

Nano/Bio Interface Center



NBIC Award for
Research Excellence in Nanotechnology

HAROLD G. CRAIGHEAD

2009 Recipient

UNIVERSITY *of* PENNSYLVANIA



Harold Craighead received his Bachelor of Science Degree in Physics, with High Honors, from the University of Maryland, College Park in 1974. He received his Ph.D. in Physics from Cornell University in 1980. His thesis work involved an experimental study of the optical properties and solar energy applications of metal particle composites. From 1979 until 1984 he was a Member of Technical Staff in the Device Physics Research Department at Bell Laboratories. In 1984 he joined Bellcore where he formed and managed the Quantum Structures research group.

Dr. Craighead joined the faculty of Cornell University as a Professor in the School of Applied and Engineering Physics in 1989. From 1989 until 1995 he was Director of the National Nanofabrication Facility at Cornell University. Dr. Craighead was Director of the School of Applied and Engineering Physics from 1998 to 2000 and the founding Director of the Nanobiotechnology Center. He served as Interim Dean of the College of Engineering from 2001 to 2002 after which he returned to the Nanobiotechnology Center as Director. He has been a pioneer in nanofabrication methods and the application of engineered nanosystems for research and device applications.

Dr. Craighead's recent research activity includes the use of nanofabricated devices for biological applications. His research continues to involve the study and development of new methods for nanostructure formation, integrated fluidic/optical devices, nanoelectromechanical systems and single molecule analysis.

Abstract: Control and engineering of structures at the nanometer scale provide new opportunities for investigating life processes at the cellular and molecular level. With our advancing technological capabilities and understanding of how biomolecules function, we can consider new ways of harnessing and incorporating active biomolecules in labs-on-a-chip for biochemical analysis. In one such example, a new form of high speed DNA sequencing has been based on real time observation of the actions of the molecule responsible for replication of chromosomes in living cells. We are also developing new single molecule approaches to detecting the chemical differences in chromosomes or epigenetic features that cause differences in gene function without changes in the underlying genetic sequence. This may aid in the understanding, among other things, how diseases like cancer are initiated. Apart from their function in genetics and epigenetics the nucleic acids DNA and RNA can be engineered for their chemical function, and lab-on-a-chip approaches utilizing nanotechnology may provide new ways of selecting molecules that have utility as drugs or in diagnostic devices. Research at the nano-bio interface is critical in developing the science and technology for these emerging applications.

Join the Nano/Bio Interface Center

NBIC Award for Research Excellence in Nanotechnology

(2009 Recipient)

Harold G. Craighead

Charles W. Lake, Jr. Professor of Engineering

Professor of Applied and Engineering Physics

Director, Nanobiotechnology Center

Cornell University

*Nanobiotechnology: Crafting the Interface
Between Nanostructures and Biology*

Wednesday, October 28, 2009

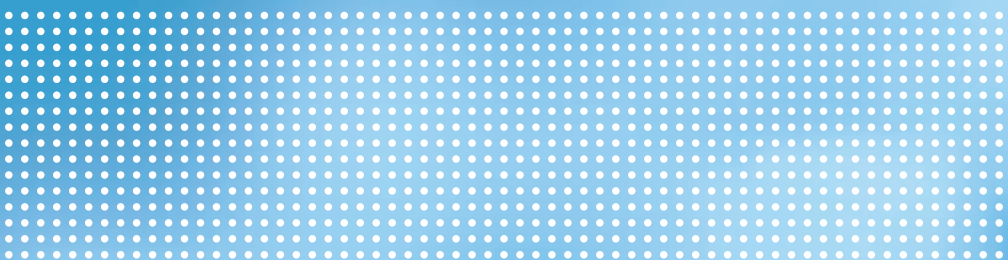
4:00 PM

Wu and Chen Auditorium

Levine Hall

3330 Walnut Street

Reception to follow



Nano/Bio Interface Center at the University of Pennsylvania is a Nanoscale Science and Engineering Center (NSEC) bringing together researchers from the Schools of Engineering and Applied Science; Arts and Sciences; and Medicine. The NBIC exploits Penn's internationally recognized strengths in design of molecular function and quantification of individual molecules. The study of the ethics of nano-bio technology is also an integral part of the program. The Center unites investigators from ten departments to provide, not only new directions for the life sciences, but also for engineering in a two-way flow essential to fully realizing the benefits of nano-biotechnology.