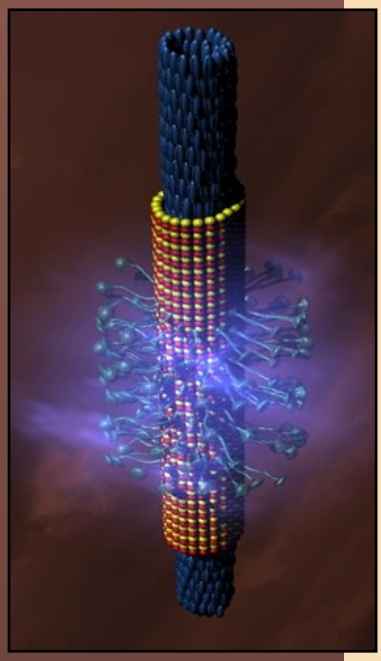


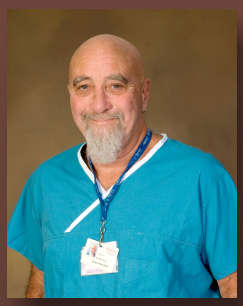
Special Seminar

Microtubule Update: Megahertz Coherence, Ballistic Conductance and Quantum Computing

sponsored by the
Center for Consciousness Studies, The University of Arizona

Thursday October 28, 2010, 3:00 pm to 5:00 pm

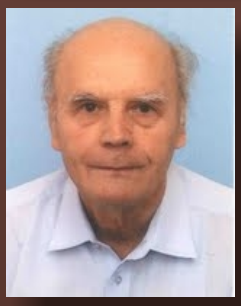
Medical Research Building - 1656 E Mabel St., Room 102MRB



Introduction *(3:00 pm to 3:10 pm)*

Stuart Hameroff MD, *Professor, Anesthesiology and Psychology*
Director, Center for Consciousness Studies

Microtubules engender speculations of classical and quantum computation relevant to cell functions. Recent relevant experimental evidence will be presented by two pioneering scientists taking part in the October 22 Google Workshop on Quantum Biology http://sitescontent.google.com/google-workshop-on-quantum-biology/



Microtubules – Electric Oscillators in Living Cells *(3:15 pm to 3:50 pm)*

S Jiri Pokorny PhD, *Czech Academy of Sciences, Prague, Czech Republic*

Ten years ago we proved that particular electromagnetic oscillations occurring in cells at 8 megahertz (MHz) are generated by microtubules (Pokorný et al., Electro-Magnetobiol. 20, 2001, 371). We also found microtubule oscillations depend on fields around mitochondria, that microtubules convert non-ATP or GTP mitochondrial field energy to coherent electromagnetic oscillations due to nonlinear structural dynamics, electrical polarity and ordered water. High degrees of conductivity and oscillatory coherence times of 0.1 – 1 microseconds (μs) occur in microtubules in the frequency range 5 – 15 MHz, as experiments show. The microtubule coherent electromagnetic field may play a specific role in cellular functions, communication, differentiation and disturbance in cancer and other diseases.

Electronic Transport Properties of a Single Microtubule *(3:50 pm to 4:30 pm)*

Anirban Bandyopadhyay PhD, Institute of Materials Sciences, Tsukuba, Japan

Using nanotechnology we interface via AFM/STM electrodes to opposite ends of a single viable microtubule (MT). We vary AC and DC conditions and study electronic transport properties at temperatures ranging from 10K to room temperature. At specific conditions we found 1) spontaneous MT growth leading to Frohlich condensation, 2) ballistic electronic transport, 3) ferroelectric MT properties. Multilevel information processing and memory (beyond binary logic) in MT will be discussed, as will efforts to understand room temperature coherent transport in terms of band energies. Finally, I will describe challenges and resolution of detection of MT topological quantum bits, or qubits based on Hemchandra/Fibonacci MT geometry at physiological temperature.

4:30 pm to 5:00 pm - General Discussion

for additional information: 621-9317
hameroff@u.arizona.edu
www.quantumconsciousness.org
www.consciousnes.arizona.edu