Physics
AT QUEENS COLLEGE

Colloquium Notice

Vladimir Privman

Clarkson University

Information Processing with Biomolecules: Unconventional Computing Paradigms, Biocomputing, and Enzyme Reaction Kinetics

We describe enzymatic systems which involve biocatalytic reactions utilized for information processing ("biocomputing").
Extensive ongoing research in biocomputing, mimicking binary logic gates has been motivated by potential applications in biotechnology. Furthermore, novel sensor concepts have been contemplated with multiple inputs processed biochemically before the final output is coupled to transducing "smart-material" electrodes and other systems. These applications have warranted consideration of networking of biocomputing gates. First few-gate networks have been realized and studied. In order to achieve scalable, stable network design and functioning, considerations of noise propagation and control have been initiated as a new research direction. Optimization of single enzyme-based gates for avoiding analog noise amplification has been explored, as were certain network-optimization concepts. We survey these developments, as well as offer an outlook for possible future research foci. The latter include design and uses of non-binary network elements, specifically, filters, as well as other developments motivated by potential novel sensor and biotechnology applications.

Wednesday
February 16, 2011
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326