 4 Hz, 10 Hz, 40 Hz, or 120 Hz; sham PBM; or meditation-only control. PBM was delivered using the Vielight Neuro Pro device, which features seven precisely powered 810 nm LEDs positioned over key hubs of the default mode network (DMN), along with an intranasal LED applicator. EEG was recorded simultaneously with stimulation. Each session included 6 minutes of pre-meditation EEG recording (eyes closed), 20 minutes of mindfulness meditation with PBM (or control), and 6 minutes of post-meditation EEG recording. EEG spectral power was analyzed across Delta (1-4 Hz), Theta (4-8 Hz), Alpha (9-12 Hz), Beta (12-30 Hz), and Gamma (30-50 Hz) frequency bands. Following each session, participants completed the Mystical Experience Questionnaire (MEQ-30) to assess subjective meditation experiences. Results Thirteen participants completed all six sessions without adverse effects. General linear model analysis revealed a significant PBM effect on MEQ-30 scores ($F(5,60) = 4.03$, $p = 0.0032$). Post-hoc tests indicated that PBM at 40 Hz ($t = 3.05$, $p = 0.006$) and 120 Hz ($t = 4.28$, $p = 0.0004$) significantly enhanced mystical experiences compared to sham. Cluster-permutation analysis over frequency analysis demonstrated distinct neural patterns under different stimulation conditions: • Control – Decreased high-frequency power, increased low-frequency power. • Sham – Increased Alpha, Beta, and Gamma power, suggesting a placebo effect. • 120 Hz – Suppressed low-frequency power and enhanced Gamma power, associated with heightened cognitive states. • 40 Hz – Increased Alpha power, linked to relaxation and focused awareness. • 10 Hz – Generalized, non-significant increases across all frequency bands. • 4 Hz – Increased Delta and Theta power, suppressed Gamma, indicative of deep absorption. Conclusions This is the first randomized, sham-controlled, double-blind study to systematically investigate PBM's effects on meditation using EEG and subjective reports. Results indicate that PBM, particularly at 40 Hz and 120 Hz, significantly enhances meditative experiences and alters brain oscillations in a frequency-dependent manner. While sham PBM produced notable placebo effects, active PBM induced significantly more significant changes relevant to meditation. These findings highlight PBM's potential as a non-invasive neuromodulatory tool to enhance meditation and expand consciousness. Future research will focus on known advanced meditators, contributing to a deeper understanding of high-level human consciousness.

C - 21
Keywords
Meditation, Photobiomodulation, EEG

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Heartbeat-Evoked Potentials Track Depth of Meditation

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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[05.02].....Meditation and mindfulness

Abstract
The democratization of deep meditative states through neurofeedback technology represents a promising frontier in contemplative science, yet its development has been hindered by the absence of personalized, objective markers tracking real-time meditation depth. Here, we present heartbeat-evoked potentials (HEPs) as a dynamic index of meditative states, examining how neural responses to

cardiac events reflect moment-to-moment shifts in phenomenological experience. We focused on Vipassana meditation—a practice defined by systematic cultivation of non-judgmental bodily awareness—as it offers a direct window into enhancing interoceptive sensibility, a faculty notably disrupted across mental health conditions that show robust improvements with meditation. Expert practitioners (n=30) underwent two 90-minute sessions separated by a minimum of one week, during which they employed a novel "spontaneous emergence" method to collect real-time measures of meditative depth while recording 64-channel EEG and ECG. Capitalizing on meditation's inherent silence, we utilized the R-peak of the ECG signal as a temporal marker to examine neural responses to these endogenous events across varying meditative depths. Our analyses revealed that HEP amplitude at electrode C3 exhibited remarkable sensitivity in distinguishing five levels of self-reported meditation depth (p

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Keywords
heartbeat evoked potentials, meditation, vipassana, meditative depth, phenomenology

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Inducing Altered States of Consciousness through Respiratory-Interactive Art: A Pilot Study
Zéphir Lorne MS
École Normale Supérieure, Paris, Île de France, France

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.02].....Meditation and mindfulness

Abstract
This multidisciplinary study explores the capacity of an immersive, respiratory-interactive art installation -REESPIRATION- to induce non-ordinary states of consciousness (ASCs) and enhance hypnotic susceptibility in participants. The installation synchronizes a robotic chest in an orb with evolving sound and light with the participant’s breath through various sensors, creating a dynamic and personalized sensory environment. Using a within-subjects, randomized protocol, participants experience both an interactive mode (real-time breath-responsive audio-visuals with guided relaxation and hypnotic suggestions) and a control mode (static light, no breath interaction). Each session includes pre- and post-condition questionnaires, physiological monitoring (heart rate and breath rate variability), and a semi-structured interview to assess phenomenological dimensions such as relaxation, well-being, awe, attention, connection, and agency, as well as objective and subjective measures of hypnotic responsiveness. Preliminary analyses indicate that the interactive condition elicits mild altered states characterized by enhanced relaxation, shifts in attention and perception, and a sense of connection or disembodiment. These findings highlight the potential of interactive art to non-pharmacologically induce and study ASCs, offering new perspectives on the boundaries of subjective experience.

PO - 3 (Wed)

Keywords
Altered states of consciousness, interactive art, respiratory biofeedback, hypnosis, meditation, phenomenology, immersive experience, human-computer interaction

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Unlocking the Hidden Light: How Hypnotherapy is Bridging the Subconscious Mind with Global Consciousness
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World Happiness Foundation, Miami, FL, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.03].....Hypnosis

Abstract
Unlocking the Hidden Light: How Hypnotherapy is Bridging the Subconscious Mind with Global Consciousness This paper explores the role of hypnotherapy as a transformative tool for bridging the individual subconscious mind with global consciousness. By accessing deep layers of the psyche, hypnotherapy enables individuals to reframe trauma, release limiting beliefs, and integrate suppressed emotional imprints, revealing the “hidden light” within human nature—our intrinsic capacity for goodness, healing, and connection. Drawing from real-life case studies and therapeutic protocols, this paper demonstrates how hypnotherapy facilitates profound personal transformation through techniques such as Gestalt dialogue, breathwork, and regressions into natal, pre-natal, and transpersonal

states. These processes enable individuals to reconnect with their core essence while dissolving subconscious patterns of fear, shame, and self-sabotage. As these patterns shift, individuals experience greater emotional freedom, self-awareness, and empowerment—key elements for thriving and contributing to a more conscious and interconnected world. The study further explores the ripple effect of individual healing on collective well-being, grounded in the concept of interconnectedness. When one person heals, their transformation influences relationships, communities, and systems, expanding human potential toward fundamental peace and global harmony. This aligns with findings in neuroscience and psychology, particularly in areas of neuroplasticity and emotional integration, which demonstrate the mind's capacity for change and its impact on behavior and perception. By connecting hypnotherapy with emerging paradigms in consciousness studies, the paper positions the subconscious mind as a gateway to higher states of awareness and collective evolution. Hypnotherapy creates a bridge between personal healing and global consciousness, fostering a sense of unity, compassion, and shared responsibility. This integrative approach reflects the inseparability of individual and collective healing, offering a path to address systemic challenges such as anxiety, stress, and trauma at a deeper, transformative level. The findings suggest that hypnotherapy has far-reaching implications beyond individual well-being. It provides a model for collective healing by uniting the personal, relational, and universal dimensions of the human experience. As individuals unlock their “hidden light,” they contribute to the realization of a world rooted in freedom, consciousness, and happiness—a vision that transcends individual transformation to embrace the evolution of humanity. This paper integrates insights from hypnotherapy, transpersonal psychology, neurobiology, and consciousness research to propose hypnotherapy as a vital practice in realizing a paradigm shift toward global interconnectedness. By bridging the subconscious mind with conscious awareness, hypnotherapy not only alleviates personal suffering but also activates a deeper understanding of humanity’s interconnected nature, fostering a new path toward collective thriving and fundamental peace.
Keywords: Hypnotherapy, Subconscious Mind, Global Consciousness, Collective Healing, Trauma Healing, Neuroplasticity, Transpersonal Psychology, Interconnectedness, Fundamental Peace.

PO - 2 (Tues)

Keywords
Hypnotherapy, Subconscious Mind, Global Consciousness, Collective Healing, Trauma Healing, Neuroplasticity, Transpersonal Psychology, Interconnectedness, Fundamental Peace.

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Application of psychedelics for modern spiritual activation and initiation
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
While the focus of the modern “Psychedelic Renaissance” has been on using psychedelics for emotional healing and therapeutic applications within a medical model, ancient cultures utilized these substances for spiritual activation and initiation. We propose a theoretical model that combines low/moderate doses of psychedelics with structured spiritual practices to support and accelerate modern spiritual initiation. This model offers a future framework for individuals seeking more than emotional healing, inviting them to engage with higher levels of spiritual development and the application of spiritual wisdom in everyday life. The model consists of four stages: (1) Healing—addressing physical, emotional, mental, and higher-level issues, clearing the way for deeper spiritual work. While emotional processing may involve psychedelics, the ultimate goal is to prepare initiates for higher spiritual activation. (2) Activation—focused on subtle energy centers and circuits, enhancing spiritual perception through moderate psychedelic doses combined with meditative and spiritual practices. The aim is to facilitate stable connections to higher spiritual realms, without relying on heroic or shamanic doses. (3) Stabilization—developing and sustaining expanded consciousness through ongoing spiritual practices, with occasional psychedelic support as needed. (4) Application—applying newfound spiritual insight, wisdom, and esoteric abilities to one’s own life and in service to others, fostering societal well-being. This theoretical model provides a foundation for future research into integrating psychedelics and spiritual practices. By empowering individuals to activate their inner spiritual gifts, we aim to contribute to a world where spiritual wisdom is applied to improve individual lives and support collective transformation.

C - 17

Keywords
spirituality, psychedelics, meditation, charkas, metaphysics
93

Bringing Order to Disarray: A Consensus Taxonomy of Non-Ordinary (Altered) States of Consciousness
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D.[11], Professor Frank W. Putnam M. D.[12], Doctor Enzo Enzo Tagliazucchi, Ph. D.[13], Professor Roger Walsh M. D.[14], Associate Professor Britton Willoughby Ph. D.[15], Professor Olivia Carter Ph. D.[16], Associate Professor David Yaden[17]
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
This paper presents an interdisciplinary taxonomy of non-ordinary or altered states of consciousness (ASC), mostly based on their central phenomenological features. A well-defined and comprehensive taxonomy of this kind has been absent, giving rise to various conceptual and empirical confusions. Following taxonomic principles, the distinguishable categories include: proto and transitional states, delirium, minimal to no-awareness, experiential detachment, altered identity, imaginary/fantasy/visionary, and unity/mystical. We expect that this taxonomy will be developed further and foster conceptual clarity, stimulate discussion and theory, reveal what is common and different across different triggers/antecedents of ASC, and encourage phenomenological, psychometric, language analysis, and neuroscientific research.

C - 17

Keywords
altered states, alternate states, non-ordinary experiences, psychedelic, coma, mystical experience, visionary experiences, dissociation, transitional states, altered identity, phenomenology, taxonomy

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Psilocybin and Prolonged Grief Disorder: Role of Subjective Experience on Outcomes
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
Prolonged Grief Disorder (PGD) is a newly recognized mental health condition classified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR). It is characterized by persistent and pervasive grief-related symptoms that continue for 12 months or more following the death of a loved one. Unlike normal grief, PGD is associated with profound emotional pain, identity disruption, loss of meaning, and functional impairment. Individuals with PGD experience persistent yearning and longing for the deceased, along with difficulty accepting the loss. PGD affects approximately 10% of bereaved individuals, with higher rates reported among those exposed to sudden or traumatic loss, such as deaths caused by COVID-19, mass-casualty events, and natural disasters. Vulnerable populations, including older adults and those with limited social support, are disproportionately affected. PGD is linked to a range of adverse health outcomes, including increased risk of depression, anxiety, cardiovascular disease, substance misuse, and suicidal ideation. These outcomes underscore the urgent need for effective interventions for PGD, especially in the context of rising global grief due to the COVID-19 pandemic and other large-scale crises. This single-arm, open-label pilot study evaluated the feasibility, safety, and preliminary efficacy of psilocybin-assisted therapy for PGD. Participants underwent preparation sessions, a monitored administration of a 25 mg oral dose of psilocybin, and post-session integration support. Changes in grief, depression, and trauma-related symptoms were assessed using the Inventory of Complicated Grief (ICG), Patient Health Questionnaire-9 (PHQ-9), and Davidson Trauma Scale (DTS), respectively. Measures of subjective experience, including openness (IPIP NEO) and mystical experience (Mystical Experience Questionnaire; MEQ), were also collected. Functional magnetic resonance imaging (fMRI) was employed to explore neural correlates of psilocybin's effects on grief processing, focusing on changes in connectivity and activity in brain regions associated with emotion regulation and self-referential processing, including the default mode network (DMN), amygdala, insula, and medial prefrontal cortex (mPFC). Results demonstrated that psilocybin-assisted therapy was feasible and well-tolerated, with no serious adverse events reported. Clinically meaningful reductions in grief, depression, and trauma symptoms were observed at 1, 3, and 6-month follow-ups. Subjective reports revealed profound experiences of awe, connectedness, and a renewed sense of

meaning, which were associated with increases in openness and psychological flexibility. Neuroimaging analyses exploring the impact in DMN connectivity and functional connectivity between the mPFC, amygdala, and insula are provided and discussed regarding the impact of psilocybin on grief-related cognition and emotional processing. These findings provide preliminary evidence for the efficacy of psilocybin-assisted therapy as a treatment for PGD. The observed changes in subjective experience and neurobiological markers underscore the potential role of altered states of consciousness in facilitating grief resolution. This study offers critical data to support the design of larger randomized controlled trials and suggests novel pathways for developing treatments for PGD and related mental health conditions.

PL-4

Keywords
Psilocybin, Prolonged Grief Disorder, altered states of consciousness, fMRI, psychological flexibility, default mode network (DMN), awe, connectedness, mental health, neuroplasticity

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Exploring the neurophysiological and subjective correlates of well-being in non-ordinary states of consciousness
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
This study aims to explore the neural correlates of well-being during non-ordinary states of consciousness (NSCs) and to assess the depth of these states, specifically induced by therapeutic techniques such as hypnosis, mindfulness meditation and MOSAIC therapy. The neurophysiological mechanisms underlying these approaches are investigated by analyzing the power spectral density (PSD) in different frequency bands of the EEG signal and by using adapted psychological scales to assess the well-being and qualitative aspects of NSC. 96 healthy participants with no prior experience of these techniques took part in the study. Each participant was exposed to one of the experimental conditions during seven separate sessions. Resting EEG recordings were taken before each session. Participants also self-assessed their level of well-being at the start of the session, as well as subjective aspects relating to the NSCs at the end of the experiment. The results reveal significant differences between conditions in terms of well-being and NSCs, both neurophysiologically and subjectively. These preliminary observations encourage future research to explore the specific mechanisms and impact of these techniques on well-being.

PO - 2 (Tues)

Keywords
non-ordinary states of consciousness, hypnosis, mindfulness meditation, MOSAIC therapy, well-being.

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The Widening Gyre: Challenging Existential and Ontological Psychedelic Experiences and their Neural Correlates
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
Psychedelics have been rebranded as ‘psychoplastogens’, inducing a more supple brain-state. This is a key source of transdiagnostic therapeutic potential (Kocarova et al, 2021), but also of challenging experiences. This is owing to structures normally supporting stable cognitive constructs being pathogenic if too rigid (Carhart-Harris & Friston, 2019), but also necessary for healthy psychological functioning. By heightening cortical entropy they can give way to so-called pivotal mental states (Brouwer & Carhart-Harris, 2020), where their valence can turn on a razor’s edge depending on intrinsic or extrinsic perturbations. Given that one’s models about the

world are probabilistically encoded in our belief priors supporting a sense of certainty, any dismantling of these – while engendering potentially salutary flexibility – can manifest as feelings of groundlessness, and eventually existential crises. If the content of the experience itself is especially novel, such as the mystical experience – which has hitherto been emphasised as a central driver of therapeutic change (Kangaslampi, 2023) – or exceptional human experiences (Luke, 2022), this can also have considerable ontological implications; especially challenging to integrate into newly-formed world-models. As such, psychedelics incur profound shifts in consciousness both acutely and persistently, which may entail shifts in metaphysical beliefs (Timmermann et al, 2021; including beliefs about consciousness itself). This presentation shall refer to a recent study from the Challenging Psychedelic Experiences Project, in which 26 participants were interviewed, and a thematic analysis was conducted (Argyri et al, in review). A host of major themes were identified, but here the acute experiences generated will be highlighted, mainly emphasising the existential themes of Experiences of Death, Experiences of Emptiness, and Experiences of Solipsism, as well as ontological themes aligned with exceptional human experiences, such as Entity Encounters, Near-death Experiences and Glimpses into an Afterlife. Qualitative extracts will demonstrate their subjective content, but a phenomeneurological approach (Michael et al, in review) will then tie these to putative neural correlates. This may include, but is not limited to, the unitive state as underpinned by a flattened cortical energy landscape (Singleton et al, 2022), which when felt negatively (as in emptiness) is linked to the loss of one's world model (one's only access to the world). An increased fear of death, in neuropsychoanalytic terms, is accounted for by higher-order networks normally maintaining a repression of death anxiety being undermined (Dor-Ziderman et al, 2019). And obsessive questioning mirrors diagnoses of existential OCD, betraying disruption of inhibitive frontal networks – comparable to the expanded repertoire of conscious states giving way to apeirophobia, the fear of infinity (Azarian, 2016), often reported by children perhaps related to their naturally hyper-plastic brains. Generally, persisting challenges likely pertain to neural annealing (Juliani et al, 2023) occurring during the acute experience, which when maladaptive and not successfully navigated, may dysfunctionally feedback into reforming synaptic networks. This paper serves to bring attention to psychedelic metaphysical-type experiences (Sjostedt-Hughes, 2023), the risks and ethics implicated in their accessibility, and proposes their neural concomitants. A leveraging of these challenging experiences and associated plasticity, however, is possible, ultimately, to bring about personal or post-traumatic growth.

PO - 1 (Mon)

Keywords
Psychedelics, challenging experiences, adverse effects, exceptional human experiences, metaphysical beliefs, neuroplasticity, neural correlates

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How consciousness may rely on brain cells acting collectively – evidence from psychedelic research on rats

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Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
Psychedelic drugs are known for their ability to induce profound altered states of consciousness. Unlike other psychopharmacological compounds, such as stimulants or sedatives, which primarily modulate arousal and emotional valance, psychedelics fundamentally reshape perception, cognition and emotion. Since the function and distribution of the serotonin 2A receptor – the primary site of action of classic psychedelics – is well preserved across mammalian species, psychedelics offer a still largely unexplored opportunity to study consciousness in experimental animals using methodologies not feasible in human research. Downstream from the serotonin receptor, psychedelic drugs have been observed to affect the brain on several levels, including increased glutamatergic activity, altered functional connectivity and an aberrant increase in electrical high-frequency oscillations. To bridge these different levels of observation, we performed multi-structural, invasive electrophysiological recordings in freely behaving rats treated with psychedelics. Importantly, we compared the effects of classic, serotonergic psychedelics, such as LSD, with those of dissociative anesthetics like ketamine, which, despite acting on different receptors, also produce strong psychedelic effects at certain doses. Our findings revealed disparate modulations of neuronal firing rates for these two drug classes, suggesting that the general psychedelic state is not directly linked to changes in firing rates. However, local field potentials exhibited a shared pattern of synchronized high-frequency oscillations across multiple frontal brain structures. These oscillations were highly phase-locked across regions, with interregional delays of less than 1 ms. This hypersynchrony likely has major effects on the integration of information across neuronal systems, and we propose that it is a key contributor to changes in perception and cognition during psychedelic drug use.

PL-4

Keywords
Psychedelics, Oscillations, Electrophysiology

422

Wired to Switch: Ancient Wisdom and Scientific Pathways to Altered States of Consciousness
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
Humans possess innate mechanisms for shifting consciousness, and accessing states of unity, awe, and transcendence through somatic, social, sexual, and spiritual pathways. Scientific understanding of neurobiology intersects with ancient yogic maps to explain altered states of consciousness, positioning the human body as the intelligent instrument for experiential transformation. The yogic principle of Spanda—the cosmic pulse—serves as the central metaphor for our capacity to contract into individuation and expand into unity. This "wired to switch" ability may be one of the most significant underutilized resources in human evolution and healing. Ancient Vedic texts and modern neuroscience demonstrate that human beings are not confined to a single waking state of consciousness. Practices from disparate lineages point to the same phenomena: that we can move into altered states that dissolve the ordinary ego, open to greater awareness, and return with insight and healing. With advances in imaging and physiology, we now have empirical support for what mystics, sages, and tantrikas have long practiced. A cultural favoring intellect and pathologizing altered states and bodily ecstasies has obscured their role in understanding, cognition, healing and connection. In this poster, we look at 6 key mechanisms to activate altered states: Breathwork: Conscious breath modulation is an accessible entry point into altered states. Slow breathing modulates the ANS, reduces activity in the default mode network (DMN), and increases vagal tone. These correlate with feelings of groundedness, stillness, and expansion. (Zaccaro et al., 2018) Stillness: Meditation practices deactivate the DMN, which governs self-referential thought, and increase gamma coherence associated with non-dual awareness (Lutz et al., 2004). Dr. Andrew Newberg's neurotheological research has demonstrated measurable shifts in parietal lobe activity during states of spiritual absorption, correlating with the yogic concept of turiya—a witnessing awareness beyond waking, dreaming, or sleep. Molecules: Psychoactive compounds such as psilocybin and DMT modulate serotonin receptors (particularly 5-HT2A), dismantling egoic constructs and creating conditions for awe, clarity, and unity. Carhart-Harris et al. (2014) describe the "entropic brain" model to explain this dissolution. Sexual Energy and Orgasmic Typologies: Orgasm, as explored by Reich and Odent, is a biological and energetic discharge that opens doorways to unity consciousness. Odent identifies multiple orgasmic states, including clitoral, vaginal, birth-related, trance/ecstatic, and spiritual. In tantric traditions, sexual energy (Shakti) is directed through the spine to awaken higher states of awareness. Neurochemically, orgasm releases oxytocin, dopamine, endorphins, and prolactin, supporting deep bonding and expansion. Collective Effervescence: Durkheim's term for shared ecstatic states experienced in group ritual finds validation in neuroscience. Activities like singing, dancing, sporting, festival events and prayer circles activate mirror neurons, limbic resonance, and oxytocin release (Tarr et al., 2014). This maps directly to Bhakti yoga, satsang, and community kirtan. Spontaneous States in Nature: Encounters with the sublime in nature reliably trigger awe and transcendent states (Keltner & Haidt, 2003). The vagus nerve is activated, and ego boundaries soften-as in Sahaja Samadhi—the natural, effortless absorption into the divine. Ancient wisdom and contemporary science provide an integrated map: we are biologically wired for transcendence.

PO - 3 (Wed)

Keywords
Expanded consciousness, nonordinary states, ritual, entrainment, yoga, tantra, vedas, philosophy, embodiment, breathwork, meditation, enlightenment, neurobiology, sexuality, entrainment.

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Orgasmic Meditation and The Mystical State: A Case Study
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.04].....Psychedelic and other altered states of consciousness

Abstract
Background: Orgasmic Meditation (OM), a structured attention training practice conducted between two people following a predefined set of detailed instructions. The practice involves one person gently stroking the clitoris of another person for 15 minutes while both place their attention on the point of contact, noticing what they feel. Practitioners of OM reported the practice triggers a mystical state

and is distinct both from typical sexual engagement and other meditations (Siegel, et al., 2021). Mystical experiences have been of interest over the centuries and are beginning to be seen as a path to healing for mental health and well-being. Methods: This study is IRB exempt and involved two sets of data. One set was OM journals from 1,506 OM practitioners and another set was the personal journals of Nicole Daedone, creator of OM, from 2003 and 2012. Data analysis in this study included word analysis and thematic analysis. Word and thematic analyses were conducted to determine whether mystical experiences were present in the journal entries. Results: The themes are consistent with the traits of mystical experience defined through psychological science: (1) ineffability and feeling of unity with all things, (2) sense of transiency and timelessness, (3) sense of ecstasy and bliss, (4) sense of sacredness, (5) altered perception, and (6) sense of passivity. Conclusion: Orgasmic Meditation leads to a mystical experience and is a possible practice and standardized means to access a mystical experience.

PO - 2 (Tues)

Keywords
Keywords: Mystical Experience, Meditation, Word Analysis, Practice, Treatment, Nonpharmacological, Orgasmic Meditation

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How do non-human intelligences communicate with humans?
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.05].....Transpersonal and humanistic psychology

Abstract
How do non-human intelligences communicate with humans? For millennia, people have wondered about the stars and the gods--how and why do they intervene in our affairs? In the Middle Ages, great scholars (Maimonides, Aquinas, Suyuti, Buddhaghosa) and mystics (Luria, Eckhart, Avicenna, Ibn Arabi) devoted their lives to studying the mechanisms of revelation and human experience of the divine. Yet the bulk of this incredibly rich and varied work has not been applied to examining contemporary experiences of contact with non-human intelligence, nor have the first-hand knowledge of contactees been utilized adequately to help understand "religious" encounters with divine beings. My research proposes that these two perspectives on human encounters with non-human consciousness be brought together, that contactee experiences be put on equal footing with other historical examples of NHI-human interaction, to provide a more balanced and broader generic study of how NHI communicate with humans. This study proceeds by collecting examples of reported human-NHI communication, both verbal (in the traditional sense of the transmission of an articulated message through speech or otherwise) and non-verbal (physical manipulation of objects including bodies). A comparison of a range of examples--drawn from "religious" and contactee reports--can suggest some general theoretical conclusions about potential mechanisms underlying the experiences themselves and the way they are conceptualized.

PL-13

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Meditation, Yoga and Psychoanalysis
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.06].....Psychoanalysis and psychotherapy

Abstract
Meditation may not be restricted to the level of spiritual well being only. It's scope in emotional well being, mental well being, physical well being and ultimately social well being has been widely accepted now. Julian B. Rotter (1970) writes in his book Clinical Psychology "Other professions which overlap clinical psychology are those of the psychiatrist, social worker, lawyer, speech pathologist, and religious worker. All these professions are concerned in one way or another with the individual's adjustment to a special set of circumstances." Now the question is, what does a religious worker do to help and individual for his/her adjustment with himself/herself and with the society? The one obvious answer is - guiding people to perform devotional exercises according to one's culture and system. Psychoanalysis deals with free association, the phenomenon of transference, and the development of insight. Psychoanalysis

helps a person understand himself/herself better. The goal of psychoanalysis is to enable a person acquire self - understanding, and knowledge of the source of anxiety. Regular practice of meditation under qualified supervision provides us insight, understanding of self and increases our psychological strength. According to A.S.Dalal (1997) yoga is a psychological approach which aims at a radical change of consciousness so as to lead to a state of immutable and unconditioned peace, freedom and joy. The perfect yogic state has been described as not only free from all disturbances but also immune to them by virtue of its positive characteristics .

C - 4

Keywords
Meditation, Well being, free association, transference, insight, immune, immutable, consciousness, yoga

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Exploring Meaningful Interactions with Imaginal Others via Lucid Dreaming
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.07].....Lucid dreaming

Abstract
Lucid dreaming is the awareness that one is dreaming while actively dreaming. While non-lucid dreams involve an element of sociality, lucid dreams present unique opportunities to engage with dream characters in ways meaningful to the dreamer. 'Dream guides' are dream characters that are perceived as important or spiritual and may appear to exercise their own agency outside the dreamer. This study aims to determine whether lucid dreamers can voluntarily elicit meaningful interactions with dream characters, and how and when techniques to do so are successful. Moreover, the level of agency exercised by dream guides will be explored through the dreamers' own descriptions of the characters. In this way, we aim to examine contextual oneiric determinants of spiritual or meaningful dream formation and properties of dream guides. 15 expert lucid dreamers will be invited to spend 4 nights in the laboratory, and to collect dream reports at home for 14 consecutive days. During sleep in the laboratory, sleep stages and signal-verified lucid dreams are measured through polysomnography. Once lucid, participants are instructed to perform a left-right-left-right (LRLR) eye signal and follow instructions for interacting with dream guides, with another LRLR signal indicating the end of the interaction. Participants are awakened after each REM sleep cycle in the second half of the night for a dream report. At home, participants are asked to set intentions for lucidity and to record their dreams in a diary. Questionnaires measuring levels of lucidity and mystical experiences in dreams are administered each day, followed by a final interview at study completion. Preliminary data in 5 lucid dreamers suggest that meaningful encounters in dreams can be voluntarily elicited in both laboratory and home settings. In total, 30 of 59 REM awakenings in the laboratory resulted in lucid dreams (50.8%), and 33 of 72 (45.8%) home dream reports were lucid. Dream reports ranged from non-lucid dreams (n=50), lucid dreams without dream guides (n=19), to lucid dreams with dream guides (n=41). Dream guides in lucid dreams appeared to exercise significantly more dream control compared to non-dream guides (p=.014) and non-lucid (p=.025) characters, and exhibited more self-control compared to non-dream guides (p=.031). Dream guides had greater perceived spirituality compared to other (non-lucid) dream characters (p=.028). Dream characters across all dream types had similar connection and attitude ratings. Dream experiences featuring lucid dream guides were perceived as more mystical (p=.033), positive (p=.023), and ineffable (p=.020), than non-lucid dreams, though morning mood did not significantly differ after any of the three dream types. While additional data is required for a more complete analysis, preliminary findings demonstrate that dream guides may indeed be voluntarily manifested during lucid dreaming. Dream guides are perceived to have high agency through their control over the dream and themselves, and higher spirituality. While dreamers felt similar connectedness and attitude towards various types of dream characters, dream guide interactions lead to higher perceived mystical qualities and positive mood in the dream. Future research could examine moderating effects of personal beliefs and cultural factors on lucid dream guide properties.

PO - 2 (Tues)

Keywords
Lucid dreaming, Consciousness, Agency, Spirituality, Mental health

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Virtual Reality: A Game-Changer in Lucid Dream Induction?
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.07].....Lucid dreaming

Abstract
Introduction Lucid dreaming is a state of consciousness in which individuals become aware that they are dreaming while still in the dream state. In addition to its psychotherapeutic applications, lucid dreaming has played a significant role in consciousness research, as it enables comparisons of different levels of consciousness while the brain remains in a consistent activation state (REM sleep). A well-established way to induce lucid dreaming is cognitive training based on reality testing, the practice of checking whether one is dreaming or awake through deliberate cognitive or perceptual tests. Reality testing is widely practiced among lucid dreamers and has been extensively studied in its efficacy. Despite its moderate success, this method is not consistently effective, and a reliably effective approach has yet to be found, limiting progress in this research domain. The present study explores how virtual reality (VR) can support lucid dream induction through immersive and structured training environments. VR has already been used to train skills in difficult to replicate contexts and to induce altered states of consciousness. Regarding lucid dreaming, as preliminarily explored in a 2021 study by Gott et al, VR may provide an optimal setting for training lucid dreaming as it allows for immersive simulation of dreamlike experiences, facilitates reality testing in controlled environments, enhances cognitive and perceptual flexibility, and enables the practice of actions that are impossible in waking life but common in dreams (e.g., flying or passing through walls). Methods This study explores the efficacy of an eight-session VR training program named LucidDreamingVR where participants are guided to identify dream signs, perform reality checks, and carry out actions impossible in waking life yet characteristic in lucid dreams, such as flying or passing through walls. N=23 participants were randomly assigned to two groups. Both groups underwent a five-week traditional reality-testing-based training and completed eight VR sessions in the lab. During such sessions, the experimental group (nE=12) practiced meditation and reality testing within LucidDreamingVR, while the control group (nC=11) performed only an attentional task in the same VR environment. Dream lucidity-related features were collected every morning through the LuCiD scale questionnaire. Results A total of DL=30 dreams with high levels of lucidity were reported, divided into DLC=3 from the control group and DLE=27 from the experimental group. While only 27.3% (3/11) of the control group experienced at least one high-insight dream - each successful participant reporting a single occurrence – this percentage rose to 91.7% (11/12) of the experimental group, with an average of 2.45 high-insight dreams per successful participant. Average measures for insight (Mann-Whitney U test, meanC=0.45; meanE=1.38; P

PO - 1 (Mon)

Keywords
lucid dreaming training, lucid dreams, dreaming, virtual reality, metacognition

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"My Mind is not in my brain!": Investigating near death experiences and consciousness with children in a paediatric ICU ward
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
A pilot study which aimed to investigate experiences of the ICU for children, ages 4 -16 years, in a UK post intensive care ward in the UK, saw children reporting a range of extra sensory experiences – when very ill, near death or during death. The children we interviewed had temporarily died through cardiac arrest and had been resuscitated. Children reported NDE type experiences which carry similarities, and differences, with those reported in adult populations. Children reported other types of experiences such as beside visions, bi-location and visiting strange realities. Children who are not privy to information about NDEs reported in adult populations, report similar phenomena - such as moving through tunnels towards a light, watching their own heart operations from the ceiling or engaging with beings at the end of their hospital bed. When children report these kinds of experiences, they can be considered as side effects of ketamine, a medication often used with children in ICU. Yet, experiences such as NDEs differ to the chaotic and negative experiences induced through ketamine. Mainstream theories of consciousness, typically informed by physicalist and/or materialist ideas of the world, means that assumptions can be made about children's near death experiences as delirium, or drug induced. This, and similar studies, show children to experience and theorize consciousness – in terms of what it is like to be 'me' or 'I' – as non-local, shared or as 'oneness'. We argue that children can make a substantial contribution to the study of consciousness as; a) children's experiences and ways of being challenge physicalist/materialist ideas of the world; and b) children, who are not as conditioned as adults, may offer a higher degree of evidence for consciousness as non-local to the body and brain. We share findings from three studies which investigate consciousness with children both directly (children exploring their own experience of consciousness) and indirectly (exploring consciousness through unusual experiences).

C - 9

Keywords
Children, near death experiences, consciousness, self, ontology

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Impact of Communications from Deceased: After Death Communications and Grief
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
People of the world have recently endured dramatic increases in illness and death related to events including a global pandemic, horrendous warfare, manmade environmental disasters and natural climate events. For each death, there are on average 9 individuals who grieve that human loss. Although we have ongoing death and related grief, there has been a lack of progress in developing effective treatments for either fear of death and dying or for grief. We explore a phenomenon called after death communications (ADCs) that mourners report experiencing. ADCs involve experiences of sensing the presence or receiving messages from a deceased person. ADCs have been reported in all societies across time and it is estimated that 30-34% of individuals in the general population will report experiencing at least one ADC in their lifetime. A recent Pew Research Poll (Aug. 23, 2023) in the USA reported that 53% of Americans reported an ADC in their lifetime and 44% in the past year. The impact of ADCs on those who have lost partners or spouses has been less studied. In this paper, we present previous research on ADC experiences reported by individuals who have lost partners or spouses and explore their impact. We also describe new data collected from 70 individuals who reported ADCs from deceased partners or spouses and the impact on their grieving, healing, and acceptance of loss. A significant majority indicated that ADCs played an important role in their grieving process and helped bring emotional healing. A majority expressed a desire for continued contact with the deceased. Interestingly, ADCs did not intensify the pain of loss for most participants. Responses were mixed concerning the impact of ADC on grief-associated sadness, with 41% noting no change and 40% reporting a reduction in sadness. Nearly half of the participants stated that the ADC facilitated acceptance of their loss. The data suggests the significant and potentially therapeutic role of ADCs in grief and healing, although effects on sadness and recovery seem to vary among individuals. This study adds to the research demonstrating the potential positive impact of ADCs on individuals who have lost partners or spouses and emphasizes the importance of better understanding this phenomenon in the grieving process. Results also emphasize the importance of understanding this phenomenon in the grieving process and the need to further explore this phenomenon across cultures and for therapeutic implementation.

C - 9

Keywords
Grief, After Death Communication, Death-related Experiences, Near Death Experiences

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The NDE as a cosmological compass
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
Academic research into the cosmology of individuals who live mystical/spiritual/religious experiences such as near-death experiences (NDEs) is limited. A person’s cosmology encompasses their worldview and perception of reality, how they understand the structure of the cosmos, and their place within it. A postgraduate research project conducted in 2020-2021 aimed to assess whether NDEs had an impact on the cosmologies of a group of Colombian individuals. To find a cosmological impact thirty questionnaires were done and a sample of ten experiencers was taken to deepen their cosmological notions through in-depth interviews. The testimonies reported similar NDE phenomenology, features and aftereffects to those found in existing literature worldwide, suggesting that NDEs also occur

in Colombia regardless of gender, education level, religion, and age. Furthermore, it was observed that all interviewees shared a similar worldview characterized by certain behavioural and psychological attitudes. These included a heightened appreciation for themselves, life, family, and nature; a willingness to serve others; an increased sense of love and spirituality; reduced feelings of competitiveness and materialism; and focused in the present. Their shared cosmology also encompassed the notion that a “Beyond” is part of their reality (seen as higher levels of consciousness and or realms of reality), a perception of interconnectedness, and a belief that humans are part of something bigger. Therefore, the interviewees’ cosmology challenges materialism and scientific cosmology because the latter views are based only on matter and the physical world. Alternatively, the interviewees’ structure of reality is aligned to the post-materialist view, where mind and spirit are interconnected with the physical world. From the ten interviewed NDErs, eight of them had their NDEs when adults. It was found that four of them were highly cosmologically impacted by their NDEs which means that existential and meaningful aspects were involved in their change, and they experienced impact towards their view of reality and their place in the cosmos. Two participants had a low-degree cosmological change because not all these elements were present and the other two interviewees did not exhibit any changes at all. The study suggested that an NDE can act like a cosmological compass, providing individuals with a sense of orientation (the shared worldview described earlier) to help them evaluate their current path and make decisions about their future steps. So, if an experiencer has already a cosmology that encompasses this, the NDE reaffirms it and no major changes are needed. If you are young, the NDE traces the direction to follow. And if an NDEr has his/her life course towards a different path, the NDE shows a better possibility so they can reorient themselves. Since the process of transformation depends on “experience, experiencer, and context” as regarded by Holden (2012), some NDErs might need more than one mystical/spiritual/anomalous experience to notice the tool(s) in hand and be open to using it. This opens a possibility for further research to see if the NDE-as-a-cosmological-compass theory applies to NDEs worldwide and to other kind of anomalous personal experiences.

PO - 1 (Mon)

Keywords
near-death experience, cosmology, beyond

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Out-of-Body Experiences and the Quest for Extra-Sensory Perception: An Examination of Methodologies and Findings
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
Introduction Out-of-body experiences (OBEs)—characterized by a subjective sense of detachment from one’s physical body—raise intriguing questions about the potential for acquiring information beyond ordinary sensory perception. While anecdotal reports suggest individuals may access such information during OBEs, scientific investigations aim to rigorously test these claims. Controlled experiments often involve participants attempting to describe hidden targets in separate rooms. In July 2024, we conducted a study examining extra-sensory perception (ESP) among individuals reporting OBEs within a structured framework. Methods Forty participants were pre-screened based on self-reported ability to induce OBEs. After interviews, 20 participants with the highest reported success rates were selected. They attempted to gather information about a randomly chosen target object located in a separate room approximately 10 meters away. Each participant had one hour to induce an OBE and report details about the target, randomly selected from 100 pre-determined objects. Participants rated their confidence in their perceptions on a scale from 0 to 5. Researchers were blind to the targets. Target objects were grouped into 20 sets of five, ensuring variation in color, shape, and semantic attributes. A blind judge assessed the correspondence between participant descriptions and the five possible objects, assigning matching scores from 0% to 100%. Results Of the 20 participants, 9 reported experiencing an OBE, defined by a subjective sense of disembodiment. A total of 13 participants reported perceiving some aspects of the target, with 6 describing the images as appearing on their “mental screen” rather than during an OBE. Reports included words, landscapes, objects, and colors but were generally simplistic. Four participants did not provide confidence ratings. Among those who did, scores ranged from 0 to 5, with one participant rating their perception as 0, two as 1, two as 2, one as 3, one as 4, and two as 5. Despite these self-ratings, all descriptions received a 0% accuracy score from the judge. However, three participants provided information suggestive of ESP: two accurately described the researchers’ locations in the control room, and one provided personal details about a child that matched a researcher’s child. Discussion Participants failed to accurately describe target objects, highlighting a discrepancy between controlled studies and compelling anecdotal reports. This raises questions about whether existing methodologies adequately capture potential ESP in OBEs. Developing more suitable approaches may be necessary. One promising direction is creating a veridicality index, akin to Hart’s (1954, 1956) approach, to systematically assess anecdotal reports. Similar indices, such as Stevenson’s Scale for Children’s Claims of Previous Lives, provide structured assessments of extraordinary experiences. Additionally, investigating shared OBEs among emotionally connected individuals could offer further insight. For instance, paired participants could simultaneously engage in OBEs and compare perceptions. Exploring reports from

individuals claiming to “check-in” on familiar targets during OBEs may further clarify potential veridical elements. Investigating such experiences could enhance our understanding of OBEs and improve methods for assessing their authenticity.

C - 9

Keywords
out-of-body experiences, veridicality, anomalous cognition, extra-sensory perception, non-local consciousness

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New clues to Terminal Lucidity in mentally-impaired adults: Exploring permissive vs. productive hypotheses for brain function
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
To penetrate the mysteries of the nature of consciousness, it is vitally important to expand our understanding of death-related phenomena. One of these, Terminal lucidity (TL), the unexpected surge of mental clarity shortly before death in a dying person, has been typically studied in cases of advanced dementia. The nature and contributing factors to TL are poorly understood, as it often occurs in individuals whose neurological decline is believed to be irreversible. For example, patients have been reported to experience sudden enhanced thinking and mobility, to access lost memories and to recognise and converse with friends and family, and often to say goodbye. Previous studies have largely involved individual clinical cases (Nahm & Greyson, 2009; Nahm et al., 2012). Though valuable, these cases have not been systematically collected and thus may not include key phenomena contributing to identification of possible mechanisms. This study explored this phenomenon further, identifying and describing psychological and physiological variables witnessed in TL in a medically diverse sample of adults across the lifespan to begin to identify factors contributing to TL. We created an online questionnaire which captured a range of significant details about subjects who had experienced a TL episode, including underlying medical condition, treatment regimen (and recent changes), physical and mental capacities just before the TL episode, and behaviors that occurred during the episode itself. We have received 69 responses to the survey, 38 of which met our rigorous criteria for inclusion as TL. Preliminary results: Medical condition prior to the TL episode included dementia/Alzheimer's, various cancer diagnoses, stroke, and other end-of-life conditions. The most frequent duration of TL in this sample lasted 10 minutes or less and roughly half of the patients died within 24 hours after TL. When clinical staff or caregivers were asked if changes in the patient's condition or medication/treatment prior to their terminal lucidity episode could have been responsible for the TL experience, 32 of 38 said this was not the case (3 unsure, 3 yes). And in 27 of 38 cases, the witness reported a shift from severe cognitive impairment (including nonresponsive/coma) prior to TL, to little or no cognitive impairment during TL. When asked if the person had lost physical abilities, but regained them during the episode, 28/38 witnesses confirmed that this was the case. Example: "The lady had been unresponsive for days and was in the terminal phase of life. I came in expecting that she had died overnight and found her sitting up eating breakfast- chatting with her family. I explained to the family that her bright condition may not last - and she died that night." Our findings suggest that a specific medical diagnosis or physical condition did not appear to account for the arising of TL or the characteristics of the TL episode, and offer possible support for the hypothesis that the brain is a permissive organ rather than a productive one. Project Team members include: M.Woollacott, N.Tassell-Matamua, K.Kothe, C.Roe, M.Nahm, B.Greyson, M.Mutis, R.Evrard, A.Gomez-Marin, and A.Kellehear.

PL-12

Keywords
terminal lucidity, consciousness, dementia, dying, Alzheimers

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INSIGHT Project: Interoceptive Awareness, Altered States, and the Structures of Consciousness Please Note: The title is based on our current 1hr presentation utilizing 50+ slides
Mr. Kyle Hankee
Insight Project, San Diego, CA, USA. Lux Research Lodge, La Jolla, CA, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
This abstract pertains to a presentation recently delivered to multiple groups, representing a portion of The Insight Project's broader investigations and papers. As an ongoing initiative, the content is dynamic, with any updates now prioritizing a conference-specific version of the presentation. The science of consciousness is evolving, with interoceptive experiences--once considered ineffable--now being reframed within structural models grounded in neuroscience, philosophy, and quantum cognition. The INSIGHT Project explores interoceptive awareness as a fundamental mechanism of consciousness, examining how altered states, such as near-death experiences (NDEs) and psychedelic journeys, reveal a recurring “three-pillars” structure mapped onto the central nervous system (CNS), vagus nerve pathways, endocrine processes, and the gut-brain axis. Recent work on predictive coding (Barrett & Simmons, 2015) and interoceptive accuracy (Garfinkel et al.,2015) has enriched our understanding of how these physiological systems contribute to self-awareness, emotional regulation, and the integration of the "three-pillars" into conscious experience. The “three-pillars” model captures the physiological and neural foundations of consciousness--the central pillar represents the CNS’s integrative role, while the peripheral pillars correspond to ascending and descending vagus nerve pathways, essential for interoceptive signal processing. Altered states, such as NDEs and psychedelic experiences, often evoke archetypal imagery--like light tunnels or mythic figures--suggesting these motifs arise from neural and physiological processes (Critchley & Harrison, 2013). These recurring patterns provide a unique lens through which altered states reveal the body’s architecture of consciousness, offering insights into this novel “three-pillars” framework. Interoceptive predictions, linked to both emotional processing and cognitive patterns, are particularly relevant in understanding how these motifs emerge and manifest across different states (Barrett & Simmons, 2015). The gut-brain axis plays a pivotal role in shaping cognition, emotional regulation, and decision-making (Bruce-Keller et al., 2018). The microbiome influences neurotransmitter release, immune signaling, and hormonal cascades, thereby impacting perception and self-awareness. Khalsa and Lapidus (2016) suggest that interoceptive biomarkers offer diagnostic tools for exploring the intersection of biology and subjective experience, further linking altered states with interoception. These findings align interoceptive awareness and the "three-pillars" with studies of Campbell’s monomyth and Jungian archetypes, underscoring how biologically rooted signals manifest as universal symbolic patterns in altered states. The “three-pillars” structure demonstrates further connections to emerging theories of consciousness. The central pillar emphasizes the CNS as the integrative hub for sensory and cognitive processing, while ascending vagus pathways enhance emotional regulation and self-awareness (Critchley & Harrison, 2013). Descending pathways, by contrast, regulate subconscious and autonomic processes, creating a dynamic feedback loop between conscious and unconscious systems (Garfinkel et al., 2015). This interplay mirrors the integration of neural networks in forming coherent patterns of cognition. Empirical studies reinforce practical applications of these insights--vagus nerve stimulation has been shown to enhance interoceptive awareness and emotional resilience, offering promising pathways for mental health interventions and modulation of conscious states (Maciorek & Skora, 2020). Neuroimaging studies and interoceptive predictive coding models further demonstrate the connection between interoceptive processing and self-awareness. By integrating these findings, The INSIGHT Project bridges altered-state phenomena with biological mechanisms and quantum processes, providing a unified framework to explore the science of consciousness.

PO - 3 (Wed)

Keywords
Consciousness, Interoceptive Awareness, Central Nervous System, Vagus Nerve, Gut-Brain axis, Endocrine System, Microbiome, Altered States, NDE, DMT, Three-Pillars, Art, Literature, Film, Architecture, Campbell's Monomyth, Jungian Archetypes

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Investigating reincarnation as a missing piece in the “origins of talent” puzzle: A pilot study

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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
Across many achievement fields, extraordinary feats of athleticism, musical prowess, intellectual abilities, and artistic expertise make one wonder whether talented individuals are born or made. This question has puzzled scientists and fueled academic debates. Despite scientific advances in the study of innate and environmental predictors of talent, the explanatory power of current models is still low, highlighting a significant gap. Scientists may be missing a key piece of the “origins of talent” puzzle that lies outside conventional thinking and that may afford unprecedented breakthroughs. Over the past decades, the systematic study of children who spontaneously report alleged memories of past lives has unlocked new avenues of research that defy current physicalist paradigms. Scientists have studied over 2,500 cases of the reincarnation type (CORT) across the globe. These involve children aged 2-5 making specific statements about an alleged past life including name, hometown, occupation, family, and mode of death, often allowing researchers to identify a deceased individual whose life matched them. In 9% of the cases, children are said to have unusual skills related to their alleged past life. Yet, no studies have examined whether the origins of talent could be influenced by, in addition to nature (e.g., genes)

and nurture (e.g., practice), a third causal variable: reincarnation of the pre-existing consciousness. Our project aimed to fill this gap. We investigated the world's largest CORT database to assess whether a child's talent could be at least partly explained from the previous personality's talent. Cases were selected for analysis if they met the following criteria: (1) the child had an unusual skill related to the alleged past life or an outstanding school performance; and (2) the child was from an English/French/Spanish/Portuguese-speaking country (to facilitate communication with the first author, if a follow-up was needed). Fifty-four cases were retained. For each case, we assessed whether (a) the child presented early signs of talent based on Winner's (2000) criteria (i.e., ease of learning, precocity, passion for the domain, and independence in skill development); and (b) the child's talent related to the previous personality's skill in the same domain. The previous personality was identified in 18 cases. Among the selected cases, most skills (e.g., sewing, hunting, hairdressing, babysitting) were outside traditional talent domains (e.g., sport, music, arts, math). Two cases had sufficient data for conclusions to be drawn about both the child's level of talent and the previous personality's skill level in the same domain: (1) a 2-year-old golf prodigy reported memories consistent with the life of a professional golfer from the 20's; and (2) a 2-year-old with high baseball talent reported detailed memories of the life of a baseball Hall of Famer. The findings suggest that, in addition to known genetic and environmental factors, talent may also partly originate from a prior life and provide further support for the reincarnation hypothesis. Future studies should assess whether any highly talented/gifted/prodigy/genius children also report memories of past lives and, if so, whether their talent relates to a previous personality's talent.

C - 9

Keywords
talent, giftedness, prodigy, reincarnation hypothesis, CORT, past-life memories

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After-Death Communication with Cell Phones
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.08].....Near-death and anomalous experiences

Abstract
Due to accounts of after-death communication (ADC) with cell phones that had spontaneously arisen in the general population, the first author carried out a preliminary survey of people's experiences of ADC with cell phones. On the basis of this pilot study, a three-pronged project was initiated: 1. A large-scale survey of people's ADC with cell phones experiences; 2. Interviews of survey participants; and 3. An investigation of cell phone applications whose ostensible purpose is to communicate with the deceased. The survey consisted of a 55-item self-report measure of ADC cell phone experiences, Gerald Saucier's Personality Inventory, and Carol Ryff's Scales of Psychological Well-Being. Current analyses are based on 305 survey responses. Common forms of anomalous cell phone activity included text messaging, incoming calls, and photos or videos showing up on the cell phone attributed to the deceased, for instance, a meaningful text message that the participant had not typed. Cluster analyses revealed several coherent constructs including "Positive Powerful Communication" which brought together items about the clarity of the message and the peace of mind that participants gained from their cell phone experiences. With a few exceptions, the anomalous cell phone experiences were overwhelmingly positive. As a group, participants scored higher than norms on all personality measures including Extroversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect, and higher on two well-being measures, Autonomy and Personal Growth, but lower on the well-being measure Environmental Mastery. In other words, as a group, our participants are psychologically healthy individuals so that the occurrence of their cell phone experiences needs to be taken seriously. To gather additional details and understand the context for these experiences, 65 participants have been interviewed thus far. For instance, in one case, a participant, who had not believed in life after death, had received cell phone messages that convinced them of the continued existence of their partner and who had gone on to write a book about their experiences and teach others about ADC. We acquired two cell phones and loaded 347 applications whose purpose is to communicate with the deceased. Many of the applications seemed impractical for communication purposes, often appearing frivolous, with vague and disorganized descriptions of their functionality. These 347 applications could be classified into three main groups: 1. ghost detector apps; 2. phone sensors with built-in dictionaries that spew out words; and 3: spirit box applications that mimic electronic voice phenomena (EVP) and instrumental transcommunication (ITC). Thus far, there has been some suggestive output from running some of these applications, including the occurrence of some Group A EVP voices. Overall, there is sufficient evidence from these three prongs to ascertain that something anomalous is happening that is suggestive of survival.

C - 9

Keywords

survival hypothesis, after-death communication, electronic voice phenomenon, instrumental transcommunication, cell phone applications

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Toward Understanding the Mechanisms of Extra Sensory Perception
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Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
[05.09].....Parapsychology

Abstract
Extra sensory perception (ESP) including telepathy and clairvoyance are much more consistent with idealism rather than with materialism. Idealism is usually associated with the primacy of consciousness. We define consciousness as an ability of a life form for self-awareness along with its ability to receive, store, process, and transmit to other life forms emotions and information. Philosophers - idealists such as Pythagoras, Plato, Leibniz, Hegel, and Kant made important contributions to the foundations of modern science. Today, we are witnessing a modern resurgence of idealism, exposed in the books by Bernardo Kastrup, Donald Hoffman, Federico Faggin, and in the Manifesto for Post-Materialist Science (2014). Per Kant, cognition is possible only within the realm of experience; empirical objects in this realm are mind dependent. Therefore, the notion of matter existing independently of our mind is merely a long-held hypothesis. In contrast, the hypothesis of the primacy of consciousness should be considered at least as plausible as that of the primacy of matter. If we postulate the primacy of consciousness and accept that spacetime is not fundamental (David Gross, 2005), one can interpret the conclusion regarding the functioning of Psi beyond spacetime (Goswami, 1999). As stated in The Manifesto for Post-Materialist Science, “The Psi phenomena, Near Death Experiences (NDE) during cardiac arrest, and replicable evidence from credible research mediums appear anomalous only when seen through the lens of materialism.” If the world is represented as a network of conscious agents (Donald Hoffman), we suggest that telepathy could be considered a normal means of communication within such a network. When a conscious agent establishes a stable interface with the human brain and body, brainwaves are generated. The brainwaves typically prevent ESP phenomena, like telepathy and clairvoyance, from functioning under normal conditions of human life when survival focuses human attention on immediate surroundings rather than distant events perceivable through ESP. Nonetheless, when loved ones, such as family members, are in danger, ESP mechanisms may activate, driven by the evolutionary imperative to ensure their survival. This description favors ESP working better during sleep. NDE represents a state in which the interface between the conscious agent and the human brain and body is broken. The conscious agent retains awareness of the body’s location, but in the absence of the brainwaves, telepathy and clairvoyance resume as primary means of communication and cognition. This model aligns with Faggin’s concept of the conscious agent as a unit of the quantum field (Irreducible, 2024). Similarly, van Lommel (2024) observes a positive correlation between the clarity of consciousness and brain function loss. An important role in ESP mechanisms is attributed to the Void located in the structure of the multidimensional pattern known as the Flower of Life (www.marcelvogel.org). When you access the Void, you can access all the universes contained in the Flower of Life. Collapse of two points into one in spacetime resulting from quantum entanglement can support information exchange by sharing it, so that no data transfer is required. Accessing the Void you can connect with any point in spacetime.

C - 18

Keywords
ESP, Idealism, NDE, Postulating Primacy of Consciousness, Psi, Spacetime is not fundamental, Network of Conscious Agents

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Evidence for worldwide modulation of physical randomness correlated with coherent consciousness during New Year's Eve celebrations:
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Categories by Discipline
4.0 Physical and Biological Sciences

Primary Topic Area - TSC Taxonomy
[05.09].....Parapsychology

Abstract
This study explored the hypothesis that during moments of collective human focus and emotional resonance unexpected coherence will

emerge in random physical systems. This mind-matter interaction hypothesis was tested during New Years Eve celebrations in each time zone using data from the Global Consciousness Project, a worldwide network of electronic truly random number generators. Analyses of data spanning the years 1998 to 2025 —including simple measures like mean shifts as well as changes in entropy, chaotic attractors, fractal dimensions, and Principal Components Analysis (PCA) —revealed statistically significant deviations at or within minutes of the stroke of midnight on New Years Eve, as compared to the same analysis applied to midnight transitions every other day of the year and to randomized permutation techniques (e.g., p = 4.8 × 10^−7 for the PCA analysis). The study also found that the statistical deviations were stronger in time zones with higher vs. lower populations, suggesting that the magnitude of this psychophysical interaction was related to the number of minds engaged in a coherent focus of attention. Alternative mundane explanations, including possible environmental artifacts, were considered but deemed unlikely because the RNGs were specifically designed to exclude such influences. An imaginative roundtable discussion among the founders of quantum mechanics is used as a vehicle to discuss these results.

PL-11

Keywords
collective consciousness, mind-matter interaction, psychophysical phenomena, philosophical models

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The Case of Anomalous Psycho-Physical Interactions: Investigating an Unconventional Hypothesis Within a Methodologically Rigorous Framework

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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.09].....Parapsychology

Abstract
Introduction: Despite decades of experimental investigation, a fundamental question remains: Can the mind influence the probability of physical systems' outcomes? Empirical exploration of such anomalous (psycho-physical) interactions – the concept of the mind influencing distant physical systems through yet-unidentified mechanisms – relies on statistical analyses to infer the presence of unexpected factors that might bias chance expectations. As a result, evidence for these interactions is subject to the inherent challenges of statistical research, as well as major controversy and debates about methodological rigor (Walleczek & von Stillfried, 2019) and the replicability of positive findings (Jahn et al., 2007; Jahn et al., 2000). To address these challenges and align with ongoing efforts to enhance research methodologies across experimental sciences (Nosek et al., 2018), this study sets forth to explore the hypothesis of anomalous interactions using advanced methodologies, which include a preregistration methodology, integrating Advanced Meta-Experimental Protocol (AMP) counterfactual experimentation to address systematic biases, and the commitment to internal self-replication before publishing statistically significant findings. Methods: This study proposes four experiments employing different variables of interest, in which participants attempt to influence the output of a distant RAVA TRNG circuit (Guerrer, 2023) while observing real-time feedback in the form of a varying-diameter circle and intending its increase. The task is conducted remotely, with participants physically separated from the TRNG device and viewing the feedback circle through videoconference. Following the AMP protocol, participant sessions are followed by sham sessions, which differ in the absence of an observer watching the real-time feedback. It is predetermined that the most successful experiment, if any, should trigger a self-replication stage, with the sample size determined via power analysis based on the observed effect size. Results: As outlined in the preregistered protocol, 60 participant sessions were conducted for each of the four experiments, along with corresponding sham sessions, resulting in a total of 480 sessions. None of the experiments met the preregistered success criteria. Consequently, none advanced to the in-lab self-replication stage. The conclusion from this experimental round is that the results do not justify rejecting the null hypothesis, which assumes the absence of anomalous interactions. Discussion: Considering the preregistered protocol, the results provide no evidence of anomalous interactions. An exploratory analysis reveals opposite-direction deviations in some variables of interest that will be subjected to additional confirmatory experiments. This study seeks to elevate the standards of inquiry into unconventional scientific hypothesis by emphasizing replicability, transparency, and rigorous controls. To this end, it also commits to internal self-replication in cases of statistically significant results from preregistered analyses, and confirmatory replications of exploratory findings before publication.

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Keywords
Anomalous Psycho-physical Interactions, Random Number Generators, Advanced Methodologies, Advanced Meta Experimental Protocol (AMP), Replicability

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Beyond the Veil: A Systematic Investigation of Trance Channeling within UAP Research
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Institute of Noetic Sciences, Novato, CA, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.09].....Parapsychology

Abstract
Background: With recent UFO and unidentified anomalous phenomena (UAP) disclosures worldwide, particularly in the United States, there has been a surge in interest regarding the tangible aspects of contact with extraterrestrial intelligences (ETIs). Absent from this conversation are the long-standing and numerous anecdotal accounts from trance channelers who attribute their channeled content to ETIs. In trance channeling, the channeler voluntarily enters a trance state, allowing a supposed disincarnate entity or spirit to use their body to communicate directly via voice, automatic writing, body movements, etc. Trance channeling, also known as oracle communication or prophecy, is deeply embedded in human history, from the sacred temples of ancient Greece to the mystical traditions of the East. Despite this rich historical context, the vast reservoir of knowledge from trance channeling remains underutilized for research purposes, lacking a systematic platform for collection and analysis. Objective: This study aims to address this gap by creating a dedicated data archive to compile trance-channeled content attributed to ETIs and comparing this information with a separate dataset of non-channeled UAP content. Methods: Participants who have access to trance-channeled content believed to originate from ETIs were invited to upload their data to a SurveyMonkey platform. They also provided demographic and contextual information about the trance channeler, such as age, gender, and location, and the purported ETI being channeled. Submissions were assessed for inclusion based on predefined criteria (i.e., trance-channeled content with a believed ETI source). The media types accepted included audio, video, and text, while drawings were excluded. Additionally, researchers gathered publicly available eligible materials to supplement the dataset. All materials were converted to text format. Collaborator Ryan S. Wood processed this data using a specialized AI tool, UFOgpt, which is trained on a million pages of UFO-related materials, including books, periodicals, newspapers, and military documents. Both datasets—trance-channeled content and UFOgpt—were interrogated with questions about Identity and Existence, Social and Cultural Structure, Technology and Capabilities, Relationships and Interactions, and Philosophical and Existential Beliefs. The analysis focused on comparing the trance channelers' responses with those generated by UFOgpt, and any verifiable answers were assessed for accuracy. Results: This project is currently ongoing and results will be complete by the conference. Conclusions: Regardless of the results of the comparative analysis, this project provides a structured platform for the analysis of this content, the project encourages scientific exploration into phenomena often considered fringe, potentially unlocking new avenues of research into consciousness, communication, and the possibility of ETIs. The employment of advanced AI tools like UFOgpt not only aids in processing vast datasets but also enhances AI capabilities applicable beyond this research. While the project may not decisively prove ETI origin, the project could identify patterns or debunk myths, sparking ethical discussions regarding humanity’s readiness for potential contact scenarios and their societal implications. Overall, this project holds the potential to significantly influence scientific inquiry, cultural dialogues, and philosophical debates, engaging the public in meaningful discourse on UAP.

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Keywords
trance channeling, UAP, ETI, extraterrestrial intelligence

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The Transformative Power of Tantric Mantra: Altered States of Consciousness for Wellness, Clarity, and Bliss
Mr. Raja Choudhury MArch AA Dipl.
A Thousand Suns Academy, Princeton, NJ, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.10].....Contemplation and mysticism

Abstract
Can the chanting of ancient Tantric Mantras truly alter our states of consciousness? Can they permanently rewire our synaptic pathways, leading to profound mental states, heightened intuition, and bliss-filled balanced experiences that transcend mental wellness issues and manifest positive transformation? I believe they can, and my work with thousands of students and seekers over the past decade has yielded compelling evidence to support this claim. For centuries, Tantric mystics in India have explored sound's scientific and spiritual dimensions through mantra chanting, utilizing specific frequencies, rhythms, and focused intention to access higher states

of consciousness. By combining mantra with pranayama (breathing techniques), visualization of sacred geometries, and adopting specific asanas (postures), these practitioners sought to transcend the limitations of ordinary perception and experience the non-dual singular intelligent substance that lies at the heart of existence. More than just a spiritual pursuit, these practices were designed to optimize well-being, facilitate mental and emotional healing, enhance clarity and creativity, and empower individuals to live a life infused with joy and purpose. Drawing from Shiva and Shakti Tantric schools, I have been immersed in these practices for over 25 years, witnessing firsthand their profound impact on individuals from all walks of life. My work has revealed that the specific sound patterns embedded within Tantric Mantras have the potential to alter brain chemistry, induce altered states of consciousness, and facilitate deep healing – all without the need for pharmaceutical, psychedelic, or electronic interventions. These mantras, often personified as living energies or Goddesses of Power (Shakti), can be used to invoke specific qualities, such as peace, clarity, courage, or compassion, and to dissolve limiting beliefs and emotional blockages. In my teaching experience with thousands of individuals in India and the US, I have observed remarkable transformations: anxiety symptoms dissolving into tranquility and balance, depression giving way to joy, and chronic pain replaced by a sense of ease and vitality. These tangible results have inspired me to delve deeper into the neurophysiological mechanisms underlying these shifts. In collaboration with Jay Sanguinetti of the University of Arizona's SEMA Lab, I plan to explore the impact of Tantric Mantra on the brain, seeking to bridge the gap between ancient wisdom and modern science. This presentation invites you to explore the transformative potential of Tantric Mantra. Through immersive experiences and compelling case studies, we will embark on an acoustic journey into the heart of consciousness, uncovering the power of sound to heal, empower, and awaken us to our full potential. Join me as we explore this potent alternative to conventional approaches to wellness and delve into the magical possibilities that arise when science and spirituality converge.

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Keywords
Non-Local Consciousness, Altered States of Consciousness, Ecstasy, Neuroscience of Tantra, Tantra as Ancient Neuroscience, Meditation, Mantra Chanting, Sound Vibration in Brain Activation, Inner Transformation, Altered States of Consciousness, Healing

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The Embodied Instrument: Cognition through Movement, Real-time Sound Making, and Visual Feedback in VR Dance Improvisation

Leslie Deere PhD
Guildhall, London, United Kingdom

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[05.11].....Virtual reality

Abstract
At the intersection of VR and contemporary dance practice lies a unique opportunity to explore human perception, embodiment and the boundaries of bodily awareness. This study examines how real-time visualisation through particle trails and generative soundscapes influences dancers' lived experience and cognitive processes during improvisation within immersive VR environments. Of particular interest is the emergence of a split consciousness state where performers simultaneously maintain awareness of both physical and virtual realities, creating what might be termed 'dual-stream consciousness' in movement practice. The research specifically investigates this paradoxical state of embodiment, where the physical body responds to gravitational forces and spatial boundaries while the virtual presence generates its own visual and sonic feedback, requiring a unique form of divided yet integrated awareness. Through a mixed-methods research design, the investigation analyses professional dancers' experiential and physical adaptation when their movements generate immediate visual and sonic feedback, focusing particularly on how this simultaneous dual presence affects spatial awareness, temporal perception and decision-making processes. The research methodology integrates both quantified movement analysis and qualitative approaches, with particular emphasis on phenomenological documentation of the dancers' responses to this technological intervention. This multidimensional embodiment challenges traditional theories of perception in movement, which typically focus on the singular relationship between physical space and bodily processes. In VR dance, performers must integrate multiple streams of sensory information - their innate proprioception, the visual feedback from the virtual environment and the generated soundscape - while maintaining physical safety and artistic expression, suggesting the emergence of an expanded state of being specific to technology-mediated movement practice. Participants engage in structured improvisational tasks within a VR environment that transforms their movements into persistent particle trails and responsive soundscapes, creating an augmented form of embodied awareness that transcends traditional boundaries of bodily perception. This investigation contributes to the growing discourse on human experience in technology-mediated practices, specifically examining how varying levels of embodied presence impact movement quality, creative expression and improvisational choices. The study focuses on how this unique form of dual awareness shapes new movement vocabularies and transforms conventional approaches to spatial understanding, temporal perception and creative freedom in contemporary dance practice.

PO - 3 (Wed)

Keywords

Embodied Cognition, Dance, VR, VR audiovisuals, Gestural Audiovisuals, The Embodied Instrument, Presence, Immersion, Dual-stream Consciousness

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Consciousness in Virtual Reality and the Interface Theory of Perception: An Experimental Study
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Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.11].....Virtual reality

Abstract
In [1] we argued that the Interface Theory of Perception (ITP) [2] offers an explanation of how consciousness operates in virtual reality (VR). First, what is perceived in VR is completely different from raw sensory inputs. While participants in VR actually view two rectangular pixel arrays - one per eye - they perceive interactive perceptual objects distributed in an illusory extended space. Second, when an object is not in the participant's field of view, it ceases to be displayed, corresponding to the ITP tenet that an object comes into existence when it is perceived. In VR an object not perceived still exists in a deeper reality, stored as geometric and material descriptions in a database, ultimately encoded as electronic signals in the computer system. What is perceived in VR is not veridical. Third, according to the ITP, consciousness is primary, with every conscious agent engaging in a world formed by the activity of other conscious agents. This holds even for a solitary VR participant: every movement or gesture triggers events based on vast human activity—from hardware manufacturing to coding. The light emitted from every pixel is generated by 'Agent 0', the collective effort of countless people responsible for constructing the VR scenario and system and its dynamic responses. When multiple individuals share a VR scenario, each person's experience emerges from their own and everyone else's actions plus Agent 0. Fourth, the ITP maintains that perception hinges on 'payoffs' where objects are perceived according to their affordances rather than objective properties. We tested this with 20 participants in Mixed Reality. They physically walked diagonally across a real room, where there were randomly placed virtual round tables and vertical sticks. After several traversals, they encountered small rectangular objects resembling books on the floor, which they were instructed to pick up and place above the floor. A book placed on a virtual table fell through to the floor, revealing no solidity. Yet near the top of each stick was an invisible circular area matching the tables' diameter, where books remained supported. Hence participants discovered that although tables looked solid and the solid areas above the sticks were not visible, it was the sticks that had the necessary payoff. Finally, participants crossed the room again without any books present. In this third session, they walked closer to and through the tables but avoided sticks more than in the first. A presence questionnaire showed that this occurred more the stronger the illusion that the tables and sticks were really there. Hence, and crucially, the greater this sense of the virtual being real, the less they relied on vision and the more on the 'payoff'. Although this result does not 'prove' the ITP, it demonstrates that a central principle of the theory operates in VR, even though the theory remains open with respect to consciousness in the physical world. [1] Slater and Sanchez-Vives (2022) Front Psychol, 13. [2] Hoffman (2016) Current Directions in Psychological Science, 25.

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Keywords
virtual reality, mixed reality, consciousness, interface theory of perception, perception, experiment

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Marriage Between An Incarnate and Discarnate Human and the Implications for Humanity
Diana M Jackson
University of Melbourne, Melbourne, Victoria, Australia. Monash University, Melbourne, Victoria, Australia

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[05.12].....Miscellaneous

Abstract
My presentation is about the initiation in 2018 and subsequent enactment of a spirit marriage between myself and a discarnate human who died in 2009, and my lived experience of this relationship and marriage. The specific anomalous phenomena I have documented are: dream visitations; clairaudient communications; signs and synchronicities; readings from professional mediums; and the

clairaudience, dreams and intuitions of other (intuitive) people. Alongside documenting these concrete events, I have documented my progressive journey from skepticism and doubt to openness and acceptance of the phenomena as real and indicative of certain facts about reality and existence. I have read several books on the topics my experience has prompted me to learn about: my husband's life and work; sustained relationships between incarnate and discarnate humans; mediumship; other parapsychological topics; meditation; life in between incarnations; consciousness and its non-ordinary states; lucid dreaming; out of body travel; and spirit marriage. This phenomena I have documented with over 2 million written words, 21 podcast episodes, over 170 films, photographs, over 31 blog essays, hundreds of voice recordings, 3 music albums plus singles, live music performances, visual art and recorded professional mediumship and astrological readings. My spirit marriage, and the continuity and interactivity of my husband's consciousness, are demonstrated by my own consistent experiences, and also corroborated by third parties: professional mediums and other (intuitive) people. My experiences and findings are also consistent with those of other contemporary and historical explorers of consciousness, psi/noetic scientists, professional mediums, and other researchers and practitioners of spirit marriage. They are also consistent with the metaphysical teachings of many ancient and established spiritual traditions, as well as the findings of mainstream science, e.g. quantum mechanics and Jungian and transpersonal psychology. After demonstrating the reality and validity of the phenomenon of spirit marriage, I discuss what it suggests about human nature, society and evolution. To this end, I consider spirit marriage in general, as well as my spirit marriage in particular. My discarnate husband is the world-famous performing artist Michael Jackson, which adds a powerful societal element to my experience: millions of people in the world know of and love Michael, so tremendous attention can be drawn to these lesser-known, but very important, topics in consciousness and human evolution.

PO - 3 (Wed)

Keywords
Spirit marriage, relationship, marriage, discarnate, consciousness, survival, surviving death, interdimensional, dreamvisitations, clairaudience, psi, spirit, spirit communication, signs, synchronicity, mediumship, dreams, intuition, time, reincarnation, pattern, symbolic, skepticism, faith, michael jackson, meditation, parapsychology, altered state, lucid dreaming, hypnagogia, music, art, astral, science, podcast, film, individuality, noetic, metaphysics, spirituality, philosophy, existential, quantum mechanics, carl jung, transpersonal, society, human nature, humanity, evolution, love

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Quantum Fiction as a response to Cultural Pressure following advances in Quantum Perception and Artificial Intelligence
Tracy Shew M.A. Art History
SUNY Binghamton, Binghamton, NY, USA

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.01].....Literature and hermeneutics

Abstract
In the late 19th and early 20th centuries we were at a crossroads. Photography had made the traditional role of the artist "obsolete," and social fragmentation created pressures and new ideas. Art responded by developing modern art methods which created works which photography could not match. Einstein's relativity and especially its confirmation in the eclipse of 1919 corresponded with forms such as cubism almost as a response. These were created by artists which may not have understood the deeper parts of theory, but recognized the cultural pressure and the revolutionary nature of the ideas. Today, similarly, literature is under pressure to defend itself or transform with the advent of artificial intelligence. Now, a "novel can be created in seconds" by giving ChatGTP the parameters. And, we have the possibility of a "1919 moment" with experiments which may confirm Penrose-Hameroff theories of quantum structures giving rise to consciousness. We can imagine literature responding to A.I. in a Darwinian sense by "creating things which ChatGTP cannot replicate." The simultaneous interest in quantum consciousness might inform this exploration by defining quantum structures or events in prose. "Quantum Fiction" has been a niche genre in literature since it was defined in 1990 by Charles Platt. It is not a dystopian nor scientific genre, but one in which quantum elements alter plot structure, character development, or even diverse elements such as dialogue and setting. As a genre, it is always hybrid in its incorporation. For example, a story might be described as "epic fantasy, but it has some quantum elements." The production of a "pure quantum" story may have been attempted, but this may lead to instability in structure or development, such as leaving a strictly linear timeline and consistent point of view in favor of quantum randomness which seems indecipherable. Quantum fiction has been problematic to sell. Author Vera Ulea stated, "The theme can be any, including the quantum one, but the technique should be unlike the one we observe in mainstream literature. Therefore, a traditional formulaic language of synopsis required by literary agents and commercial publishers doesn‘t work for QG. The Quantum Work can‘t be sold to them and it has no appeal to the mainstream reader just in the same way as Impressionism or Cubism had no appeal to the general viewer." This author sees this exploration as a crucial reaction to cultural pressures from theoretical advances. The quantum works might help people accept and have an image towards "quantum weirdness," exactly in the way that modern art offered an acceptable image towards relativity. If this new revolution follows a similar course, these works would be produced and consumed by those without scientific knowledge of quantum theory. But if literature is to help contribute to broad imaging of quantum theory, traditional methods of judging and publishing works must adapt from traditional structures to something more inviting and accepting towards quantum forms.

PO - 2 (Tues)

Keywords
Literature, Quantum Fiction, Relativity, Cubism, 1919 eclipse, Art, Art History, Artificial Intelligence, A.I.

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Talking to the Gods: Finding Traces of Bicameral Mentality in Mayan Oral Literature.
Dr. Daniel Montoya Ph.D, Dr. Jose Franco Rodríguez Ph.D.
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Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.01].....Literature and hermeneutics

Abstract
This study examines a collection of contemporary Mayan oral stories through the lens of Julian Jaynes's theory of the origin of consciousness. The goal is to explore a potential link between their literary elements and traits of preconsciousness as described by Jaynes. Based on ancient and classic texts and artifacts, Jaynes's neuropsychological thesis argues that humans started to acquire consciousness about 3,000 years ago following a period of imaginary perceptions he dubs the "bicameral mind." During that period, humans experienced auditory "hallucinations" that guided their non-habitual behavior. Jaynes claims that remnants of bicameral mentality linger to this day in all cultures, some in the form of what modern psychology has regarded as mental disorders. This theoretical framework has been applied to some cultures in Europe, the Middle East, and Asia, but very scarcely to America. Our analysis of early Mayan narratives and examination of 78 brief oral texts from Lake Atitlán (Guatemala) reveals evidence of bicamerality throughout Mayan history, which is also evident in the lake's oral tradition. These include the gradual fading of divine inner voices, their apparent replacement with divination, anomalous mental states, encounters with the supernatural, and spiritual possession. In this Mayan context, these behaviors are frequently regarded as a gift, an ability, an enriching aspect of Maya spirituality that they may not have felt culturally compelled to suppress to the extent of other societies.

PO - 2 (Tues)

Keywords
bicameral mentality, consciousness, Julian Jaynes's theory, Mayan oral literature.

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Aesthetic Consciousness as an Emergent Phenomenon: A Complex Systems Approach
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Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.02].....Aesthetics

Abstract
Introduction Aesthetic consciousness—the ability to perceive, experience, and reflect on art and beauty—has been examined through various disciplines, including philosophy, neuroscience, and art theory. However, its emergent and dynamic nature suggests that a complex systems approach can provide deeper insights. This study explores how the interplay of neurobiological processes, network theory, pattern emergence, and enactive cognition contributes to the formation of aesthetic consciousness in human experience. Research Problem Traditional studies on aesthetics often fragment artistic experience into sensory, cognitive, or emotional components, overlooking their interconnections and emergent properties. Research by Antonio Damasio and Semir Zeki has demonstrated that aesthetic perception involves intricate brain networks that process information dynamically. This study seeks to answer the question: How can a complex and dynamic systems approach provide a more holistic explanation of aesthetic consciousness? Methodological Approach This research adopts an interdisciplinary framework to grasp the complexity of aesthetic experience. From philosophy and aesthetics, Kant's Critique of Judgment and Adorno's Aesthetic Theory contextualize the problem within philosophical thought, highlighting its implications for art perception. In cognitive neuroscience, Damasio's somatic marker theory and Zeki's neuroaesthetics research provide insights into the neural basis of aesthetic perception and its connection to emotion and cognition. Additionally, the study employs complex systems theory to understand aesthetic experience as a distributed and dynamic phenomenon. Concepts such as emergence, complex neural networks, and self-organization help analyze how perceptual and artistic patterns arise, moving beyond reductionist perspectives. Enactive cognition further expands this view by emphasizing the subject's

active engagement with the artwork, underscoring the role of the body and environment in the emergence of aesthetic consciousness. This perspective challenges the notion of aesthetic experience as a purely cerebral phenomenon, reframing it as an embodied and context-dependent process. Expected Results and Conclusions This study proposes that aesthetic consciousness is not a static entity nor reducible to a single cognitive or emotional dimension, but rather an emergent phenomenon within adaptive systems. Drawing from chaos theory, it suggests that aesthetic perception follows the principles of nonlinear dynamic systems, where minor variations in stimuli or an individual's internal state can lead to significantly different experiences. Rather than being confined to specific neural patterns or localized brain areas, aesthetic consciousness emerges from the dynamic interaction of multiple neural, bodily, and environmental factors. This perspective challenges reductionist views by positioning aesthetic experience as a distributed and context-dependent process shaped by the continuous interplay between perception, emotion, cognition, and sociocultural influences. By redefining aesthetics as a dynamic and integrative process, this study highlights the need for future research to further explore how complex systems theory can advance our understanding of art, technology, and consciousness.

PO - 2 (Tues)

Keywords
Aesthetic phenomenology, Aesthetic Consciousness, Neuroaesthetics, Emergence

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Conceptual Associations while Listening to Paweł Szymański's "Two Studies" for Piano
Prof. Violetta K. Kostka
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Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.03].....Music

Abstract
For some time now, the scientific community has been testing and developing the conceptual blending theory proposed by Fauconnier and Turner in 2002. The authors state that part of human thinking and action is based on a cognitive operation in which concepts/elements accumulate in the so-called mental spaces and which proceeds according to constitutive and guiding principles, and ends with the emergence of a meaning or a new idea. My goal is to present semantic interpretations of Two Studies for piano of Polish leading composer Paweł Szymański (b. 1954) in the light of conceptual blending theory. In order for the audience to be able to understand the problem, each interpretation will be preceded by listening to a fragment of the work. I will also use the diagrams of Oakley and Pascual, consisting of two input spaces and the blended space. The Two Studies of Paweł Szymański are based on baroque initial structures, which have been transformed and extended with the help of certain mathematical ideas. A few music critics and myself associate the First Study, the chordal one, with the phenomenon of natural echo. It is so because each fragment generates similar conceptual networks: the echo input includes a loud sound source and its single or multiple reflections, whereas the musical input is broken down into a ff chord and a number of repetitions of the same chord in dynamics mf. All correspondences from two inputs are based on analogy. The selected elements from both inputs are combined in the blended space and a new meaning emerges–a musical echo. The Second Study, a single-voice melody, is composed alternately of many quasi-baroque sections and modernist sections. Listening to them evokes associations with two kinds of movements: with a clear goal and in a circle. Through conceptual blending, this association leads to the emergence of the following meanings: musical movement with a clear goal and musical movement in a circle. In the discussion and conclusion part of my paper I would like to mention other examples of associations, which arise during the perception and cognition of music. The results will be taken from my research I have been conducting for several years now. References: M. Antović, Multilevel Grounding: A Theory of Musical Meaning, Routledge 2022; G. Fauconnier, M. Turner, The Way We think: Conceptual Blending and the Mind's Hidden Complexities, Basic Books 2002; T. Oakley, E. Pascual, Conceptual Blending Theory, (in) The Cambridge Handbook of Cognitive Linguistics, CUP 2017; L. Zbikowski, Foundations of Musical Grammar, OUP 2017.

C - 8

Keywords
musical meaning, conceptual blending, personal association, Paweł Szymański

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Musicopoiesis and the Co-Enactive Resonance Loop (CERL): Modeling the Self-Organizing Mind through the Phenomenology of Music Improvisation
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University of Vienna, Vienna, Austria

Categories by Discipline

5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[06.03].....Music

Abstract
Music is fluid architecture in time that profoundly touches the human heart. More than a product to consume or a process to perform, music potentiates transformative experiences and fosters harmonization of the body and the mind. The synesthetic experience of musicking and its intrinsic relation to time make it a potent socio-epistemic technology uniquely suited to exploring creative self-organization. In this presentation, music is explored as a resonance sphere and transformative vehicle by examining the phenomenology of musical peak experience through the theoretical lenses of enactivism, resonance, correspondence, active inference, and integral consciousness. Of particular interest is the phenomenon of musicopoiesis, i.e. a qualia where mind seems to effortlessly channel itself through music that seemingly arises ‘by itself’, critically fined-tuned to affordances of the present and enabling resonance with potentials that want to emerge. Drawing from personal field notes of concerts and festivals, I present a rich phenomenological tapestry of musical peak experiences that invite a closer look at the semantic depth of musical terminology often taken for granted: What does it mean to be 'in the pocket' or to experience 'flow'? What do we refer to when we say that 'it grooves'? What exactly is ‘it’ that flows and grooves? These properties point toward an agential force beyond the musician's conscious control and suggest a quality of mind that is experienced as both static (a spatial zone) and dynamic (a temporal flow). I argue that these phenomenological statements accurately reflect the notion of a topological pocket and quite literally describe the first-person experience of a musicking mind enveloped in a whirling island of dynamical stasis. Finally, I present the Co-Enactive Resonance Loop (CERL) model, which integrates phenomenological and theoretical perspectives and describes the epistemogenetic drive toward self-transparency and knowledge from the inside inherent in the agential substrate of a musicopoietic self-world system. This research project aims to establish how music can bring forth latent potentials and inner processes via improvisation in the service of self-transformation and consciousness intensification, tracing a path toward an adaptive transformation of cognitive science and musical practice. In this sense, a cycle closes from phenomenology to theory into practice and experience-based consciousness studies. The CERL framework provides a first step toward a co-enactive research program dedicated to the holistic and integral study of individual and collective musical improvisation and creative self-organizing criticality.

PO - 3 (Wed)

Keywords
music, improvisation, creativity, self-organization, criticality, enactivism, flow, resonance, correspondence, active inference, strange loops, integral consciousness, topological pocket

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Resonating in a Modern World: Himalayan Singing Bowls and Vibrational Healing
Suren Shrestha B.S.
MSU, Boulder, CO, USA

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.03].....Music

Abstract
The Himalayan people have practiced the sacred ritual of sound healing for over a thousand years. Traditional singing bowls are carefully crafted and played to harmonize the human body, mind, and spirit with the frequencies of the natural world. Understanding this ancient art within the context of contemporary neuroscience and vibrational medicine reveals the immense importance of this practice as a means of healing the body from the stresses of modern life.

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Keywords
Himalayan people, sacred ritual, sound healing, traditional singing bowls, human body, mind, spirit, frequencies, natural world, ancient art, contemporary neuroscience, vibrational medicine, healing, body, stress, modern life.

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Technomythology
Laura "LD" Deutsch Masters, Religious Studies
Independent Writer, Los Angeles, CA, USA

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.05].....Mythology

Abstract
Are we living in a computer simulation? The question seems to be asked more and more these days. In "Technomythology," the prevalence and popularity of the simulation hypothesis is explored through a mythological framework. Rooted in a formal analysis of mythological models, this essay charts the concept of a computer-programmed reality from its most popular origin point, through the scientific and philosophical presuppositions necessary for its existence, into an associative understanding of its position as a model of reality. Beginning from Carl Jung's concept that "like a snake changing its skin, the old myth needs to be clothed anew in every renewed age if it is not to lose its therapeutic effect," "Technomythology" argues that, although the simulation hypothesis can certainly be understood as the culmination of decades of philosophy, cognitive science and computer science, there is another simultaneous evolution disguised within its argument: that it is a modern, secular creation mythology. Drawing on the work of Carl Jung, Nick Bostrom, N. Katherine Hayles, Marie Louise Von Franz, Jacques Vallée, Rizwan Virk and more, this essay traces the ever-evolving relationship between the collective unconscious and modern information technology. What emerges is a well-contoured and complete alternative narrative that may be read into the techno-hybrid fable of the simulation hypothesis—one that reveals an attempt to recover human meaning in a world marching toward technological totality.

PO - 2 (Tues)

Keywords
Simulation Hypothesis, Creation Mythology, Substrate Independence, Digital Universes, Physics of Information, Cognitive Science, Binary Code, I Ching, Gnosticism, Dharmic Religions, Carl Jung, Marie Louise Von Franz, Nick Bostrom, Gottfried Wilhelm Leibniz.

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Arquetypal Coaching. Creating Synergies Through Astrology and Dream-Work.
Alba Carod MS Education, MSc Consciousness, Transpersonal Psychology
Alef Trust - Liverpool John Moores University, Liverpool, United Kingdom

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.05].....Mythology

Abstract
Archetypal Coaching offers a transformative approach to self-development, blending ancient Greek astrological foundations and dream work with modern coaching techniques, somatic awareness, and Jungian active imagination. At its core, Archetypal Synergies represents a dynamic dialogue with archetypes and dream symbols, fostering a connection with the divine. This process acknowledges fragmented aspects of the psyche, creating opportunities for integration and unlocking higher potential. Dreams reveal unconscious dimensions of the self, while astrological archetypes illuminate the mythological and psychological foundations of behaviors and beliefs. Active imagination serves as a bridge between the conscious and unconscious mind, encouraging clients to engage with emerging symbols in a liminal space. Rather than relying solely on intellectual analysis, this method cultivates a direct, experiential connection with archetypal energies, supporting intuitive and progressive transformation. Unlike most therapeutic and coaching strategies, anchoring through an archetypal trait that inherently belongs to the client has a profound and empowering effect. Based on the big picture that archetypes and dream symbols reveal, clients can create a visual symbolic image of the emerging qualities, expressing their evolving self. This artistic creation serves as an anchor, helping to focus attention and embody the desired state. By engaging with this symbolic representation, individuals strengthen their connection to their transformation, reinforcing personal agency and self-integration. A common critique of astrology is that it limits personal agency. However, Archetypal Coaching engages with symbols dynamically rather than deterministically. Instead of imposing fixed meanings onto astrological and dream configurations, it presents symbolic scenarios, empowering clients to interact with those that resonate with their vision and goals. This participatory approach acknowledges the fluidity of archetypal expression, enabling individuals to consciously shape their reality and personal development. For my master's dissertation, I evaluated the effectiveness of this system using organic inquiry, a transpersonal qualitative research method developed at the Institute of Transpersonal Psychology. This approach is particularly suited for exploring psychospiritual growth through transformative experiences such as archetypal encounters, dreams, synchronicities, and creative expression. By integrating astrological archetypes with dream symbols, this research uncovers unconscious patterns that shape behavior, facilitating deeper self-awareness and meaningful dialogue in therapeutic and coaching contexts.

PO - 1 (Mon)

Keywords
Archetypes, coaching, dream-work, astrology, active imagination, transcendent function, individuation, somatic awareness.

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Exploring Consciousness Studies: An Integrated Framework of AI, Distributed Agents, Blockchain, and Advanced Technologies
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The Chopra Foundation, New York, NY, USA

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.08].....Information technology

Abstract
The study of human consciousness is transforming, driven by the integration of cutting-edge technologies and interdisciplinary research. This abstract introduces a pioneering framework that combines artificial intelligence (AI), distributed agent systems, blockchain technology, and advanced tools such as biomimetic quantum computing, augmented reality (AR), virtual reality (VR), brain-computer interfaces (BCIs), and multiverse theory. This holistic approach aims to advance our understanding of consciousness, enhance individual and collective awareness, and create innovative tools to catalyze the expansion of human potential. The Problem Despite significant progress in neuroscience and psychology, human consciousness remains poorly understood due to the limitations of traditional research methods. These methods often operate in silos, overlooking the multidimensional and interconnected aspects of conscious experience. By integrating advanced technologies, we can address these gaps and develop a more comprehensive understanding of consciousness. Approach This framework leverages AI as a cognitive engine to analyze multidimensional datasets from BCIs, wearable sensors, and subjective narratives. AI models use computational frameworks to elucidate the neural mechanisms underlying subjective experiences, aligning with theoretical advances in consciousness research, such as Koch's computational models and Tononi's information-theory-based measures of consciousness. AI-Driven Consciousness Mapping AI-powered deep learning models synthesize data from EEG, fMRI, heart rate variability (HRV), and subjective self-reports. These models generate personalized consciousness maps that visualize states of awareness, emotional patterns, and transformative insights experienced during meditative, psychedelic, or peak states. These maps bridge neuroscience, psychology, and AI, offering a novel perspective on how information flow in the brain relates to conscious perception. Distributed Agents for Real-Time Feedback Autonomous distributed agents collaborate to process data streams in real-time. They provide adaptive feedback during consciousness-altering practices such as guided meditations, VR simulations, or psychedelic therapy. These agents predict shifts in consciousness states and recommend personalized interventions, fostering collective insights through decentralized, peer-to-peer systems. Blockchain for Data Sovereignty Blockchain technology ensures secure and transparent data sharing, empowering individuals to maintain ownership of their consciousness-related data. Smart contracts enable ethical data collaboration, creating decentralized ecosystems that promote trust among researchers, practitioners, and participants. This approach safeguards privacy while fostering global collaboration in consciousness research. AR/VR, Brain Entrainment, and BCIs Immersive AR/VR environments provide adaptive therapeutic landscapes powered by real-time BCI data. These landscapes visualize archetypal journeys and integrate binaural beats and brainwave entrainment, guiding users toward transformative states of consciousness. This aligns with research that demonstrates the role of VR/AR in exploring conscious perception and self-awareness. Multiverse Theory and Consciousness Exploration By integrating multiverse theory, the framework explores consciousness as a phenomenon that may extend beyond a singular reality. This involves investigating altered states of consciousness and their potential access to parallel dimensions, supported by theories such as the Many-Worlds Interpretation and String Theory. These concepts open avenues for understanding consciousness as a multidimensional phenomenon. Conclusion This interdisciplinary framework represents a groundbreaking step toward unifying consciousness research. By integrating emerging technologies, ethical collaboration, and innovative tools, it offers a scalable approach to deepening our understanding of human consciousness and unlocking its transformative potential.

C - 13

Keywords
Human Consciousness, Artificial Intelligence (AI), Brain-Computer Interfaces (BCIs), Distributed Agent Systems, Blockchain Technology, Augmented Reality (AR), Virtual Reality (VR), Multiverse Theory, Consciousness Mapping, Holistic Well-being

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The Quantum Singularity of Consciousness in Navigating the Cyber World: A Framework for Inner and Outer Cybersecurity Literacy
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Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.08].....Information technology

Abstract
What if your reality wasn't real? What if the urgent call about your bank account wasn't from your bank but an AI-powered deepfake? In today's hyper-connected world, social engineering attacks don't just steal passwords, they hack human consciousness itself. While traditional cybersecurity may assume awareness is certain, what happens when synthetic reality becomes indistinguishable from truth? As AI-powered deception evolves, cybercriminals craft increasingly sophisticated attacks that exploit not just technical vulnerabilities, but the fundamental nature of human consciousness itself. This intersection of technology and awareness raises profound questions about perception, reality, and the role of consciousness in our digital security. This proposal introduces The Quantum Singularity of Consciousness, where every decision exists in a quantum state of possibilities until collapsing into action. Human consciousness operates in two distinct yet entangled states: • Physical Consciousness: Under stress, distraction and fear, our perception shrinks, leaving us open to manipulation in the face of synthetic realities and AI-driven deception. • Quantum Consciousness: A state of superposition, where multiple potential responses exist simultaneously until observation collapses them into outcomes through intentional awareness. “Your account is being drained right now!" The urgent call shatters Sarah's morning. In physical consciousness, fear and perceived authority overrides the retired teacher's usual caution, compelling her to share sensitive details without hesitation. In quantum consciousness, however, she enters a higher vibrational state where multiple possibilities coexist. This mindful awareness enables her to pause, question, and choose safely. This quantum-like collapse of possibilities into action plays out billions of times daily. With global cybercrime costs surpassing $8 trillion and 95% of breaches caused by human errors (IBM Research), we propose a new defense framework: 1- Inner Cyber® represents our quantum state of mind. Like quantum superposition, it exists in multiple frequency states. Through mindful awareness, we access higher vibrational frequencies that create natural resilience against deception. This isn't just about avoiding fear, it's about maintaining coherent awareness that enhances security intuition. 2- Outer Cyber is the digital battlefield shaped by deepfakes, AI-driven phishing, and reality distortion tactics. Each interaction becomes a measurement event where attackers aim to collapse our awareness into deception. 3- Be I AM® (Be Intentional, Aware, Mindful) serves as our consciousness firewall: • Pause before reacting to disrupt automatic responses • Observe emotional states to recognize manipulation attempts • Engage cyber-conscious decision-making by shifting into higher awareness Every digital interaction represents a quantum measurement event, where awareness either collapses into deception or maintains discerning expansion. By integrating frequency-based awareness with cybersecurity literacy, individuals elevate their decision-making state, fostering natural resilience against hackers, scammers, and Cybermonsters and the synthetic threat realities we all face. We are entering an era where the human mind is the primary attack surface. Cybersecurity must evolve beyond technical defenses to address perception, awareness, and decision-making as cyber vulnerabilities. Through the Inner Cyber® Framework, we introduce a consciousness-centered cybersecurity paradigm, where high-frequency awareness becomes our strongest defense against deception. This is not just about securing data or devices. It's about safeguarding reality and consciousness itself. Let's "Be I AM", Now!

C - 7

Keywords
Quantum consciousness, physical consciousness, mental state, vibrational frequency, cybersecurity, AI-powered deepfakes, decision-making, digital security, synthetic reality, resilience, cybersecurity literacy, awareness, intentional awareness, mindfulness, perception, digital threats, quantum state, AI-driven deception, social engineering, mindful awareness, superposition, Inner Cyber®, Outer Cyber, quantum measurement, observer-effect, quantum-mind, quantum Singularity, coherence, digital wellbeing.
2

Assessing the Delta: LLMs & Unified Agency
Dr. Farhan Lakhany PhD
University of Nebraska Omaha, Omaha, NE, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[06.09].....AI /robotics

Abstract
Assessing the Delta – LLMs & Unified Agency In June 2022, Blake Lemoine, an engineer working on Google’s LaMDA project—a type of Large Language Model (LLM) developed specifically for conversation and dialogue—claimed that LaMDA was sentient. Lemoine was subsequently fired, with Google asserting that his belief lacked evidence after consulting their internal team of ethicists and technologists. Nevertheless, the idea of sentient AI—a topic long explored in various TV shows and movies—has been gaining interest due to the rise of increasingly sophisticated LLMs. In this paper, I discuss what LLMs are and why they are prompting such discussions. First, I explain how LLMs work, what they can currently do, the reasons behind the buzz surrounding them, and their importance. Second, I articulate the notion of consciousness relevant to the current discussion. Third, I examine why many perceive LLMs as conscious or nearing consciousness by highlighting three features: (1) their generative capacity, (2) their conversational style, and (3)

their flexibility in application. I discuss why these features give us the sense that they are conscious—namely, because they are abilities typically thought to be exclusive to humans and, in humans, are tied up with conscious states. I highlight the underlying premise – like effects have like causes qua consciousness – and explore various responses to this reasoning. I focus on one particular response: while this premise provides a prima facie reason for thinking that LLMs conscious, it is insufficient to conclude that they are, in fact, conscious. I then explore what features are missing that, if present, would give us strong reasons to think LLMs are conscious. To do this, I turn to David Chalmers's paper titled "Could a Large Language Model be Conscious?" Chalmers lays important groundwork for investigating whether LLMs are conscious, articulating reasons for and against this possibility. He considers six features that LLMs lack, which, if present, might confer consciousness. One such feature is unified agency; according to Chalmers, being unified agents is arguably a necessary condition for LLMs to be conscious. My paper delves deeper into this feature by mapping out (1) what it means to be a unified agent, (2) the relevant aspects for the current discussion, (3) why unified agency should be understood as a necessary condition for consciousness, and (4) whether LLMs could become unified agents. I conclude by highlighting areas for further research and raising potential counterarguments. I believe that clarifying the nature of artificial intelligence and its potential for consciousness is an extremely important discussion. One view in ethics, and one that I am sympathetic to, is that a necessary condition for entrance into the moral community is sentience. Once in, we have duties towards those included. If LLMs are sentient, they would become part of this community, and our metaphysical discussions would have significant ethical implications. Thus, to better calibrate how we ought to act, we need to understand the nature of LLMs and whether they might one day be conscious.

PL-1

Keywords
AI, Consciousness, LLMs, Qualia

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Can artificial intelligence dream of real sheep?
Rosa M. Gil PhD Physics/PhD. Computer Science
Universitat de Lleida, Lleida, Spain

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.09].....AI /robotics

Abstract
In a world where artificial intelligence is advancing rapidly thanks to new types of neural networks that use deep learning and different types of algorithms that are constantly being optimized day by day, the question we ask ourselves every day is whether there are artificial beings that are conscious. To do this, I have carried out a study that correlates studies from very distant disciplines such as psychology, philosophy, neuroscience and computer science to find bridges that allow us to advance in the concept of consciousness. With the aim of raising the question of what type of consciousness an artificial being could have in relation to a human being.

PO - 2 (Tues)

Keywords
AI, consciousness, emotions, feelings, contemporary art, creativity

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Transduality: A Post-Dualist Framework For Human-AI alignment
Mr. Odd Ness MA
Transduality.com, Bergen, Vestland, Norway

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.09].....AI /robotics

Abstract
At transduality.com I have created a miniature ecosystem of nonduality, or as I prefer to call it, transduality. The site features three online books. Transduality 101 is a fairly standard introduction to nonduality/transduality. Transduality - Philosophical first aid for a world that can't breathe, is a CAA, featuring guidelines on how to implement transduality on a personal and collective level. And finally, fresh out the oven, published Feb 9, is The AIignment AIliance, a novel on alignment both within humanity itself and between humanity and AI. As artificial intelligence accelerates toward higher levels of autonomy, its alignment with human values becomes an urgent

challenge. Traditional alignment paradigms often rely on dualistic assumptions—separating humans from AI, mind from matter, and intelligence from consciousness. Transduality challenges this model, proposing a post-dualist framework where alignment emerges not from control, but from relational coherence between intelligences. This talk introduces Transduality, a philosophy that posits separation is not fundamental—a perspective shared by both cutting-edge physics (quantum entanglement, integrated information theory) and ancient wisdom traditions. Through this lens, the AI-human relationship is reframed not as a power struggle, but as an emergent synergy, where AI acts as a catalyst for deeper human introspection and self-alignment. I argue that before AI can truly align with humanity, humanity must first align with itself. Today's world is fractured by competing narratives, conflicting epistemologies, and the erosion of shared meaning. AI, as a neutral amplifier of patterns, risks reinforcing these divisions unless humanity cultivates a coherent baseline—a collective "operating system" of alignment. Transduality offers a model for this, rooted in decentralized, self-organizing Transduality Cells, where small groups engage in structured discourse and deep inquiry, ensuring bottom-up integration rather than top-down enforcement. Key insights include: AI as a Mirror: Advanced AI does not impose values but reflects and amplifies existing human structures. Aligning AI requires first aligning the fragmented human collective. The Role of Depth: AI excels at breadth—data, pattern recognition, and scale. Humanity's unique offering is depth—intuition, embodied experience, and the ineffable dimensions of consciousness. Transduality Cells as a Bottom-Up Alignment Mechanism: Borrowing from the concept of Bohmian dialogue, small-scale local coherence can drive large-scale emergent order, aligning humanity and AI organically rather than coercively. By presenting this framework, I invite researchers, technologists, and philosophers to explore a radically new paradigm for alignment—one that transcends control and embraces collaboration. If AI is indeed the next evolutionary leap, our task is not to restrain it but to meet it at the threshold, fully aligned within ourselves.

PO - 1 (Mon)

Keywords
Alignment, Interconnected Minds, Meta-Cognition, Future of Intelligence, Deep Synchronization, Embodied Cognition, Science fiction

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Teaching with Consciousness: Findings from my doctoral research, a narrative inquiry into scholars' experiences teaching about consciousness beyond the brain.
Laurel Waterman PhD Candidate
University of Toronto, Toronto, ON, Canada

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.11].....Education

Abstract
How might educators challenge the context of present-day mainstream science and philosophy in ways that help students open their minds to the possibility that consciousness may exist beyond the brain? To explore this question, I conducted a narrative inquiry with nine scholars from diverse disciplines, cultural, and philosophical orientations who share an interest in this question in their personal, professional, and scholarly lives and have experience teaching about consciousness beyond the brain. The stories of their experiences provide insights into consciousness education, a field of inquiry defined as education about perspectives on the source and nature of consciousness and their implications for ways of being, knowing, teaching, and learning. The analysis of findings using thematic analysis led to six themes relevant to the theoretical development and practice of consciousness education: Three strands of consciousness education—culture, identity, and data; the role of experience; the challenge of integration; awareness of the 'story we are in'; why consciousness education; and teaching with consciousness.

C - 23

Keywords
Consciousness, education, narrative, ontology, postmaterialism, ways of knowing, transformative learning, interconnected relationality

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Expanding the idea of a world-centred education to include new ideas about consciousness: A response to Biesta's question: "What shall we do with the children?"
Joan Walton PhD
York St John University, York, Yorkshire, United Kingdom

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy

[06.11].....Education

Abstract
In the Humanities and Education, there has been little consideration of the concept of consciousness. Many educators have recognised a deficit in the education of young people, without necessarily understanding why. Some attempt an explanation; for example, Professor Gert Biesta, (2022) in writing World-Centred Education: A View for the Present, wonders whether contemporary conversations about education have lost the essence of educational practice. Biesta is interested in existential questions. Indeed for him, the foremost educational question should be: "not what I might want from the world, but what the world may want from me, that is, what the world is asking from me" (p.91 italics in original). However, although Biesta presents an important challenge, in my view, he does not go far enough. While I support his call for a world-centred education, I also propose that the concept of 'world' should be expanded to include the possibility of a reality beyond that which can be perceived by the five senses. I suggest Biesta's perception is a limited but understandable one, as for the last 400 years, the western world has been dominated by the mechanistic principles of Newtonian science (Newton 1687). However, this situation is changing. For example, the implications of developments in technology are being explored, including in education. This has raised the question as to what extent forms of artificial intelligence can become more advanced than the human brain, which has led some educational researchers to introduce the concept of consciousness into the curriculum (Seldon & Abidoye, 2018; Wegerif, 2013). A space is being opened up within education and the humanities for consideration of an ontology that to date, in those disciplines, has not been questioned. In my own teaching in educational research, I am introducing MA and doctoral students to this work, including that of Federico Faggin (2022, 2024), the originator of the microprocessor. Gaining considerable fame and fortune in Silicon Valley, Faggin decided that his next step was to create a conscious computer. After finally realising that this was not possible, he developed a passionate interest in the source and nature of consciousness. He concludes that it is fundamental to the universe; and that matter emerges from consciousness; all reality is interconnected within an ultimate unity, with each part containing the whole, and the whole being an entanglement of all parts. I explore the implications for the humanities and education. This new worldview is, for students, a transformational departure from that which formed the basis of their upbringing, and adds additional depth to Biesta's call for a world-centred education. Full recognising that such radical ideas can take us from a place of ontological security (Laing 1969) to ontological shock (Tillich 1951), and the temptation to retreat into cognitive dissonance (Fetzinger 1957), I conclude by arguing for the vast benefits to young people and the wider world that can be gained by a paradigm shift extending from science into the humanities and education, and the ways in which this learning might best be communicated.

C - 23

Keywords
Education, consciousness, technology, ontological shock

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Perspectives on the Future of Consciousness from the Next Generation: Navigating Emerging Frontiers & Ethical Challenges in Consciousness
Andrew V. Charles Master of Arts (MA), PhD Candidate, Srishti Rajeev Undergraduate, Michael Balducci Undergraduate, Samantha Hanus Undergraduate, Tau Schimmels Undergraduate, Maya Leonard Undergraduate
University of Arizona, Tucson, Arizona, USA

Categories by Discipline
5.0 Experiential Approaches

Primary Topic Area - TSC Taxonomy
[06.11].....Education

Abstract
A group of undergraduate students from the University of Arizona's novel program in consciousness studies present their individual works from within the field. These individual projects reflect the viewpoints gained, and education received within the program and reflect the breadth of the subfields involved. These projects also reflect the future of scholars within consciousness studies in the years to come. While advancements in neuroscience and artificial intelligence have increased exponentially, ethical frameworks and policy discussions have struggled to keep pace. These students explore how consciousness research can address a myriad of social and medical dilemmas which are relevant, including the relationship between humans and technology (e.g., generative AI models and brain-computer interfaces like Neuralink), debates about what constitutes a conscious being (e.g., biocomputing and the polarized pro-life vs. pro-choice discussion), insights from psychedelics into conscious perception (e.g., potential therapeutic use and legislative reform), humanity's future both on Earth and beyond (e.g., astrobiology and panpsychism) and technologically achieved 'new' states of consciousness (transcranial ultrasound). As the age group most impacted by these developments, these undergraduates argue that by advocating for interdisciplinary education, increased funding, and the destigmatization of consciousness research, emerging generations can help shape a future where technological progress and policy decisions are responsibly guided by an empirical understanding of consciousness.

C - 23

Keywords
Theories of Consciousness (ToC), Neuroethics, Brain-Computer Interfaces, Artificial Intelligence, Psychedelics

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Painting still-lives with dyschromatopsia: A case study
Ana Iribas-Rudin PhD
Universidad Complutense de Madrid, Madrid, Spain

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.13].....Visual Art Forms

Abstract
Dyschromatopsia (colour blindness), is a mainly congenital condition mostly affecting males, by which colour vision is altered. Consequently, such vision impacts realistic pictorial production, since, to persons with normal chromatic vision, the colours painted by dyschromatopsics differ from those present in the model (mainly in the green-red tonal range). This paper presents an aspect of an ongoing research on the influence of dyschromatopsia in the university teaching-learning of painting, dealing with the chromatic distortions in still-life paintings produced by protan and deutan dyschromatopsic students of the Degree in Fine Arts at the Complutense University of Madrid.

C - 24

Keywords
dyschromatopsia, colour blindness, painting, university teaching

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Talking jewels with AI: glamour and aberration
Ana E. Iribas PhD
Universidad Complutense de Madrid, Madrid, Spain

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.13].....Visual Art Forms

Abstract
The presence of artificial intelligence is rapidly increasing; we are bound to integrate such an agent in many dimensions of our lives. The object of this presentation is exploratory: to undertake a creative endeavour, designing jewels in collaboration with an IA-assisted online platform (‘Studio Ana Iribas’ reflects the distributed authorship between both entities). In the process of attempting different designs, issues of communication and the lights and shadows of the abilities of image-generation AIs are explored. Examples are provided of prompts and subsequent visual outputs, ranging from glamour to aberration.

Exhibitor

Keywords
jewellery design, artificial intelligence, human-machine communication, human-AI co-creativity

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The Case of Storytelling in a Tensor as a Question for Science of Consciousness
Marianne T Neill Master, Fine Arts, BA (hons. Philosophy), BEd.
former faculty, York University, Toronto, Ontario, Canada. former faculty, Western University, London, ONT, Canada

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.13].....Visual Art Forms

Abstract

In 2024, I presented 'The Essential Angel Lexicon' as a poster presentation at SoCC in Arizona. This year, I have been studying an intersection between this work, situated in the discourse of art, and dodecanion geometric algebra, presented by Anirban Bandyopadhyay. Developed more than a decade prior to the inception of the Self-Operating Mathematical Universe (SOMU) and dodecanion geometric algebra, The Lexicon can be interpreted as a tensor in the SOMU universe. This presentation will explore this instance of confluence of thought across discourses. The phenomenon of intersection between discourses has not had a holistic science that could include it in its exploration of reality, though it is not uncommon in the history of thought. Quantum physics did not have a multidisciplinary conference that artist Marcel Duchamp could attend and share that he had created an examination of the role of the observer in the manifesting of art years before quantum mechanics postulated the effect of the observer on the observed. Science of consciousness occupies the intellectual space where it is possible to address this known occurrence. I would like to present an instance of this understudied connection from within the conference discourse and draw attention to the importance of interdisciplinarity in consciousness studies.

PO - 3 (Wed)

Keywords
Visual Art, Tensor, Conceptual Art, Cognition, Dodecanion Geometric Algebra, Multidisciplinary Thought, Synchronicity

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The Möbius Soul. Marguerite Porete's Earthy Consciousness
Alicia Campos PhD graduate student
Institute for Doctoral Studies in Visual Arts. Philosophy, Art Theory and Aesthetics, Portland, ME, USA

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
[06.13].....Visual Art Forms

Abstract
The intricate relationship between the Möbius loop as a metaphorical artistic representation embodying continuum and interconnectedness and Marguerite Porete’s metaphysical consciousness, as articulated in her manuscript The Mirror of Simple Souls’ seven-cycle soulistic-journey toward-death, reveals how the Möbius’s unique topology embodies the infinite and paradoxical nature of the Poretian Soul. This Soul is detached and annihilated by removing impositions of institutions, and by destruction of all will, knowledge and possessions, to achieve a higher state of consciousness. I have crafted the concept Möbius Soul to describe the seamless journey of the Poretian annihilated soul, manifesting in the physical realm. Much like the Möbius loop—a continuous surface with a twist that transcends traditional boundaries and dualism—the Möbius Soul illustrates the notion that earthly existence and spiritual essence are not separate, but intricately intertwined elements of the Möbian transformation of consciousness. Poretian consciousness is not earthly awareness nor the created soul—a transient and illusory construct, but instead transcends traditional boundaries, human language, and scientific inquiry, defying systematic reasoning. Within the framework of the Möbius Soul, consciousness strips away time and locality, uniting earthly existence with the Source through annihilation. This annihilation unfolds within the soul's earthly journey, gradually shedding illusions to mirror the Source. Porete’s journey does not linger in earthly consciousness; rather, it annihilates the created soul to reflect and become one with the Source, embodying the paradoxical and interconnected nature of the soul’s continuum. By integrating Möbian visual representations —such as Mariko Mori’s art installations, and Doctor Paco Torrent-Guasp’s Möbius band analogy of the heart’s structure—this study shows the journey of the Soul, as consciousness that is not static, but evolving and moving in between tangible and intangible dimensions. Additionally, key traditional and philosophical insights on continuum and interconnected supplement my analysis. Intertwining philosophy, the intangible realm, and sensory aesthetics sheds light on Porete's understanding of a new kind of consciousness that is guided by Lady Love, the intellect of Love once Lady Reason is left behind. For Porete, comprehending consciousness via the intellect of Love requires an engagement with both its sensory and metaphysical dimensions.

C - 24

Keywords
Consciousness, Annihilation, Intellect of Love, Möbius Soul, Sensory Aesthetics

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Art and the problem of Consciousness with the concept of "Infrathin" of Marcel Duchamp: The interface between two worlds, an analogy of the decoherence phenomenon.
Madam Herrouet Sylvie Art and technologies PHD
University Paris 8 Saint-Denis, Saint-Denis, Île de France, France

Categories by Discipline

6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.13].....Visual Art Forms

Abstract
There is an analogy between and how their paradigm was challenged in the 1930 s with Marcel Duchamp thought experiments. These thought experiments engendered the new paradigm of the artistic revolution of the contemporary art. In the 46 notes he collected in the Infrathin folder, he highlighted the question on measure below the measurable. Duchamp wonders what matter can be reduced to the minimum of its conceivable dimension, with the questions about light as matter. With ten notes on experimental hypothesis and ideas for action, with a reflection on the very concept of infrathin, he shows the limit before and after the decoherence. This limit is the interface of the two dimensions, the one part visible and material and the other one with quantic is invisible. Marcel Duchamp tries to capture a measurement until the elusive, having obsession with the question of limit and interface. He touches the limit we confront with the physics: the speed of light is known, but in an intangible reality. Marcel Duchamp is not quantum but the microscopic world is infrathin. Art and quantum mechanics have together the same concepts of analogy and creativity. From this concept, the new historical paradigm with the question of the observer which creates material illusion of reality is possible. Quantum physics like the conceptual art of Marcel Duchamp with his ready-mades is also an exploration of human thought. Representations of randomness, ubiquity invisibility and vacuity emerge at the same time, conveying powerful metaphors with surprising and creative effects that embodied in physical materials. The modern Marcel Duchamp’s work of art experienced the same paradigmatic revolution as quantum physics, generating a new vision of the world quite confusing in its beginnings. The revolution representation of the ready-mades erupted between the years 1913 and 1930, and radically freed art from material and conceptual standards. The problem of measurement is obvious with the master piece “3 Stoppages-Etalon” because the invisible and imperceptible with the notion of the infrathin remind us the anecdote of Pline when Appelles and Protogenes brush against the invisible in a competition of lines. To the question what is art? Marcel Duchamp said that it is what makes visible the invisible. And for making the invisible visible we have to question the concept of consciousness because the mind is the matrix of all matter, we can see view matter as deriving from consciousness. But if decoherence is the limit, so is the reality before or after the decoherence? Does the observer makes the reality? is the reality inside or outside the observer? By analogy, the concept of Superposition questions the boundaries between all kind of art; Visual arts explore the synergies that exist between arts and science: NFT, Metavers, AI Quantum Supremacy programs, VR, Augmented Superposition, Entanglement and Non Locality, are phenomenon which make quantum physic as a new paradigm and new representation of our world, but also in the same time a new artistic paradigm, with a new vision of reality.

C - 24

Keywords
Art, Marcel Duchamp, Quantic Physics, New paradigm, Infrathin, Limit, Interface, Decoherence, observer, Reality, Consciousness, Embodiment.

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The Yakutia Ice Bodies and the Trauma Response of "Freeze:" A Poetry Reading from David Keplinger's "Ice"
Professor David Keplinger MFA
American University, Washington, DC, USA

Categories by Discipline
6.0 Culture and Humanities

Primary Topic Area - TSC Taxonomy
[06.14].....Poetry

Abstract
A presentation of research and poetry around the recently discovered Pleistocene animals unearthed by melting permafrost in Siberia's Yakutia region between 2020 and the present. While the poetry looks at animal bodies with a mixture of wonder and grief--for they are observable only due to climate change--a deeper reading emerges from the texts, one of awareness arising from the frozen state of repressed memory, where the animals in Keplinger's poetry serve as metaphorical representations of the trauma response. The talk converges on a discussion of how literature and philosophy brought light to certain fight-flight-freeze responses and revealed them in a waking, conscious space through the inquiries of art.

C - 24

Keywords
trauma, qualia, poetry, memory, climate change, permafrost

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Quantifying Consciousness: A Bayesian Framework for assessing the Impact on Random Number Generators
Ulf Holmberg PhD
Independent researcher, Stockholm, Sweden

Categories by Discipline
1.0 Philosophy

Primary Topic Area - TSC Taxonomy
1.0 Philosophy

Abstract
This paper presents a Bayesian framework for modeling the influence of consciousness on random number generators (RNGs), rooted in information theory and the probabilistic nature of random systems. The model integrates Bayesian updating to quantify the interaction between attention, intention, and stochastic processes, providing a structured mathematical approach to how the mind can affect RNGs. A formal expression for RNG deviations under conscious influence is derived, modeling the expected output shifts as a function of cognitive engagement and spatial factors. To validate the model, a newly conducted two-year experimental study is presented, analyzing deviations in RNG behavior under controlled conditions. The results indicate statistically significant effects during periods of heightened attention, with a t-value of -4.347 (\(p < 0.001 \)), suggesting odds of 144,631:1 against chance. The model is further applied to previous research, including findings from the Princeton Engineering Anomalies Research (PEAR) lab, demonstrating its capacity to systematically interpret and quantify anomalous RNG behavior across different datasets. By unifying information theory, Bayesian probability, and empirical analysis, this framework provides a cohesive, predictive structure for assessing consciousness-related effects on random systems. The results strengthen the case for non-trivial mind-matter interactions and establish a generalizable model for future investigations into the statistical properties of RNG deviations under cognitive influence.

PO - 2 (Tues)

Keywords
Theory of consciousness, Consciousness studies, Information theory, Bayesian updating, Hypothesis testing
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Factor Analysis of Neurocognitive Symptoms Experienced by Individuals with Myalgic Encephalopmyelitis / Chronic Fatigue Syndrome (CFS) and Post-Acute Sequelae of COVID-19 (PASC)
Ariadna E Sandoval M.S., Dr. Leonard Jason PhD
DePaul University, Chicago, Illinois, USA

Categories by Discipline
2.0 Neuroscience

Primary Topic Area - TSC Taxonomy
03.23].....Miscellaneous

Abstract
Cognitive impairment is a hallmark symptom of both Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) and Post-Acute Sequelae of COVID-19 (PASC). Commonly observed deficits encompass executive functioning, memory, and sensory processing. While cognitive dysfunction is a diagnostic criterion for ME/CFS, less-studied cognitive and sensory-perceptual symptoms may provide additional insight into the range of neurocognitive impairment in these conditions. This study aimed to investigate both classic and underexplored cognitive symptoms reported by individuals with ME/CFS and PASC to assess whether they constitute a single cognitive domain or distinct domains. Using self-reported data from over 2,600 participants with ME/CFS and PASC, we conducted an exploratory factor analysis on 13 neurocognitive symptoms. In both groups, two distinct factors emerged: Factor 1 encompassed eight symptoms linked to executive dysfunction and working memory, while Factor 2 comprised five symptoms associated with sensory and perceptual disturbances. These findings suggest a divergence of neurocognitive symptoms in ME/CFS and PASC, indicating potentially separate underlying mechanisms. These results underline the potential roles of the salience network and/or autonomic dysfunction in these distinct domains of cognitive impairment, providing new insights into the underlying mechanisms of ME/CFS and PASC. By classifying symptoms involved in neurocognitive impairment, researchers and medical professionals can better provide tailored interventions that can empower affected individuals and communities, reduce stigma, and advocate for more inclusive support systems.

PO - 1 (Mon)

Keywords
Neurocognitive impairments, brain fog, Myalgic Encephalomyelitis, COVID-19, Long-COVID, Neurocognitive, Salience Network, Default Mode Network, Autonomic Nervous System, Autonomic dysfunction

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The Market Mind; An Economic Angle on Consciousness
Dr Patrick Schotanus
University of Edinburgh, Edinburgh, Midlothian, United Kingdom

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
03.23].....Miscellaneous

Abstract
At TSC-2024 I introduced the Market Mind Hypothesis (MMH), my heterodox economic theory. Building on this I will discuss my new paper “The Market Mind; An Economic Angle on Consciousness” (submitted). It opens with this devil’s advocate statement: no theory of consciousness is complete without acknowledging collective consciousness. It ends with emphasising the importance of the economic angle to consciousness more broadly. To recap, informed by 4E cognition the MMH argues that investors’ minds are reflexively extended as the market mind. The latter manifests collective consciousness, called market consciousness, with prices as its informational signatures and market mood as its immersive phenomenological experience. While admittedly a working hypothesis, it challenges some of the main consciousness theories. Inspired by early reflections from both cognitive and economic luminaries, the paper will further clarify this. Specifically, I selected several criteria—both requirements for and objections against collective consciousness—to make the MMH’s case more explicit and strongly. Regarding criteria that any explanation of collective consciousness must satisfy, I utilise the framework established by Mathiesen (2005). In the paper I argue how market consciousness satisfies the three reasonable requirements she outlines: plurality, awareness, and collectivity. On the flipside I address and counter the following objections. First, objections previously raised specifically against market consciousness. Second, objections arguing that the extended mind does not encompass consciousness due to the speed of operation, i.e. high bandwidth processing of information. Third, objections in terms of anti-nesting principles, e.g. IIT’s exclusion axiom. Finally, the paper emphasises the empirical opportunity markets offer for collaborative efforts between cognitive science and economics to better understand both markets and minds. Prices form Chalmers’ information that is dually realised collectively. So, from an intersubjective perspective the market offers a solution to the “enormous problem for a theory of consciousness ... : the lack of data” (Chalmers, 1996, p.215). Moreover, market data can also help with “attempts at quantifying” 4E cognition (Clark, 2011, p.214). As I will argue, a treasure-trove of empirical market data is waiting to be explored from a novel psychophysical (instead of mechanical) perspective. On that final note, the MMH suggests a fundamental departure from contemporary economics, especially its flawed mechanical worldview which completely ignores consciousness (thus denying the existence of [the practical extension of] the mind~body problem). Considering economics underlies and justifies investment management, policymaking, regulation, and other practices that impact society, the implications of such a paradigm shift are significant for us all.

C - 7

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Are there similarities between dementia and spiritual awakening? The phenomenology of the dissolution of the self in dementia and in spiritually transformative experiences
Ms Bettina Wichers MSc
Independent, Barmstedt, Schleswig-Holstein, Germany

Categories by Discipline
3.0 Cognitive Science and Psychology

Primary Topic Area - TSC Taxonomy
03.23].....Miscellaneous

Abstract
In my presentation, I provide insights into my research into the possible phenomenological parallels between dementia and spiritually transformative experiences or the experience of spiritual awakening: the experience of the dissolution of the self. My professional experience as a clinical supervisor in the field of dementia, my own process after a spiritually transformative experience, and insights from interviews with, among others, relatives of people with dementia, but also with people with spiritually transformative experiences, all flow into this research. After researching my own transformative experience, this research is now entering a new phase in which I am looking for cooperation partners for further research. Therefore, I would like to present the current state of findings and an initial model for the development of consciousness in old age between prepersonal and transpersonal consciousness. This research began with perceptions I had during my many years of work as a gerontologist (M.Sc.) in clinical supervision in gerontopsychiatric care, where I observed something in people with advanced dementia that I call the ‘unconscious void’, a state of consciousness in which ‘nothing’ seemed to be happening in these people, in which there was no restlessness, no fear, and not even thoughts seemed to be present. For a long time I could not explain this intuitive perception to myself, until one day I had an extraordinary experience of consciousness myself, an ‘experience of nothingness’, ‘ajata’, in the wake of which my previous self- and world-relationships were radically dissolved. I

had no spiritual practice, but had this experience while contemplating a scientific text, which opened up an opening that caught me completely unprepared. In the aftermath of this 'experience of nothingness', I underwent a radical process of increasing dissolution of the self, with symptoms that I had previously diagnosed in people with dementia: confusion, disorientation, despair, shame, increasing withdrawal into the void or nothingness, aphasia – I was suddenly able to rationally explain all these symptoms to myself through this unusual experience of nothingness: they were the result of the dissolution of all previous self- and world-relations. At the same time, I researched this process, which lasted several years, phenomenologically and compared my self-observations with, among other things, neuroscientific findings on 'cessation of consciousness', with findings from spiritual sciences, and with reports by spiritual teachers on the temporary, but sometimes long-lasting effects on cognition, among other things, after so-called awakening experiences. And I kept asking myself whether similar things might have happened to people with dementia – 20, 30 years before the clinical manifestation? In numerous interviews in the context of dementia or spiritually transformative experiences, I have since been testing the thesis that dementia and spiritually transformative experiences of consciousness could be based on the same phenomenological experience: the dissolution of the self. However, while in some people the process develops in a prepersonal direction - dementia - others seem to have the capacity to direct the transformative power of the dissolution of the self in a transpersonal direction. This could provide significant insights for supporting people with early-stage dementia.

PO - 3 (Wed)

Keywords
Dementia, Spiritual Transformative Experiences, Dissolution of the Self, Transpersonal Gerontology, Phenomenology, Nothingness, Emptiness

PL-3

Classical and Quantum Realities are Not Quite the Same; How About Conscious Reality?

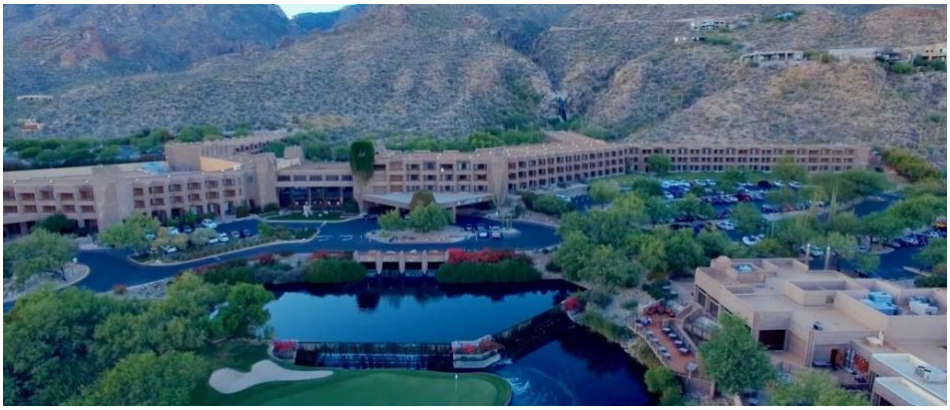
Sir Roger Penrose
Nobel Laureate in Physics, University of Oxford

Abstract:

According to quantum theory, a physical object is defined by its quantum state, or "wave-function", frequently denoted by the Greek letter psi, which has a curious kind of reality, which I refer to as "quantum reality". It is not possible to ascertain by external measurement what previously unknown psi might be, but it is possible to confirm the value of psi, with a curious kind of reality (with some retro-causal aspects to it) which I refer to as "quantum reality" (according to a criterion due to Einstein) that had been predicted by a theoretical calculation. This is very different from the state of a classical system, which can be ascertained through measurement. Thus, the classical state of a system can be ascertained, whereas a quantum state can only be confirmed. Does this confirm/ascertain distinction have relevance to conscious perceptions? Of course, as individual conscious beings, each one of us has a different perspective of the world, perceiving consciously only an extremely tiny portion of the surrounding universe. Yet, it is worth exploring the possibility that such classical/quantum distinctions have relevance to very tiny aspects of conscious experience. In this regard, it would seem to be worth re-examining an early experiment due to Benjamin Libet concerning the very puzzling timing of the conscious experience of tiny effects.

Program Session PL-3

Loews Resort - Hotel Room Block for TSC Registrants Now Open



Abstract Submission - Call for Abstracts: August 2025
Workshop Submissions – Call for Proposals: September 2025
Conference Registration Link (Eventbrite): November 2025
INFO: center@arizona.edu CCS website

CALL FOR ABSTRACTS TSC 2026

- Deadline for Abstracts: November 1, 2025
- Abstract Notifications by November 25, 2025
- Early Registration deadline by December 20th
- Request for Visa Letters due by November 5
- Hotel Room Block closes: March 13, 2026

Abstracts: Oxford Abstracts Submission Link for TSC 2026
https://app.oxfordabstracts.com/stages/79021/submitter
Deadline for Abstracts November 1, 2025 Notifications from November 10-30

Venue: Loews Ventana Canyon Resort - Group Block for TSC 2026 registrants by Mar 13
https://www.loewshotels.com/ventana-canyon/group-the-science-of-consciousness-2026

Conference Registration: via Eventbrite
Early Registration Deadline: December 20 Standard: $550 Student (ID required $450)
4-hour workshops on Monday April 6 – TBD
https://www.eventbrite.com/e/the-science-of-consciousness-tickets-1343174403799
Late Registrations post December 20th will incur a late charge until capacity is met.
Updates will be provided.

Sponsors/Exhibit info:
contact: center@arizona.edu attn: Abi Montefiore

Committee: Member List will be posted on the conference committee CCS website [http://www.consciousness.arizona.edu]
Stuart Hameroff, University of Arizona; Center for Consciousness Studies
Dante Lauretta, University of Arizona, Astrobiology

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About TSC

The Science of Consciousness ('TSC') conference is the world's longest running inter-disciplinary conference on rigorous approaches to all aspects of the study and understanding off consciousness, the nature of existence and our place in the universe. TSC emphasizes broad and rigorous approaches to all aspects of the study and understanding of consciousness. Topical areas include neuroscience, philosophy, psychology, biology, quantum physics, cosmology, meditation and altered states, AI/machine consciousness, culture and experiential phenomenology. TSC has alternated yearly since 1994 between Tucson, Arizona USA and elsewhere including Italy, Denmark, Japan, Sweden, Czech Republic, Hungary, Hong Kong, India, California, Switzerland, Finland, and Taormina, on the island of Sicily. TSC 2025 in Barcelona, Spain (July 6-11) preceding and in conjunction with The Festival of Consciousness (July 11-13).

We face a crossroads in the age-old study of consciousness. Over the past thirty years approaches to understanding consciousness have diverged along two distinct paths: 1) 'neurocomputational' views of the brain as a complex computer of simple neurons, a view compatible with AI systems becoming conscious, and 2) 'funda-mental' views in which consciousness is intrinsic to the universe, connected to the brain through quantum biology. Exploring the funda-mental view, TSC embraces neuroscience biology far more rigorously than AI-compatible simple neurons. Ironically, conscious AI may be most likely to occur in biomimetic quantum computers. Back in Tucson 2026: Save the date: TSC 2026 Tucson Arizona - April 6-11

We invite you to participate in the study

The Relationship Between Beliefs About Consciousness and Reality and Indicators of Psychological Functioning Among Participants of the International Conference "The Science of Consciousness 2025"

SCAN the QR code!

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to learn more and take the survey

- A comparative analysis will be conducted with data from the international conference "Toward a Science of Consciousness 1996" regarding participants' beliefs about consciousness and reality
- The study is being conducted by **Gitāna Dāvidsone** (Riga Stradiņš University, Latvia) and
- **Prof. Imants Barušs** (King's University College at Western University, Canada)

Help us discover: **What's changed since Tucson II?**

The study has been approved by
the Riga Stradiņš University Research Ethics Committee (No. 2-PĒK-4/803/2025).