

UGIM 2010

University Government Industry Micro/Nano Symposium
June 28 - July 1, 2010 • Purdue University • West Lafayette, IN

PURDUE UNIVERSITY
Discovery Park

nano.purdue.edu/UGIM

Symposium on the Management of Fabrication Facilities and Laboratories

Monday - June 28, 2010 ([Discovery Park](#), MRGN 121)

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| 7:15 AM | 7:45 AM | <i>Transportation from Purdue Memorial Union to
Burton D. Morgan Center for Entrepreneurship (MRGN)</i> |
| 7:30 AM | 4:00 PM | Registration (Near entrance to MRGN 121) |
| 7:30 AM | 8:00 AM | Breakfast (continental) - Venture Café |
| 8:00 AM | 8:15 AM | Welcome – John Weaver, Associate Chair, UGIM 2010
Facility Manager, Birck Nanotechnology Center, Purdue University |
| 8:15 AM | 9:00 AM | Keynote Presentation – Ahmad Soueid, HDR CUH2A
<i>Nanotechnology Facilities: Where We Are and Where We Are Going</i> |
| 9:00 AM | 10:20 AM | Session A – Lab and Fab Financial Issues (<i>Stacy Brown, Chair</i>)

<i>David Bunzow, Lawrence Berkeley Laboratories</i>
<i>Fiscal Operational Models for DOE NSRCs: The Molecular Foundry @ LBNL</i>

<i>Vijay Mishra, India Institute of Science</i>
<i>Indian Nanoelectronics Users Program: An Outreach Vehicle to Expedite Nanoelectronics
Research in India</i>

<i>Aamer Mahmood, Purdue University</i>
<i>Microfabrication process cost analysis</i>

<i>Dennis Grimard, University of Michigan</i>
<i>Financial and Operational Survey of Major University Nanofabrication Facilities</i> |
| 10:20 AM | 10:40 AM | Break |

10:40 AM 12:00 NOON Session B – Lab Management and Operation I (*Dan Christensen, Chair*)

Vicky Diadiuk, Massachusetts Institute of Technology
Fabrication Facilities and Operational Model at MIT's Microsystems Technology Labs

John Weaver, Purdue University
The Birck Nanotechnology Center Operational Model

Rosie Hicks, Australian National Fab
Challenges of staffing multi-user nanofabrication facilities

Daniel Woodie, Cornell University
Microelectronic Laboratories Hazardous Waste: Challenges and Solutions

12:00 NOON 1:00 PM Lunch - Venture Café

1:00 PM 2:20 PM Session C – Lab Management and Operation II (*Vicky Diadiuk, Chair*)

Subhadra Gupta, University of Alabama
Challenges of operating a user microfabrication facility in a university

Anthony Hmelo, Vanderbilt University
The VINSE Core Laboratories: Opportunities, Challenges and Lessons Learned at Year 6

Bill Flounders, University of California at Berkeley
Survival of the Fit-Up - The Evolution of the Berkeley Microlab

Lisa Hogle, Arizona State University
Training in a Global Work Environment

2:20 PM 2:40 PM Break

2:40 PM 4:20 PM Session D – Lab Management and Operation III (*John Sweeny, Chair*)

Janet Teshima, ONAMI
ONAMI Shared User Facilities and Commercialization Programs

David Bunzow, Lawrence Berkeley Laboratories
The Molecular Foundry at Lawrence Berkeley National Laboratory

Bob Celotta, National Institute for Standards and Technology
The NIST Center for Nanoscale Science and Technology: Supporting US Innovation in Nanotechnology

Roberto Panepucci, Renato Archer Center for Information Technology (Brazil)
Innovation Environment in Micro/Nano Technology in Brazil: The Case for an Open Access Research Facility

S. Mohan, India Institute of Science
Centers of Excellence in Nanoelectronics in India

4:20 PM	5:20 PM	<p>Roundtable - Lab Management Issues</p> <p>David Bunzow, Lawrence Berkeley Laboratories John Hughes, University of Illinois Urbana-Champaign John Schott, Stanford University John Weaver, Purdue University</p>
5:30 PM	7:00 PM	<p>Tours of the Birck Nanotechnology Center – <i>Facility Design and Capabilities</i></p> <p>Food and Networking - Buffet Dinner - Venture Café</p>
6:30 PM	8:00 PM	<p><i>Transportation to Purdue Memorial Union</i></p>
8:00 PM	8:30 PM	

Tuesday - June 29, 2010 ([Purdue Memorial Union](#), South Ballroom)

7:30 AM	4:00 PM	Registration (West entrance-South Ballroom)
7:30 AM	8:00 AM	Breakfast (continental)
8:00 AM	8:20 AM	Conference Kick-off - Dr. Tim Sands, Provost and Executive Vice President for Academic Affairs, Purdue University
8:20 AM	9:05 AM	Keynote Presentation – John Prater, Army Research Office <i>Army Basic Research in Nanotechnology: An Overview of Needs and Opportunities</i>
9:05 AM	10:25 AM	<p>Session E – Lab Management and Operation IV (<i>Bill Flounders, Chair</i>)</p> <p>Abbie Gregg, Abbie Gregg Incorporated <i>Case Studies in Cost and Capacity Models for Research Centers</i></p> <p>John Sweeny, Harvard University <i>How to Develop a Formal Process for Integrating a Toxic Gas Monitoring System Into a Buildings Fire Alarm System</i></p> <p>Alexander McEachern, Power Standards Corporation <i>Practical Power Quality and Energy Measurements at Research-Based Semiconductor Fabs</i></p> <p>Daniel Christensen, University of Wisconsin Madison <i>Design and Construction of a Sub-atmospheric Vapor Delivery Source Retrofit for an Ion Implanter</i></p>
10:25 AM	10:45 AM	Break

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10:45 AM	11:55 AM	<p>Session I (<i>Huiling Grace Xing, Chair</i>)</p> <p>Alan Seabaugh, University of Notre Dame (Invited) <i>Emerging Energy-Efficient Device Technologies vs. Ultimate CMOS</i></p> <p>Ankit Jain, Purdue University <i>A Theoretical Study of Negative Bias Temperature Instability in p-type NEMFET</i></p> <p>Xufeng Wang, Purdue University <i>Introducing the nanoMOS simulator</i></p>
12:00 NOON	1:30 PM	Lunch and Annual Business Meeting – North Ballroom
1:30 PM	3:20 PM	<p>Session II (<i>Alan Seabaugh, Chair</i>)</p> <p>John Rogers, University of Illinois Urbana-Champaign (Invited) <i>Materials and Mechanics for Stretchable Electronics</i></p> <p>Gary Cheng, Purdue University <i>Laser dynamic forming of functional materials laminated composites on patterned three-dimensional surfaces</i></p> <p>Lin Dong, Purdue University <i>SrTiO₃ Field-Effect Transistor with ALD Al₂O₃/LaAlO₃ gate oxide</i></p> <p>Linlin Hou, University of Cincinnati <i>Fabrication and Demonstration of a Scalable Microfabrication Process for Arrayed Electrowetting Microprisms</i></p> <p>Leonid Ocola, Argonne National Laboratory <i>Geometry Assisted PEC for Electron Beam Direct Write Nanolithography</i></p>
3:20 PM	3:45 PM	Break
3:45 PM	4:55 PM	<p>Session III (<i>John Rogers, Chair</i>)</p> <p>Kevin Chen, Hong Kong University of Science and Technology (Invited) <i>GaN Smart Power IC Technology</i></p> <p>Oana Malis, Purdue University <i>Near-infrared intersubband absorption in MBE-grown lattice-matched InAlN/GaN superlattices</i></p> <p>Huili (Grace) Xing, University of Notre Dame <i>AlGaAs/GaAs/GaN HBTs by wafer fusion</i></p>
5:15 PM	6:15 PM	Walking tour of Neil Armstrong building (before banquet)

6:15 PM	6:30 PM	<i>Transportation to The Trails</i>
6:30 PM	7:30 PM	Cash Bar – The Trails
7:30 PM	9:30 PM	Banquet – Speaker: Michael Birck, founder, Tellabs <i>University-Industry relationships</i>
9:30 PM		<i>Transportation provided back to Purdue Memorial Union</i>

Wednesday - June 30, 2010 (Purdue Memorial Union, South Ballroom)

7:30 AM	4:00 PM	Registration (West entrance – South Ballroom)
7:30 AM	8:00 AM	Breakfast (continental)
8:00 AM	8:45 AM	Keynote Presentation – C. Y. Sung, IBM <i>Post CMOS Carbon Based Graphene Nanoelectronics</i>
8:45 AM	10:15 AM	Session IV (<i>Jason Heikenfeld, Chair</i>) Eric Pop, University of Illinois Urbana-Champaign (Invited) <i>Carbon Nanoelectronics: Toward Energy-Efficient Computing</i> Tae-Gon Cha, Purdue University <i>Optical Nanosensors based on DNA-coated Single Carbon Nanotubes for Biomolecular Detection</i> Gabor Csathy, Purdue University <i>Novel Phases in Correlated Electronic Systems Confined to Reduced Dimensions</i> John Watson, Purdue University <i>Density dependence of mobility in a high quality Carbon-doped GaAs two-dimensional hole system</i>
10:15 AM	10:45 AM	Break
10:45 AM	11:55 AM	Session V (<i>Xiuling Li, Chair</i>) Yong Chen, Purdue University (Invited) <i>Graphene: materials and applications for electronics, sensing and thermal management</i> Michael Bolen, Purdue University <i>Insights into mobility variation in epitaxial graphene Hall bars on C-face 4H-SiC</i> Robert Colby, Purdue University <i>Cross-sectional transmission electron microscopy of graphene and graphite films</i>

12:00 NOON	1:30 PM	Lunch – North Ballroom
1:30 PM	3:20 PM	<p>Session VI (<i>Eric Pop, Chair</i>)</p> <p>David Janes, Purdue University (Invited) <i>Nanowires FETs for Full Transparent Electronics</i></p> <p>Winston Chern, University of Illinois Urbana-Champaign <i>Silicon Nanowire Array Based Solar Cells Produced by Non-lithographic Patterning and Metal-Assisted Chemical Etching</i></p> <p>Jun Fang, University of Kentucky <i>Nanoimprinted SU-8 Nanopillars and Hierarchically Branched Nanowires by Anodic Aluminum Oxide templates and Their Optical Properties</i></p> <p>Patrick Kung, University of Alabama <i>Synthesis and Optical Properties of ZnO Nanowires for Nanophotonics</i></p> <p>James Mitchell, Purdue University <i>Femtosecond Laser Direct Writing of Nanoscale Silicon Lines</i></p>
3:20 PM	3:35 PM	Break
3:35 PM	4:45 PM	<p>Session VII (<i>J.-Y. Kim, Chair</i>)</p> <p>Kevin Walsh, University of Louisville (Invited) <i>No-Power MEMs Devices using Buckled Diaphragms and Engineered Stress</i></p> <p>Kuo-Ping Chen, Purdue University <i>Optical Properties of Noble-Metal Nanostructures and the Grain Boundary Effect</i></p> <p>Aeraj ul Haque, Purdue University <i>Measurements of Gravity Induced Ca²⁺ Signaling using a Silicon Microfabricated Cell Electrophysiology Lab-on-a-Chip (CEL-C)</i></p>
5:00 PM		<i>Transportation to the Birck Nanotechnology Center</i>
5:30 PM	7:00 PM	<i>Tours of the Birck Nanotechnology Center – Research Activities in the Center</i>
5:30 PM	7:00 PM	Poster session at the Birck Nanotechnology Center
7:00 PM	7:30 PM	<i>Transportation to the Purdue Memorial Union</i>

Thursday - July 1, 2010 ([Purdue Memorial Union](#), South Ballroom)

7:30 AM 8:00 AM Breakfast (continental)

8:00 AM 9:50 AM Session VIII (*J.V. Clark, Chair*)

Suresh Garimella, Purdue University (Invited)
Micro/Nano-Scale Thermal Management of Electronics

Wenwen Chai, Purdue University
Dense Matrix Factorization of Linear Complexity for Impedance Extraction of Large-Scale 3-D Integrated Circuits

Shuaib Salamat, Purdue University
Development of Instructional Modules and Simulation Tools for Thermoelectric Systems with Application to Hot Spot Cooling in Integrated Circuits

Jeremy Schroeder, Purdue University
Bridging the gap between nano and micro for advanced thermoelectric materials/devices

Vivek Chandra Vasireddy, Tennessee Technological University
Device Simulation and Experimental Results of a 0.15 μ m Double Gated CMOS Transistor

9:50 AM 10:05 AM Break

10:05 AM 11:15 AM Session IX (*Kevin Walsh, Chair*)

Gary Bernstein, University of Notre Dame (Invited)
Nanomagnetic Logic for Beyond Moore Systems

Niladri Mojumder, Purdue University
Self-Consistent Micro-Magnetic Simulation and Benchmarking of Different Spin-Torque Driven Magnetic Tunnel Junctions (MTJs)

Jeffery Banker, Midwest MicroDevices
Lab to Fab - Transitioning a MEMS Device to a Commercial Foundry

11:15 AM 12:25 AM Session X (*Suresh Garimella, Chair*)

J. V. Clark, Purdue University (Invited)
A Novel Pressure Sensor for Medical Ventilation Support, Weaning, and Research - A Computational Study

Bedri Cetiner, Utah State University
Frequency and Pattern Reconfigurable Antenna with Monolithically Integrated RF-MEMS switches

Greg Cibuzar, University of Minnesota
Microfabricated Structures for Evaluation of Tactile Sensitivity

12:30 PM	1:30 PM	Lunch on your own. Many options in Purdue Memorial Union.
1:30 PM	3:00 PM	<p>Session XI (<i>Yong Chen, Chair</i>)</p> <p>J.-Y. Kim, University of Texas Dallas (Invited) <i>Ozone based ALD of high-k dielectrics</i></p> <p>Lynn Fuller, Rochester Institute of Technology <i>A MEMS Universal Fluid Quality Interrogation Sensor</i></p> <p>Teimour Maleki, Purdue University <i>Single-Touch Catalytically-Activated Electrochemical Micropump</i></p> <p>G. L. Harris, Howard Nanoscale Science and Engineering Facility <i>Characterization of CdS Layers grown by Chemical Bath for CuInGaSe₂ Solar Cell Applications</i></p>
3:00 PM	3:15 PM	Break
3:15 PM	4:15 PM	<p>Session XII (<i>Lynn Fuller, Chair</i>)</p> <p>Matthew Makowski, Purdue University <i>Olefin Metathesis Reaction on GaN (0001) Surfaces</i></p> <p>Bobby Reddy, Jr., University of Illinois Urbana-Champaign <i>Temperature Measurement in Fluid Directly at the Surface with High Spatial Resolution Using a Covalently Attached Fluorescent Dye</i></p> <p>Steven Wereley, Purdue University <i>Rapid and Dynamic Multiscale Manipulation based on a Hybrid Optoelectric Device</i></p>
4:15 PM	4:30 PM	
4:30 PM		<p>Conference Closing Adjourn</p>

Special Tours:

Monday, June 28, 2010: Birck Nanotechnology Center Facility

The set of detailed tours of the BNC will focus on facility construction, infrastructure, and operation. Tours will be given by staff highly familiar with the design, construction, and operation of the facility.

Tuesday, June 29, 2010: Neil Armstrong Hall of Engineering

The tour of Armstrong Hall will focus on an innovative, hands-on Freshman Engineering curriculum and the supporting laboratories for that program. Additionally, memorabilia from the moon landings will be present for viewing – including a lunar sample.

Wednesday, June 30, 2010: Birck Nanotechnology Center Research

The set of tours of the BNC cleanroom and laboratories will focus on the research being performed in each area of the facility. Tours will be given by researchers who work in the laboratories and cleanroom.

Transportation:

The **Purdue Memorial Union** is the conference headquarters and is attached to the Union Club Hotel. Transportation from the two other conference hotels is provided by a complimentary hotel shuttle. Please make individual arrangements for transportation with your hotel if you are not staying at the Union Club Hotel. Some other area hotels also provide a complimentary shuttle to the Purdue Memorial Union.

If you are **driving a personal vehicle** to campus, a complimentary parking pass for the parking garage next to the Purdue Memorial Union will be provided upon request.

The **Birck Nanotechnology Center** and **Burton D. Morgan Center for Entrepreneurship (MRGN)** are located just under $\frac{3}{4}$ mile from the Purdue Memorial Union. While most participants will most likely wish to walk, transportation will be provided for those who would prefer to travel by van. Bus transportation will be provided in event of inclement weather.

The **Neil Armstrong Hall of Engineering** is located just under $\frac{1}{2}$ mile from the Purdue Memorial Union. While most participants will most likely wish to walk, transportation will be provided for those who would prefer to travel by van. Bus transportation will be provided in event of inclement weather.

The Trails is located approximately six miles from campus. Bus transportation will be provided.