

Plenary Session Speaker:



Mihail Roco, Ph.D.  
Senior Advisor on Nanotechnology, National Science Foundation

Mihail C. Roco is the Senior Advisor for Nanotechnology at the National Science Foundation (NSF) and a key architect of the National Nanotechnology Initiative. Prior to joining National Science Foundation, he was Professor of mechanical and chemical engineering. Dr. Roco is the founding Chair (in August 2000) of the U.S. National Science and Technology Council’s Subcommittee on Nanoscale Science, Engineering and Technology (NSET). Dr. Roco is credited with thirteen patents, contributed over two hundred articles and in sixteen books including more recently “Managing Nano-Bio-Info-Cognition Innovations” (2007) and “Mapping Nanotechnology Knowledge and Innovation: Global and Longitudinal Patent and Literature Analysis” (2009). Dr. Roco is a corresponding member of the Swiss Academy of Engineering Sciences. He is a Fellow of ASME, Fellow of AIChE and Fellow of the Institute of Physics, and leads the Nanotechnology Group of the International Risk Governance Council. Dr. Roco was elected as Engineer of the Year by the U.S. Society of Professional Engineers and NSF in 1999 and again in 2004. He was awarded the National Materials Advancement Award from the Federation of Materials Societies in 2007 “as the individual most responsible for support and investment in nanotechnology by government, industry, and academia worldwide.”

Workshop Organizing Committee

- **Rashid Bashir**; Professor, Electrical and Computer Engineering, Bioengineering, and Director, Micro and Nanotechnology Laboratory (MNTL), College of Engineering (COE), *Event Chair*
- **Irfan Ahmad**; Associate Director, Center for Nanoscale Science and Technology (CNST), and Agricultural and Biological Engineering, Colleges of Engineering, and Agricultural, Consumer, and Environmental Sciences (ACES), *Event co-Chair*
- **Jozef Kokini**, Professor, Food Science and Human Nutrition, and Associate Dean of Research, College of Agricultural, Consumer, and Environmental Sciences, *Event co-Chair*
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- **Dominique Griffon**, Associate Professor, Veterinary Clinical Medicine, College of Veterinary Medicine
- **Jimmy Hsia**, Professor, Mechanical Science and Engineering, and Center on Emerging Behaviors of Integrated Cellular Systems, and Center for Cellular Mechanics, COE
- **Iwona Jasiuk**, Professor, Mechanical Science and Engineering, COE
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- **Catherine Murphy**, Professor, Chemistry, College of Liberal Arts and Sciences (LAS)
- **Graciela Padua**, Associate Professor, Food Science and Human Nutrition, ACES
- **Charles Schroeder**, Assistant Professor, Chemical and Biomolecular Engineering, Colleges of Liberal Arts and Sciences, and Engineering
- **Nahil Sobh**, Site Lead, Network for Computational Nanotechnology/NanoHub at Illinois
- **Kenneth Watkin**, Professor, College of Applied Health and Sciences, Beckman Institute, and Coordinated Science Laboratory

nano@illinois

Multidisciplinary Research: Collaboratory

**Center for Nanoscale Science and Technology (CNST)**  
1102-04 Micro and Nanotechnology Laboratory  
208 North Wright Street  
Urbana, IL 61801  
*Ilesanmi Adesida, Director*  
*Irfan Ahmad, Associate Director*  
(217) 333-2015 | [www.cnst.illinois.edu](http://www.cnst.illinois.edu)

**Beckman Institute for Advanced Science and Technology (BI)**  
405 North Mathews Avenue  
Urbana, IL 61801-2300  
*Tamer Basar, Director*  
(217) 244-1176 | [www.beckman.illinois.edu](http://www.beckman.illinois.edu)

**Center for Agricultural and Pharmaceutical Nanotechnology (CAPN)\***  
*Planning Phase*  
1102-04 Micro and Nanotechnology Laboratory  
208 North Wright Street  
Urbana, IL 61801  
*Brian Cunningham, Director*  
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**Center for Directed Assembly of Nanostructures (CDAN)\* (co-location)**  
2015 Frederick Seitz Materials Research Laboratory  
104 South Goodwin Avenue  
Urbana, IL 61801  
*Kenneth Schweizer, Site Lead*  
(217) 333-6440 | [www.mrl.illinois.edu](http://www.mrl.illinois.edu)

**Center for Cellular Mechanics (CCM)**  
1116 Micro and Nanotechnology Laboratory  
208 North Wright Street  
Urbana, IL 61801  
*Taher Saif, Director*  
(217) 333-8552 | [www.ccm.illinois.edu](http://www.ccm.illinois.edu)

**Center for Nanoscale Chemical-Electrical-Mechanical**  
Manufacturing Systems (Nano-CEMMS)\*  
4410 Mechanical Engineering Laboratory  
105 South Mathews Avenue  
Urbana, IL 61801  
*John Rogers, Director*  
(217) 265-0093 | [www.nano-chemms.illinois.edu](http://www.nano-chemms.illinois.edu)

**Center of Advanced Materials for Purification of Water with Systems (WaterCAMPWS)\***  
2127 Mechanical Engineering Laboratory  
1206 West Green Street  
Urbana, IL 61801  
*Mark Shannon, Director*  
(217) 333-2633 | [www.watercampws.illinois.edu](http://www.watercampws.illinois.edu)

**Center on Emergent Behaviors of Integrated Cellular Systems (EBICS)\***  
1102A Micro and Nanotechnology Laboratory  
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**Coordinated Science Laboratory (CSL)**  
202 Coordinated Science Laboratory  
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**Frederick Seitz Materials Research Laboratory (FSMRL)+**  
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**Institute for Genomic Biology (IGB)**  
Institute for Genomic Biology  
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**Materials Computation Center (MCC)\***  
2015 Frederick Seitz Materials Research Laboratory  
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**Micro and Nanotechnology Laboratory (MNTL)\***  
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**National Center for Supercomputing Applications (NCSA)\***  
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**Network for Computational Nanotechnology/NanoHub at Illinois\***  
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**Siteman Center of Cancer Nanotechnology Excellence (SCCNE) (Illinois co-location)\*\***  
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or visit [www.cnst.illinois.edu](http://www.cnst.illinois.edu)

\* Currently/formerly a National Science Foundation Center \*\* National Cancer Institute Center  
+ Currently/formerly a Department of Energy Laboratory/Center



Center for Nanoscale Science and Technology



Annual Nanotechnology Workshop 2010  
May 6–7

University of Illinois at Urbana–Champaign  
National Center for Supercomputing Applications; and Micro and Nanotechnology Laboratory

SPONSORED BY:

The Center for Nanoscale Science and Technology (CNST)

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- *NCI Siteman Center for Cancer Nanotechnology Excellence at Washington University in Saint Louis, and University of Illinois at Urbana–Champaign*
- *NSF Center on Emergent Behaviors of Integrated Cellular Systems (EBICS) , at the University of Illinois at Urbana–Champaign, the Massachusetts Institute of Technology (MIT), and the Georgia Institute of Technology*
- *Network for Computational Nanotechnology/ NanoHub at Illinois*
- *Nanotechnology Community of Scholars at ACES*



## Workshop Premise

The broad objective of the Center for Nanoscale Science and Technology (CNST) workshop is to show-case University of Illinois research in bionanotechnology/nanomedicine, nanoelectronics/nanophotonics, nanomaterials/nanomanufacturing, and computational nanotechnology/nanomechanics. The general framework of the nanotechnology workshop is similar to those held on campus since 2003; which were all well attended by industry and academia. Some of those interactions have since then led to industry and cross-campus collaborations. The CNST-led forums and workshops have contributed tremendously toward the formation of multidisciplinary teams leading to the establishment of multi-million dollar new nanotechnology centers on-campus.

The workshop will provide a forum for industry interactions and collaborations. The workshop brings together campus community (faculty, graduate and undergraduates, administration) from UIUC and other academic institutions, and industry engaged in cutting-edge research. A workshop panel will discuss the roadmap to future direction of research and development in nanotechnology and regional partnerships.

*The two-day workshop is being held on May 6 and 7, 2010 at the renowned National Center for Supercomputing Applications, and the Micro and Nanotechnology Laboratory at the University of Illinois at Urbana-Champaign. The workshop program includes plenary session speeches, technical sessions, panel discussion, and poster sessions, in addition to lunch and dinner receptions.*

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## CNST nano@illinois

The University of Illinois Center for Nanoscale Science and Technology (CNST) is the premier center for nanotechnology research, education, entrepreneurial, and outreach activities. CNST draws its strength by working as a collaboratory involving major nanotechnology laboratories and centers. The Center has spearheaded efforts leading to the development of multidisciplinary teams and establishment of federally funded centers and projects, and development of nanotechnology curriculum. It is working toward seamless integration of interdisciplinary research from atoms and materials to devices and systems. CNST 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, nanoagriculture, computational nanotechnology, nanocharacterization, nanoelectromechanical systems, nanoelectronics, nanofabrication, nanomaterials, nanomanufacturing, nanomedicine, and nanophotonics.

For more information visit: [www.cnst.illinois.edu](http://www.cnst.illinois.edu) or email: [nanotechnology@illinois.edu](mailto:nanotechnology@illinois.edu) or call 217-244-1353.

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## Agenda

### Thursday, May 6

<b>8:00–8:45 AM</b>	Registration and Breakfast at NCSA Atrium
Plenary Session at NCSA Auditorium	
<b>09:00–10:30 AM</b>	Plenary Session Chair: Rashid Bashir, Director, Micro and Nano-technology Lab.
<b>9:00 AM</b>	Center for Nanoscale Science and Technology
<b>9:15 AM</b>	<b>Welcome Remarks</b> Robert Easter; Interim Chancellor, University of Illinois Ruth Watkins, Dean, College of Liberal Arts and Sciences, University of Illinois Michael Bragg, Senior Executive Dean, College of Engineering; University of Illinois <b>nano@Illinois:</b> Center for Nanoscale Science and Technology (CNST) Rashid Bashir, Director, MNTL and Irfan Ahmad, Associate Director, CNST
<b>9:45 AM</b>	<b>Keynote:</b> <b>Current Progress and Future Opportunities in Nanotechnology</b> Mihail Roco, Senior Advisor for Nanotechnology, National Science Foundation
<b>11:00 AM –1:00 PM</b>	<b>Poster Session, Lunch</b> –NCSA Atrium

#### Nanomaterials, Nanoenvironment, & Nanomanufacturing Session

<b>1:15 PM–2:35 PM</b>	Session I Chair: Deborah Leckband, Chemical and Biomolecular Engineering
<b>1:15 PM</b>	<b>Semiconductor Nanomaterials for Bio-Integrated Forms of Electronics</b> John Rogers, Materials Science and Engineering, FS Materials Research Laboratory, and Director, Nano-CEMMS, Illinois
<b>1:35 PM</b>	<b>Teaching “Old” Materials “New” Tricks: Site- and Shape-specific Nanopatterning of Multifunctional Materials</b> Vinayak Dravid, Materials Science and Engineering, Northwestern University
<b>1:55 PM</b>	<b>An Integrated Approach Toward Understanding the Toxicity and Health Hazards of Metal and Metal Oxide Nanomaterial</b> Vicki Grassian, Chemistry, University of Iowa
<b>2:15 PM</b>	<b>Metal Nanocrystals: From Synthesis to Manufacturing and Applications</b> Younan Xia, Biomedical Engineering, Washington University in Saint Louis
<b>2:35 PM</b>	Coffee Break

#### Panel on Midwest Collaboration in Nanotechnology Research and Development: Developing a Regional Partnership

<b>3:00 PM–4:45 PM</b>	Session II: Moderator: Debba Dutta, Dean Graduate College Panelists: Irfan Ahmad, Rashid Bashir, Illinois; Vinayak Dravid, Northwestern; Vicki Grassian, Iowa; Younan Xia, Washington University; Paul Bohn, Notre Dame; Hongda Chen, National Program Leader, Bioprocessing Engineering/ Nanotechnology, USDA; Tiffany Houchin, Elanco, Eli Lilly and Company
<b>5:00 PM–7:00 PM</b>	<b>Poster Session and Reception at NCSA Atrium</b>
<b>7:30 PM–9:00 PM</b>	<b>Dinner/Speech (by invitation)</b> <b>Blue Waters: An Extraordinary Computing Resource to Enable Extraordinary Research</b> Thomas Dunning, Director, National Center for Supercomputing Applications I-Hotel, University of Illinois Research Park

Workshop Registration, Poster Signup, and Hotel Information  
**Registration Required.** Seating is limited, so register early online: [www.cnst.illinois.edu](http://www.cnst.illinois.edu)

#### Workshop Location

**National Center for Supercomputing Applications, and Micro and Nanotechnology Laboratory**  
For parking directions to the National Center for Supercomputing Applications or the Micro and Nanotechnology Laboratory at the University of Illinois at Urbana-Champaign visit:  
<http://www.cnst.illinois.edu/NanoWorkshop2010.htm>

## Agenda

### Friday, May 7

Venue: Micro and Nanotechnology Laboratory (MNTL) Seminar Room 1000  
**7:30 AM–8:15 AM** Continental Breakfast at Micro and Nanotechnology Laboratory Atrium

#### Bionanotechnology, Nanoagriculture, and Nanomedicine

<b>8:30 AM–10:00 AM</b>	Session III: Chair: Michael Insana, Bioengineering
<b>8:30 AM</b>	<b>Intelligent Integrated Microfluidics– Molecular Recognition and Catalysis in Single Nanopores and Nanopore Arrays</b> Paul Bohn, Chemistry, University of Notre Dame
<b>8:50 AM</b>	<b>Nanobionics: From Quantum, Synthetic to Systems Nanobiotechnology and Molecular Medicine</b> Logan Liu, Electrical and Computer Engineering/MNTL, Illinois
<b>9:10 AM</b>	<b>Intracellular Raman Chemical Imaging for Mammalian and Microbial Systems</b> Joseph Irudayaraj, Agricultural and Biological Engineering, and Birk Nanotechnology Center, Purdue University
<b>9:30 AM</b>	<b>Nanoparticles against B–lineage Acute Lymphoblastic Leukemia</b> Fatih Uckun, Institute for Pediatric Clinical Research, Children’s Hospital Los Angeles, University of Southern California
<b>9:50 AM</b>	Coffee Break

#### Nanoelectronics and Nanophotonics Session at 1000 MNTL

<b>10:15 AM–11:55 AM</b>	Session IV Chair: James Coleman, Electrical and Computer Engineering
<b>10:15 AM</b>	<b>Carbon–Based Nanoelectronics: Fundamental Issues</b> Joseph Lyding, Electrical and Computer Engineering/MNTL, Illinois
<b>10:35 AM</b>	<b>Approaches for Photonic Crystal Membrane Nanolaser Diodes</b> Kent Choquette, Electrical and Computer Engineering/MNTL, Illinois
<b>10:55 AM</b>	<b>Nanotechnology in Microcavity Plasma Devices and Arrays</b> J. Gary Eden, Electrical and Computer Engineering/MNTL/CSL, Illinois
<b>11:15 AM</b>	<b>Nanoplasmonic Lasers</b> Shun–Lien Chuang, Electrical and Computer Engineering/MNTL, Illinois
<b>11:35 AM</b>	<b>Probing Carbon Nanostructures using Superconductivity—and vice–versa</b> Nadya Mason, Physics, University of Illinois
<b>11:55 AM</b>	<b>Box Lunch at MNTL Atrium/Lab Tours</b> (Tour duration: 20 mins; tours start at 20 mins interval from 1:00 PM)

#### Computational Nanotechnology, Nanomechanics, and Multidisciplinary Nano Programs Assessment

<b>2:15 PM–4:00 PM</b>	Session V Chair: Jimmy Hsia, Professor of Mechanical Science and Engineering
<b>2:15 PM</b>	<b>The Role of Molecular Modeling in Bionanotechnology</b> Klaus Schulten, Physics and Beckman Institute, Illinois
<b>2:35 PM</b>	<b>A Multiscale Computational Framework for Modeling of Nanomaterials</b> Arif Masud, Civil and Environmental Engineering, Illinois
<b>2:55 PM</b>	<b>Multiscale Analysis of Silicon NEMS</b> Narayana Aluru, Mechanical Science and Engineering, and Nano–CEMMS, Illinois
<b>3:15 PM</b>	Break
<b>3:20 PM</b>	<b>Nano–Centers Program Assessment</b> Lizanne DeStefano, Educational Psychology, Nano-CEMMS, and I-STEM
<b>3:40 PM</b>	<b>Nanotechnology–based Multidisciplinary Translational Research and Development</b> Irfan Ahmad, Center for Nanoscale Science and Technology, and Agricultural and Biological Engineering, Illinois
<b>4:00 PM</b>	<b>Best Student Poster Awards</b> Closing Remarks: Ravi Iyer, Vice Chancellor for Research
<b>4:30 PM</b>	<b>Adjourn</b>