Center for Nanoscale Science and Technology

11\textsuperscript{th} ANNUAL NANOTECHNOLOGY WORKSHOP 2013

MAY 2-3, 2013

National Center for Supercomputing Applications (May 2)
Micro and Nanotechnology Laboratory (May 3)

University of Illinois at Urbana-Champaign

AGENDA 04/30/13

Thursday, May 2
National Center for Supercomputing Applications

7:30-8:15 AM: Registration and Breakfast at NCSA Atrium

Plenary and Technical Sessions at NCSA Auditorium

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<th>8:30-10:00 AM</th>
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<td>8:30</td>
<td>Introductory Remarks</td>
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<tr>
<td>8:35</td>
<td>Welcome Remarks</td>
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<tr>
<td>9:00</td>
<td>Keynote: Engineering Imaging Probes and Molecular Machines for Nanomedicine</td>
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<td>10:00</td>
<td>Break</td>
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Introductory Remarks

nano@Illinois: Center for Nanoscale Science and Technology (CNST)

Welcome Remarks

Michael Bragg, Interim Dean, College of Engineering
Rashid Bashir, Co-Director, CNST and Director, Micro and Nanotechnology Laboratory
Irfan Ahmad, Executive Director, CNST

Keynote: Engineering Imaging Probes and Molecular Machines for Nanomedicine

Gang Bao, College of Engineering Distinguished Professor, Georgia Institute of Technology
IGERT-CMMB and M-CNTC Annual Symposium

10:20-noon  
Technical Session I: Nanoelectronics/Nanophotonics/Nanomaterials/Nanomanufacturing (CNST Collaboratory Graduate Students and Postdocs)  
Session Chair: Nadya Mason, Physics

10:20  
Heterogeneous Integration of III-V Semiconductor Nanowires with Si and Graphene for Photovoltaics  
Parsian Mohseni, Electrical and Computer Engineering (Advisor: Xiuling Li)

10:40  
High Power Lithium Ion Microbatteries from Interdigitated Three-Dimensional Nanoporous Electrodes  
James H. Pikul, Mechanical Science and Engineering (Advisor: William King)

11:00  
Large-Scale Growth, Clean Transfer, and Nanosandwiching of Low-Dimensional Nanomaterials  
Josh Wood, Electrical and Computer Engineering (Advisor: Joseph Lyding)

11:20  
Selective Mode Coupling in Microring Resonators  
Amir Arbabi, Electrical and Computer Engineering (Advisor: Lynford Goddard)

11:40  
Detecting Protein and miRNA Cancer Biomarkers using Silicon-based Photonic Crystals and a Resonance Coupling Laser Scanning Instrument  
Yafang Tan, Electrical and Computer Engineering (Advisor: Brian Cunningham)

12:00-12:40  
Lunch

12:40-2:00  
Poster Session: CNST Graduate Students Initiative/IGERT-CMMB and M-CNTC Trainees

2:00-4:30  
Technical Session II: Bionanotechnology and Nanomedicine (IGERT-CMMB and M-CNTC Trainees)  
Session Chairs: J.J. Cheng, Materials Science and Engineering; and Taher Saif, Mechanical Science and Engineering

2:00  
Photonic Crystal Enhanced Microscopy for the Study of Cell Attachment  
Erich Lidstone, MD/PhD Scholar, Bioengineering (Advisors: Brian Cunningham and Lawrence Schook)

2:20  
Integrating Mechanical Cues and Biomolecular Patterns in a Collagen-Glycosaminoglycan Scaffold for Tendon-Bone Junction Repair  
Laura Mozdzen, Chemical and Biomolecular Engineering (Advisors: Brendan Harley and Amy Wagoner Johnson)
2:40  The Effect of Substrate Stiffness on the Apparent Stress Cells Experience during Cyclic Strain  
Heather Huntsman, Fellow, Kinesiology and Community Health  
(Advisors: Marni Boppart and Hyun Joon Kong)

3:00  Break

3:10  Development of a Click Chemistry Approach to Evaluate the Effect of Protein Corona on Active Targeting Yield  
Vahid Mirshafiee, Fellow, Chemical and Biomolecular Engineering

3:30  Cancer Metastasis, Motility and Matrix Mechanics  
Muhammad Yakut Ali, Fellow, Mechanical Science and Engineering

3:50  Detection of miRNA and Proteins Using Silicon Nanowire Biosensors  
Brian Dorvel, Fellow, Biophysics

4:10  Presentation to Cohort 1 IGERT and M-CNTC Trainees and Student Leadership Council

4:30-5:30  Panel Discussion:  
Nanotechnology Research: Academia-Industry Partnership for Innovation  
Panel Moderators: CNST Graduate Students Initiative

Panelists:  Gang Bao, Georgia Tech; Mark Bohr, Intel; Lesley Millar, OTM, University of Illinois;  
Ben Barbieri, ISS, Inc.

5:30 -7:00 PM  Reception and Poster Session: NCSA Atrium
Friday, May 3
Micro and Nanotechnology Laboratory

**8:00-1:30 Plenary Session II: Chair: James Coleman, Electrical and Computer Engineering and MNTL**

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<td>7:00-8:00AM</td>
<td>Breakfast</td>
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<td>8:00-8:50</td>
<td>Poster Session</td>
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<td>9:00-9:45</td>
<td>Keynote: Technology Scaling in the Mobility Era</td>
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<td>Mark Bohr, Intel, Senior Fellow and Director of Process Architecture and Integration</td>
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<td>9:45-10:05</td>
<td>Self-Rolled-Up Nanomembranes for Ultra-small On-Chip Passive Devices</td>
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<td>Xiuling Li, Associate Professor of Electrical and Computer Engineering</td>
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<td>10:05-10:25</td>
<td>Improving the Pulse Stability of Mode-Locked Diode Lasers</td>
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<td>A. Catrina Coleman, Professor of Electrical and Computer Engineering</td>
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<td>10:25-10:45</td>
<td>Break</td>
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<tr>
<td>10:45-11:30</td>
<td>Keynote: Single Molecule and Single Cell Sensing with Nanelectromechanical Systems (NEMS)</td>
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<td>Michael Roukes, Professor and Co-Director of the Kavli Nanoscience Institute, California Institute of Technology</td>
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<td>11:30-11:50</td>
<td>The Transistor-Injected Quantum Transition Laser: A Novel Mid-IR Source</td>
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<td>John Dallesasse, Professor of Electrical and Computer Engineering</td>
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<td>11:50AM-12:10</td>
<td>Brillouin Optomechanics</td>
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<td>Gaurav Bahl, Assistant Professor of Mechanical Science and Engineering</td>
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<td>12:10-12:30</td>
<td>Computing in the Nanoscale Era</td>
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<td>Naresh Shanbhag, Professor of Electrical and Computer Engineering</td>
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<td>12:30-12:50</td>
<td>Nanostructured Battery Electrodes for High Power and Energy Density Energy Storage</td>
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<td>Paul Braun, Professor of Materials Science and Engineering</td>
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<td>12:50-1:30</td>
<td>Concluding Session</td>
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<td>Best Poster Awards</td>
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<td>2:00-4:00PM</td>
<td>Pre-arranged lab visits and one-on-one meetings with faculty</td>
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**CNST Workshop Organizing Committee Members:**

- Rashid Bashir, CNST/MNTL/Electrical and Computer Engineering/Bioengineering, Chair
- Irfan Ahmad, CNST/Agricultural and Biological Engineering, Co-Chair
- Xiuling Li, Electrical and Computer Engineering, and MNTL, Co-Chair
- Ryan Bailey, Chemistry
- John Dallesasse, Electrical and Computer Engineering, and MNTL
- Lianne Deksteeno, I-STEM, and Educational Psychology
- William King, Mechanical Science and Engineering, and Nano-CEMMS
- Carrie Kouadio, CNST/Nano-CEMMS
- Laura Miller, IGERT/M-CNTC
- Cathy Murphy, Chemistry, and FSMRL
• Daniel Wasserman, Electrical and Computer Engineering, and MNTL
• William Wilson, FS Materials Research Laboratory

Annual Workshop and Symposium Sponsored by:

- Center for Nanoscale Science and Technology (CNST)
- NSF Integrative Graduate Education and Research Traineeship (IGERT) on Cellular and Molecular Mechanics and BioNanotechnology (CMMB)
- NIH/NCI Midwest Cancer Nanotechnology Training Center (M-CNTC)

Cosponsors:

- Micro and Nanotechnology Laboratory (MNTL)
- National Center for Supercomputing Applications (NCSA)
- Nano Chemical-Electrical-Mechanical Manufacturing Systems Center (Nano-CEMMS)
- Beckman Institute for Advanced Science and Technology
- Computational Science and Engineering (CSE)
- Institute for Genomic Biology (IGB)
- Coordinated Science Laboratory