



Society for Analytical Chemists OF PITTSBURGH



APRIL MEETING

Former Chairmen Night

Monday, April 6, 2009

Duquesne University

Powers Center Ballroom (See Map)
Social Hour 5:30 p.m. – Dinner 6:30 p.m.

Laura Falk Hall
8:00 p.m.



CHARLES M. LIEBER, PH.D.

MARK HYMAN PROFESSOR OF CHEMISTRY
SCHOOL OF ENGINEERING AND APPLIED SCIENCES
HARVARD UNIVERSITY

**"Merging Nanoelectronic and Biological Systems:
Powerful Tools, Functional Interfaces and More"**



5:30 PM	Social Hour	Powers Center Ballroom (see map)
6:30 PM	Dinner	Powers Center Ballroom (see map)
7:30 PM	Student Affiliate Meeting	Mellon Hall – Room 410
7:40 PM	Business Meeting	Mellon Science Building – Laura Falk Hall
8:00 PM	Technical Meeting	Mellon Science Building – Laura Falk Hall

ABSTRACT:

Advances in nanoscale materials can enable unique opportunities at the interface between chemistry, physics and the life sciences. The interface between nanoscale electronic devices and biological systems makes possible interactions at length scales natural to biology, and thus maximizes communication between these two diverse yet complementary systems at the length scale relevant to biological function. In this presentation, the development of nanowire nanoelectric devices and device arrays and their application as powerful tools for the life sciences will be discussed. The application of nanowire nanoelectronic arrays for ultra-sensitive, label-free, detection of disease markers will be described, as well as the development of high-sensitivity real-time kinetic assays and efforts pushing the sensitivity of these nanodevices to limits that enable new applications in detection of single molecules and DNA sequence analysis. In addition, the development of two-way electronic interfaces between nanowire nanoelectronic devices and cells, tissue and organs will be described. Multiplexed measurements made from nanowire device arrays fabricated on flexible and transparent plastic substrates show that signal propagation across the myocardium can be mapped, in flexible conformations with high spatial and temporal resolution. The application of dense nanowire arrays to high spatiotemporal resolution multiplexed measurements from individual cardiomyocyte cells and cellular arrays will also be discussed. In addition, we will show that one- and two-dimensional arrays of nanowire transistors with flexible spatial configurations on optically-transparent substrates can be reliably interfaced with specific regions of acute brain slices to detect localized potential changes due to neuron activities simultaneously across many length scales with high temporal resolution. Applications of these nanoelectronic devices will be discussed as well as prospects for blurring the distinction between inorganic devices and living systems in the future.

BIOGRAPHY:

Charles M. Lieber was born in Philadelphia, Pennsylvania in 1959. He attended Franklin and Marshall College for his undergraduate education and graduated with honors in Chemistry. After doctoral studies at Stanford University and postdoctoral research at the California Institute of Technology, he moved to the East Coast in 1987 to assume an Assistant Professor position at Columbia University. There Lieber embarked upon a new research program addressing the synthesis and properties of low-dimensional materials. He moved to Harvard University in 1991 and now holds a joint appointment in the Department of Chemistry and Chemical Biology, as the Mark Hyman Professor of Chemistry, and the School of Engineering and Applied Sciences. At Harvard, Lieber has pioneered the synthesis of a broad range of nanoscale materials, the characterization of the unique physical properties of these materials and the development of methods of hierarchical assembly of nanoscale wires, together with the demonstration of applications of these materials in nanoelectronics, nanocomputing, biological and chemical sensing, neurobiology, and nanophotonics. Lieber has also developed and applied a new chemically sensitive microscopy for probing organic and biological materials at nanometer to molecular scales. His work has been recognized by a number of awards, including the Einstein Award, Chinese Academy of Sciences (2008); NBIC Research Excellence Award, University of Pennsylvania (2007), Nanotech Briefs Nano 50 Award (2005), ACS Award in the Chemistry of Materials (2004), World Technology Award in Materials (2004 and 2003), Scientific American 50 Award in Nanotechnology and Molecular Electronics (2003), New York Intellectual Property Law Association Inventor of the Year (2003), APS McGroddy Prize for New Materials (2003), Harrison Howe Award, University of Rochester (2002), MRS Medal (2002), Feynman Prize in Nanotechnology (2001), NSF Creativity Award (1996) and ACS Award in Pure Chemistry (1992). Lieber is an elected member of the National Academy of Sciences and the American Academy of Arts and Sciences, Fellow of the Materials Research Society, American Physical Society, Institute of Physics and American Association for the Advancement of Science. He is Co-Editor of Nano Letters, and serves on the Editorial and Advisory Boards of a large number of science and technology journals. Lieber also serves on the Technical Advisory Committee of Samsung Electronics. He has published more than 300 papers in peer-reviewed journals and is the principal inventor on more than 35 patents. In his spare time, Lieber has been active in commercializing nanotechnology, and has founded the nanotechnology companies: Nanosys, Inc. in 2001 and the new nanosensor company Vista Therapeutics in 2007, and nucleated Nantero, Inc. from his laboratory in 2001.

DINNER RESERVATIONS:

If you are on the permanent dinner list, this does not apply for this meeting. Every member will need to RSVP.

Please email Valarie Daugherty (daugherty@pittcon.org), SACP Administrative Assistant by Friday, March 20, 2009 to make dinner reservations. Should you not have email, please call Valarie at 412-825-3220 ext 204. The entrées for April is a choice of Filet of Beef or Lobster Romano. Please let Valarie know your choice entrée when you make your reservation. Dinner will cost \$8 (\$4 for students) and checks can be made out to the SACP. If you have any dietary restrictions, let Valarie know when you leave message.

PARKING: Duquesne University Parking Garage entrance is on Forbes Avenue. Upon entering the garage, you will need to get a parking ticket and drive to upper floors. Bring your parking ticket to the dinner or meeting for a validation sticker. Contact Dr. Mitch Johnson at Duquesne University if any difficulties arise.