Mechanical Engineering/College of Engineering and Applied Sciences

MECHANICAL ENGINEERING DISTINGUISHED LECTURE

Dr. Chih-Ming Ho
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Directing a Biological Complex System to a Desired Destiny

Seminar Coordinator: Prof. Fu-pen Chiang, Department of Mechanical Engineering/CEAS (telephone 631 632 8311)
Date: Friday, October 27, 2006, 11:00AM, room 301 of Engineering Bldg.

Abstract

The cell consists of a large number of building blocks consisting of millions of intracellular functional molecules. The interactions among these building blocks display self organization which intrinsically serves as the foundation of the networks of signal and regulatory pathways. This biological system possesses strong adaptability to environmental changes and serves as the basic unit of life. These three characteristics are commonly observed in all complex systems. Perturbations of homeostasis by invading organisms, accumulation of pathologic substances, and uncontrolled cell growth provide the underlying basis for most morbid and mortal illness. It is well known in the field of studying complex systems that these phenomena cannot be fully understood by studying these molecules as isolated subject. On the contrary, their interactions as a whole must be investigated. By applying feedback loop control, we have successfully demonstrated this unique concept. On the other hand, we need to know the role of specific types of molecules in the networks to understand the mechanisms driving the cell responses to the control procedures. To explore the functions of micron size cells and nanoscale molecules, the existing technologies are extremely limited; especially for applications involving living cells. In this presentation, we will discuss the nanoscale modalities and the system control for guiding the cell to a directed phenotype/genotype for therapeutic purposes.

Biography

Dr. Chih-Ming Ho received his Ph.D. from The Johns Hopkins University and holds the Ben Rich-Lockheed Martin Chair Professor in the UCLA School of Engineering. He is the Director of the Institute for Cell Mimetic Space Exploration (CMISE). He was a Professor at University of Southern California and moved to UCLA in 1991 to develop the MEMS program. To this day, the UCLA MEMS research has been recognized as one of the top programs in the world. He served as UCLA Associate Vice Chancellor for Research from 2001 to 2005. Dr. Ho is known for his work in micro/nano fluidics, bio-nano technology and turbulence. He was ranked by ISI as one of the top 250 most cited researchers worldwide in the entire engineering category. In 1997, Dr. Ho was inducted as a member of the National Academy of Engineering. In the next year, he was elected as an Academician of Academia Sinica, which honors scholars of Chinese origin with exceptional achievements in liberal arts and the sciences. Dr. Ho holds five honorary professorships. He has published 240 papers and presented over 100 keynote talks in international conferences. Dr. Ho was elected Fellow of the American Physical Society as well as American Institute of Aeronautics and Astronautics for his contributions in a wide spectrum of technical areas. He has served on advisory panels to provide assistance to many countries and regions, France, China, United Kingdom, Israel, Korea, Thailand, Hong Kong, Taiwan, and Japan, on the development of nano/micro technologies. Dr. Ho also has chaired or served on many organizing committees of international conferences on high technology topics.

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