FALL 2003 SEMINAR SERIES

Chih-Ming Ho

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Associate Vice Chancellor for Research and
Director of the Institute for Cell Mimetic Space Exploration (CMISE)
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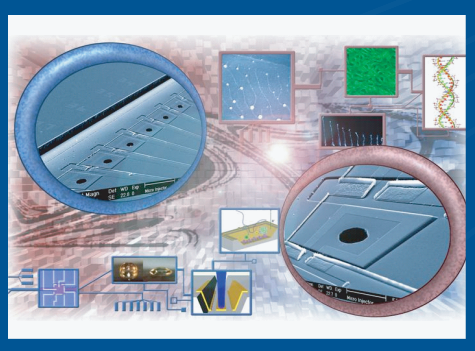
Dr. Chih-Ming Ho is Associate Vice Chancellor for Research at UCLA. He holds the Ben Rich-Lockheed Martin Chair Professor in School of Engineering, and is also the Director of Institute for Cell Mimetic Space Exploration (CMISE). He graduated from the Mechanical Engineering Dept., National Taiwan University. Dr. Ho received his Ph.D. from the Johns Hopkins University, and served as faculty at the University of Southern California. In 1991, he established and directed the Center for Micro Systems at UCLA. He is internationally recognized scientist in micro/nano fluidics, bio-nanotechnology, and turbulence. Dr. Ho is member of the National Academy of Engineering. He was elected as an Academician of Academia Sinica, honoring scholars of Chinese origin with exceptional achievements in liberal arts and the sciences. He has 220 publications, holds seven patents, and has given 70 keynote talks. He is a Fellow of the American Physical Society, and the American Institute of Aeronautics and Astronautics. He has chaired a number of professional committees, and has held associate editorship of the AIAA journal, and serves on technical advisory panels to a number of countries. .

Bio-Nano System Technologies



Nano-Electro-Mechanical-Systems (NEMS) technology enables us to develop miniature sensors and actuators, which can be used to sense and to exploit natural phenomena in a wide range of disciplines. This presentation discusses the technology of applying NEMS to control flows for sample preparation in bio-signature detection and array processing systems. We will illustrate how to facilitate transports of fluids and embedded particles with length scales varying in several orders of magnitude. The underlying physics of controlling fluid flows over a vast change of length scale are very different. For example, the extremely high viscous dissipation in micro system makes the electrokinetic forces a much more effective actuation than the hydrodynamic pressure. Further reduction in length into nano scales, the molecular forces become dominating and continuum assumption breaks down. With NEMS based optical or electrochemical sensors, we can identify bio-molecules in a rapid, sensitive and specific manner. The bio-signature sensors coupled with the micro/nano fluidics based sample preparation system enable us to realize the instrument for point-of-care diagnoses and the massive array processors for drug screening.

The 35m dollars NASA-UCLA funded Institute for Cell Mimetic Space Exploration (CMISE) is developing cell mimetic technology: a biologically inspired strategy fused with nanotechnology and informatics for engineering and control of multiscale systems. CMISE envisages emulating nature's strategy of seamless integration between the nano transducer and the distributed multilevel information management. Following this thread, we will transcend orders of magnitude differences in length scales to develop a new generation of nano, micro and macro engineering systems.

Wednesday, October 22, 2003
4:00 p.m.
Beckman Institute Auditorium
Reception to Follow in CSL Lobby

All seminars are free and open to the public. Times, dates, locations, and titles of events are subject to change. For additional information, please call (217)333-3097, email nano@cnst.uiuc.edu

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