**Center for Consciousness Studies, UArizona - Release**

**OMCAN Event**

**7 June 2023, 15:00 UK**

**Room L3, Mathematical Institute, University of Oxford, Woodstock Road, Oxford OX2 6GG**

**Oxford Mathematics of Consciousness and Applications Network**

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**Neuroscience needs a revolution**

The underlying premise in neuroscience is that the brain is a complex computer of simple neurons, each relying solely on membrane potentials and synaptic transmissions (based on the 1950s Hodgkin-Huxley model neuron). But neuroscience can’t account for consciousness, cognitive binding, real-time conscious action or memory, nor treat Alzheimer’s or brain trauma, and totally precludes the plausibility and consideration of frequently-reported non-local aspects of consciousness. The underlying premise of simple neurons is wrong, and is an absolute insult to actual neurons.

Single cell organisms behave purposefully using their cytoskeletal microtubules to sense and navigate. Microtubules (MTs) are self-assembling cylindrical polymers of ‘tubulin’ protein which in neurons organize synapses, encode memory and process information (tubulin is the brain’s most prevalent protein). Evidence now suggests psychedelics, antidepressants and anesthetics act on microtubules inside neurons, rather than, or in addition to membrane receptors and ion channels.

Whereas neuronal membranes and channels operate in frequencies from hertz to 100 hertz (cycles per second), microtubules and tubulins collectively resonate inside neurons at deeper, faster scales over 12 orders of magnitude in fractal-like patterns in hertz, kilohertz, megahertz, gigahertz and terahertz ranges (as shown by Anirban Bandyopadhyay group at NIMS in Japan). Like notes and chords resonate in music, quantum vibrations and state reductions can entangle and interfere across frequencies in the brain -  a ‘quantum orchestra’.

The Penrose-Hameroff ‘Orch OR’ theory suggests brain microtubules ‘orchestrate’ quantum state objective reductions (‘OR’) into full rich conscious experience. Mainstream ‘neuroscientific’ consciousness theories (IIT, GNW, HoT, PC/RP) use membrane-only simple neurons (emulated in AI) which may be suitable only for non-conscious algorithmic functions – ‘zombie neurons’. To find consciousness, and treat mental and cognitive disorders, neuroscience must look inward to deeper, faster quantum processes in microtubules inside brain neurons.

Reference: <https://www.frontiersin.org/articles/10.3389/fnmol.2022.869935/full>

OMCAN website at <https://omcan.web.ox.ac.uk/event/neuroscience-needs-revolution>.

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