

Plenary & Session Speakers

Gregory J. Downing, D.O., Ph.D.

Director, Office of Technology and Industrial Relations
Office of the Director, National Cancer Institute



Dr. Downing is Director of the Office of Technology and Industrial Relations (OTIR) in the Office of the Director at the National Cancer Institute (NCI), National Institutes of Health. In this role, he facilitates the collaboration among federal, academic, and private biomedical research sectors to support technology development that will yield innovative diagnostic, detection, and targeted treatment strategies for cancer. Through the OTIR, he supervises the administration of grants and contracts for programs in nanotechnology, biosensors, therapeutic delivery systems, and new technology platforms and imaging systems. He currently serves on several committees, including the NCI-FDA Interagency Oncology Task Force and the Biomedical Information Science and Technology Consortium.

Robert Chau, Ph.D.

Intel Senior Fellow
Director of Transistor Research and Nanotechnology



Dr. Robert Chau is an Intel Senior Fellow and Director of Transistor Research and Nanotechnology at Intel Corporation. He is responsible for directing research and development in advanced transistors, process modules, and technologies, and silicon integrated processes for microprocessor applications. He is also leading research efforts in emerging non-silicon nanotechnologies (e.g. III-V quantum-well devices and carbon nanotubes) for future nanoelectronics applications. Dr. Chau holds more than 75 U.S. patents, has received six Intel Achievement Awards and 13 Intel Logic Technology Development Division Recognition Awards, was recognized by *IndustryWeek* in 2003 as one of the 16 "R&D Stars" in the United States, and is an IEEE Fellow.

Richard S. Fisher, Ph.D.

Nanomedicine Initiative, Project Team Leader,
Program Director, Corneal Diseases, NEI, NIH



Richard S. Fisher received a Ph.D from the Department of Physiology and Biophysics at the University of Illinois at Urbana-Champaign. As a staff fellow in the Laboratory of Kidney and Electrolyte Metabolism, National Heart, Lung, and Blood Institute of the NIH, he continued studies of membrane transport properties and cell volume regulation. While a staff physiologist in the Department of Nephrology, Division of Medicine at the Walter Reed Army Institute of Research, he was also a visiting scientist at the Catholic University of Leuven, Belgium. Dr. Fisher returned to the NIH as a scientific review administrator in the National Institute of Deafness and Other Communication Disorders and then joined the National Eye Institute as a health science administrator where he is the Director of the Corneal Diseases program. He has served on the Institutional Review Board of Frederick Memorial Hospital, Frederick, MD, and has served on various trans-NIH committees. He also currently serves as the project team leader for the Nanomedicine Initiative.

Center for Nanoscale Science and Technology

The University of Illinois Center for Nanoscale Science and Technology (CNST) is the premier center for nanotechnology research, education, and outreach activities. CNST draws its strength from working as a collaboratory involving the Beckman Institute for Advanced Science and Technology, Roy J. Carver Biotechnology Center, Coordinated Science Laboratory, Frederick Seitz Materials Research Laboratory, Institute for Genomic Biology, Micro and Nanotechnology Laboratory, Center for Nanoscale Chemical, Electrical, Mechanical, Manufacturing Systems, Center for the Design of Biomimetic Nanoconductors, National Center for Supercomputing Applications, and the School of Chemical Sciences. The CNST is working toward seamless integration of interdisciplinary research from atoms and materials to devices and systems. It is uniquely located to harness the entrepreneurial and technical spirit in the Midwest, with ongoing industrial linkages as it prepares tomorrow's workforce. The CNST thrives on its cutting-edge research in bionanotechnology, computational nanotechnology, nanocharacterization, nanoelectromechanical systems, nanoelectronics, nanofabrication, nanomaterials, nanomanufacturing, nanomedicine, and nanophotonics. www.cnst.uiuc.edu

Micro and Nanotechnology Laboratory

The Micro and Nanotechnology Laboratory (MNTL) at the College of Engineering, University of Illinois at Urbana-Champaign is one of the nation's largest and most sophisticated university-based facilities for semiconductor, nanotechnology, and biotechnology research. The laboratory is a user facility that is available to university and industrial researchers from across the nation. It contains over 8,000 square feet of class 100 and class 1000 clean room laboratory and state-of-the-art ultra-high-speed optical and electrical device and circuit measurements. The bionanosystems area focuses on utilizing the various technologies developed in materials, nanofabrication, devices, MEMS, and NEMS to study and solve biological issues. Biomolecular flow patterns in nanoscale channels, integration of lasers onto biochips for real-time fluorescence study of bioreactions, and implantation of active devices in cells to study cellular biochemistry are examples of MNTL research activities. Currently, an \$18 million expansion of the facility is underway, which includes bionanotechnology and additional space for researchers. The expansion is scheduled to complete by Fall 2006. www.micro.uiuc.edu

Workshop Organizing Committee

Ilesanmi Adesida, Interim Dean, College of Engineering, and Director CNST

Irfan Ahmad, Associate Director, CNST (co-Chair)

Carolyn Anderson, Mallinckrodt Institute of Radiology, Washington University in Saint Louis

Kent Choquette, Acting Director, Micro and Nanotechnology Laboratory (Chair)

Dominique Griffon, Associate Professor, Veterinary Clinical Medicine

Eric Jakobsson, Professor, Molecular and Integrative Physiology

Jean-Pierre Leburton, Professor, Electrical and Computer Engineering

Graciela Padua, Associate Professor, Food Science and Human Nutrition

Taher Saif, Associate Professor, Mechanical and Industrial Engineering

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CNST

Nanotechnology Workshop

May 4-5, 2006

University of Illinois at Urbana-Champaign
Beckman Institute for Advanced Science and Technology
405 North Mathews Avenue
Urbana, Illinois

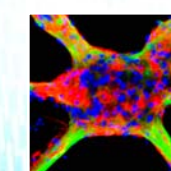
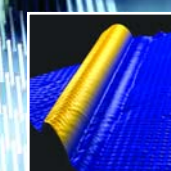
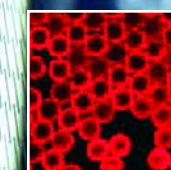
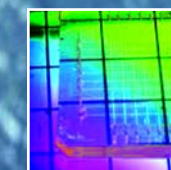
Sponsored by

Center for Nanoscale Science and Technology (CNST)

University of Illinois at Urbana-Champaign

Co-sponsors

- Beckman Institute for Advanced Science and Technology
- Institute for Genomic Biology (IGB)
- Micro and Nanotechnology Laboratory
- Nanoscale Chemical, Electrical, Mechanical, Manufacturing Systems (Nano-CEMMS)
- National Center for Supercomputing Applications
- Siteman Center for Cancer Nanotechnology Excellence, Washington University in Saint Louis, and University of Illinois at Urbana-Champaign



Workshop Premise

The broad objective of the workshop is to showcase University of Illinois research in nanomedicine, nanoelectronics/nanophotonics, and nanomaterials/nanomanufacturing.

The general framework of the nanotechnology workshop will be similar to those held on campus in May 2003-05, which were well-attended by industry and academia. Some of those interactions have since then led to industry and cross-campus collaborations.

The workshop will provide a forum for industry interactions and collaborations. The workshop will bring together campus community (faculty, graduate and undergraduates, administration) from UIUC and Washington University, and industry engaged in cutting-edge research. A workshop panel will discuss the roadmap to future direction of research and development in nanomedicine.

The two-day workshop is being held on May 4 & 5, 2006 at the prestigious Beckman Institute for Advanced Science and Technology at the University of Illinois at Urbana-Champaign. The workshop program includes plenary session speeches, technical sessions, panel discussion, poster sessions, and laboratory tours, in addition to lunch and dinner receptions.

Registration, Poster Signup, and Hotel Information
Pre-registration required. Register online at:
www.cnst.uiuc.edu/NanoWorkshop2006.htm

Parking

For parking directions to the Beckman Institute at the University of Illinois at Urbana-Champaign visit:
www.cnst.uiuc.edu/NanoWorkshop2006.htm

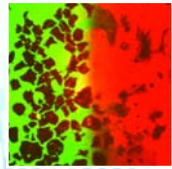
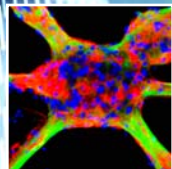
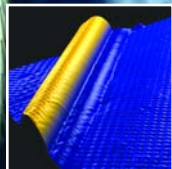
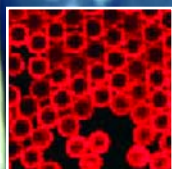
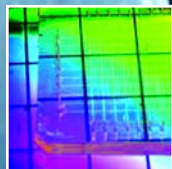
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For Technical Collaboration Contact

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AGENDA

Thursday, May 4, 2006

7:30 – 8:15 a.m.
Registration and Breakfast
Beckman, Room 1005

8:30 – 10:00 a.m.
Plenary Session
Auditorium
Chair – Kent Choquette, Micro & Nanotechnology Laboratory

8:30 a.m.
Welcome Remarks
Richard Herman, Chancellor, University of Illinois at Urbana-Champaign

Charles Zukoski, Vice Chancellor for Research, University of Illinois at Urbana-Champaign

Ilesanmi Adesida, Interim-Dean, College of Engineering; Director, Center for Nanoscale Science and Technology

Tanya Gallagher, Dean, Applied Life Studies, University of Illinois at Urbana-Champaign

9:00 a.m.
Recent Advances and Future Directions in Cancer Nanotechnology
Gregory Downing, Director, Office of Technology & Industrial Relations, National Cancer Institute

9:35 a.m.
Silicon Innovations and Emerging Nanotechnologies for High-Speed and Low-Power Logic Applications
Robert Chau, Senior Fellow and Director of Transistor Research and Nanotechnology, Intel

10:10 a.m.
Coffee Break

NANOMEDICINE I

10:30 a.m. – 12:30 p.m.
Session I
Chair – Gregory Freund, College of Medicine

10:30 a.m.
The NIH Roadmap Nanomedicine Initiative
Richard Fisher, Nanomedicine Initiative, Project Team Leader, Program Director, Corneal Diseases, NEI, NIH

10:50 AM
Targeted Nanoparticles for Molecular Imaging and Therapy of Cancer and Cardiovascular Disease
Samuel Wickline, SCCNE/Washington University in Saint Louis

11:10 a.m.
Multifunctional Contrast and Therapeutic Agents for Optical Biomedical Imaging
Stephen Boppart, Bioengineering, Medicine, Electrical and Computer Engineering

11:30 a.m.
Imaging Breast and Prostate Tumors for Receptor Content and Receptor Function Using Positron Emission Tomography: A Guide to Targeted Therapy and a Route to Individualized Medicine
John Katzenellenbogen, Chemistry

11:50 a.m.
Single Walled Carbon Nanotubes as Near Infrared Fluorescent Biomolecular Probes
Michael Strano, Chemical and Biomolecular Engineering

12:10 p.m.
Nanowrinkles and Nanofolds in an On-demand Drug Delivery
Sahraoui Chaieb, Mechanical and Industrial Engineering

12:30 – 1:45 p.m.
Buffet Lunch
Beckman, Room 1005
Poster Session
Beckman, Atrium

NANOMEDICINE II

1:45 – 3:45 p.m.
Session II
Chair – Bruce Wheeler, Bioengineering

1:45 p.m.
Actin Agglomeration in Single Cells Due to Mechanical Stimuli
Taher Saif, Mechanical and Industrial Engineering

2:05 p.m.
Visualizing the Molecular Signals in Live Cells by FRET
Yingxiao Wang, Bioengineering

2:25 p.m.
Roles of Nanomolecules and Nanomaterials in Optical Imaging of Tumors In Vivo
Samuel Achilefu, Radiology, Washington University in Saint Louis

2:45 p.m.
Atomic Resolution Imaging of Nanodevices with Large Scale Molecular Dynamics
Aleksi Aksimentiev, Physics

3:05 p.m.
Program of Excellence in Nanotechnology at Washington University
Carolyn Anderson, Radiology, Washington University in Saint Louis

3:25 p.m.
Ultrasound Mediated Delivery of RNAi for the Treatment of Metastatic Cancer using Targeted Nanoparticles
Kenneth Watkin, Speech and Hearing Sciences

3:45 p.m.
Coffee Break

PANEL ON RESEARCH AND DEVELOPMENT, AND SOCIETAL ISSUES IN NANOMEDICINE

4:00 – 5:30 p.m.
Session III
Moderator – Eric Jakobsson, Molecular and Integrative Physiology, Center for the Design of Biomimetic Nanoconductors

Panelists: Brian Cunningham (ECE, UIUC and SRU Biosystems); Wayland Eppard, Patient Advocacy Committee, NCCTG; Gregory Downing, NCI; and Samuel Wickline, SCCNE, Washington University Medical School

5:30 – 7:00 p.m.
Poster Session and Reception
Beckman, Atrium

Friday, May 5, 2006

7:30 – 9:00 a.m.
Continental Breakfast
Beckman, Room 1005

8:00 – 9:30 a.m.
NIH Grant Writing Workshop
Richard Fisher, Program Leader, Nanomedicine, NIH
Room 5602 Beckman Institute (seating limited: **pre-registration required**; send email to nano@cnst.uiuc.edu)

Objective: This CNST-organized session is primarily intended for UIUC engineering faculty and others who have had little or no NIH grant-writing experience, and have continued interest in working with/through CNST on Nanotechnology-based research and development.

NANOELECTRONICS/ NANOPHOTONICS

9:15 – 11:15 a.m.
Session IV
Chair – James Coleman, Electrical and Computer Engineering

9:15 a.m.
Microcavity Plasma Devices and Rare Earth-Doped Nanoparticles
Gary Eden, Electrical and Computer Engineering

9:35 a.m.
Carbon Nanotubes – From Individual Devices to Integrated Circuits
Zhihong Chen, T.J. Watson Research Center, IBM

9:55 a.m.
EXX Phenomena in Semiconductor-metal Hybrid Structures
Stuart Solin, Physics, Washington University in Saint Louis

10:15 a.m.
Silicon Photonics: Recent Progress in Silicon Laser and Amplifier based on Stimulated Raman Scattering
Haisheng Rong, Intel

10:35 a.m.
Controlling Carbon Nanotube Quantum Devices
Nadya Mason, Physics

10:55 a.m.
Nanoelectronic and Nanophotonic Applications for Compound Semiconductors
David Ahmari, Epiworks, Inc.

11:15 a.m.
Coffee Break

NANOMATERIALS/ NANOMANUFACTURING

11:30 a.m. – 1:00 p.m.
Session V
Chair: Placid Ferreira, Nano-CEMMS

11:30 a.m.
Tubes, Ribbons and Wires for Printed Electronics
John Rogers, Materials Science and Engineering/Nano-CEMMS

11:50 a.m.
Quest for Rapid Manufacturing at Nanoscale: An Optical Approach
Nicholas Fang, Mechanical and Industrial Engineering/Nano-CEMMS

12:10 p.m.
Integrated Microfluidic Networks for Nanoliter Combinatorial Chemistry
Paul Kenis, Chemical and Biomolecular Engineering/Nano-CEMMS

12:30 p.m.
Nanofabrication using HSQ
Niu Jin, Mechanical and Industrial Engineering; Mark Shannon, Mechanical and Industrial Engineering; and Ilesanmi Adesida, Electrical and Computer Engineering

12:50 p.m.
Closing Remarks
Irfan Ahmad, CNST

1:00 – 1:45 p.m.
Box Lunch

2:00 – 4:00 p.m.

Tours
• FS Materials Research Laboratory
• Bioengineering Department
• National Center for Supercomputing Applications
(signup online at www.cnst.uiuc.edu/NanoWorkshop2006.htm. Tour duration: 20 minutes; tours start at 20-minute intervals beginning at 2:00 p.m.)