

Sunday, July 13

- 12:00 PM - 1:30 PM Conference Registration
- 1:30 PM - 2:00 PM Bus transportation from The Brown Hotel to the UofL Campus
- 2:00 PM - 2:10 PM **Welcome & Opening Remarks**
 Dr. Kevin M. Walsh, *University of Louisville*
 Dean Mickey Wilhelm, *University of Louisville, Speed School of Engineering*
- 2:10 PM - 2:30 PM **History of the UofL Micro-Nano Technology Cleanroom**
 Dr. Kevin M. Walsh, *University of Louisville*
- 2:30 PM - 3:00 PM **Cleanroom Design**
 Abbie Gregg, *Abbie Gregg Incorporated*
- 3:00 PM - 4:30 PM Tour of the new University of Louisville Cleanroom and Metrology Facilities
- 4:30 PM - 6:00 PM Buffet Dinner
Open Discussion with Expert Panel
 Kevin M. Walsh, *University of Louisville, USA* ; Mark Crain, *University of Louisville, USA* ; Bill Flounders, *University of California Berkeley, USA* ; Tim Sands, *Purdue University, USA* ; Abbie Gregg, *Abbie Gregg Inc., USA* ; Rajinder Khosla, *National Science Foundation, USA*
- 6:00 PM - 6:30 PM Bus transportation back to The Brown Hotel
- 6:30 PM - 7:30 PM UGIM Steering Committee Meeting, *The Brown Hotel*
- 6:30 PM - 7:30 PM Conference Registration Resumes

Monday, July 14

- 7:00 AM - 8:00 AM Conference Registration and Continental Breakfast
- 8:00 AM - 8:10 AM **Welcome by the 2008 UGIM Conference Chair**
 Dr. Kevin M. Walsh, *University of Louisville*
- 8:10 AM - 8:20 AM **Technical Committee Report**
 Dr. Shamus McNamara, *University of Louisville*
- 8:20 AM - 8:30 AM **Opening Remarks**
 Dr. Manuel Martinez, *Vice President of Research, University of Louisville*

Invited Speaker

- 8:30 AM - 9:00 AM **Facilitating Nanotechnology - Collaboration, User Dreams and Limited Budgets**
 Abbie Gregg, *Abbie Gregg, Inc., USA*

Session 1 - Electro Wetting: Novel Devices and Applications

Session Chairs:

Dr. Robert Keynton, *University of Louisville, USA*
 Dr. Rekha Pai, *Naval Research Laboratory, USA*

- 9:00 AM - 9:20 AM **I-V and Gain Characteristics of Electrowetting-Based Liquid Field Effect Transistor**
 Duk Young Kim, *University of Cincinnati, USA* ; Stephen Herman, *University of Cincinnati, USA* ; Andrew J. Steckl, *University of Cincinnati, USA*
- 9:20 AM - 9:40 AM **A Capillary Microgripper Using Electrowetting**
 Abhay Vasudev, *University of Akron, USA* ; Jiang Zhe, *The University of Akron, USA*

9:40 AM - 10:00 AM **Experimental Validation of >1 kHz Electrowetting Modulation**
 N.R. Smith, *University of Cincinnati, USA* ; L. Hou, *University of Cincinnati, USA* ; J. Zhang,
University of Cincinnati, USA ; J. Heikenfeld, *University of Cincinnati, USA*

10:00 AM - 10:20 AM **Coffee Break**

Session 2 - Cleanroom Facilities and Infrastructure

Session Chairs:

Dr. David Parent, *San Jose State University, USA*
 John Weaver, *Purdue University, USA*

10:20 AM - 10:40 AM **Cornell's Nanomove:
 Decontamination, Safety Reviews, and Various Lessons Learned**
 Daniel Woodie, *Cornell University, USA* ; Lynn Rathbun, *Cornell University, USA*

10:40 AM - 11:00 AM **Coral - Software to help Operate and Manage Advanced University Laboratories**
 Bill Murray, *Stanford University, USA* ; Mike Murray, *Stanford University, USA* ; John Shott,
Stanford University, USA ; Ike Lin, *Massachusetts Institute of Technology, USA*

11:00 AM - 11:20 AM **Enterprise Dashboard Tools for Management of Share-Use University Laboratory**
 Eric Martin, *Harvard University, USA* ; Vincenzo DiBernardo, *Harvard University, USA*

11:20 AM - 11:40 AM **Consolidation and Improvement of Nanotechnology Research Facilities at
 The University of Kentucky**
 Charles E. May, *University of Kentucky, USA*

11:40 AM - 12:00 PM **Flexible Display Center at Arizona State University:
 A Unique Industry-Government-Academic Partnership for
 Creating Revolutionary Information Display Technology**
 Gregory B. Raupp, *Arizona State University, USA*

12:00 PM - 1:30 PM **Lunch**

Invited Speaker

1:30 PM - 2:00 PM **Challenges and Opportunities for Transformative Research at NSF**
 Rajinder P. Khosla, *National Science Foundation, USA*

Session 3 - Special Topics

Session Chairs:

Dr. Bedri Cetiner, *Utah State University, USA*
 Carl Sullivan, *Lexmark International, USA*

2:00 PM - 2:20 PM **Device Fabrication for Data Storage, Semiconductor and MEMS
 Applications at the University of Alabama Microfabrication Facility**
 S. Gupta, *University of Alabama, USA* ; A. Highsmith, *University of Alabama, USA* , Xiao Li,
University of Alabama, USA ; Z. R. Tadisina, *University of Alabama, USA* ; M.E. Brown, *University
 of Alabama, USA* ; C. L. Guenther, *University of Alabama, USA* ; S. Burkett, *University of Alabama,
 USA* ; S. Kotru, *University of Alabama, USA*

2:20 PM - 2:40 PM **NanoBioMaterials - From BioLEDs to Tissue Engineering**

Andrew J. Steckl, *University of Cincinnati, USA*

2:40 PM - 3:00 PM **An Electronic Tongue System Design Using Ion Sensitive Field Effect Transistors and their Interfacing Circuit Techniques**

Wen-Yaw Chung, *Chung-Yuan Christian University, Taiwan, R.O.C.* ; Kuo-Chung Chang, *Chung-Yuan Christian University, Taiwan, R.O.C.* ; Da-You Hong, *Chung-Yuan Christian University, Taiwan, R.O.C.* ; Cheanyeh Cheng, *Chung-Yuan Christian University, Taiwan, R.O.C.* ; Febus Cruza, *Chung-Yuan Christian University, Taiwan, R.O.C.* ; Tai Sung Liu, *Chung-Yuan Christian University, Taiwan, R.O.C.* ; Chung Huang Yang, *Vanung University of Technology, Taiwan, R.O.C.* ; Jung-Lung Chiang, *Chung-Chou Institute of Technology, Taiwan, R.O.C.*; Dorota G. Pijanowska, *Polish Academy of Sciences, Poland* ; Marek Dawgul, *Polish Academy of Sciences, Poland* ; Wladyslaw Torbicz, *Polish Academy of Sciences, Poland* ; Pitor B. Grabiec, *Institute of Electron Technology, Poland* ; Bohdan Jarosewicz, *Institute of Electron Technology, Poland*

3:00 PM - 3:20 PM **Coffee Break**

Session 4 - Semiconductor Devices

Session Chairs:

Dr. Jason Heikenfeld, *University of Cincinnati, USA*
Dr. Lynn Fuller, *Rochester Institute of Technology, USA*

3:20 PM - 3:40 PM **Inversion-Type Enhancement - Mode InP Mosfets with ALD High-K Al_2O_3 and HfO_2 as Gate Dielectrics**

Y.Q. Wu, *Purdue University, USA* ; M. Xu, *Purdue University, USA* ; Y. Xuan, *Purdue University, USA* ; P. D. Ye, *Purdue University, USA* ; J. Li, *AmberWave, USA* ; Z. Cheng, *AmberWave, USA* ; A. Lochtefeld, *AmberWave, USA*

3:40 PM - 4:00 PM **A New Fabrication Procedure for Reproducibly Observing Leakage Current Reduction of SiO_2 due to Enhanced Phonon-Energy Coupling**

Pang-Leen Ong, *University of Kentucky, USA* ; Zhi Chen, *University of Kentucky, USA*

4:00 PM - 4:20 PM **Compact Models of the Quantized Sub-Band Energy Levels for MOSFET Device Application**

H. Abebe, *USC/ISI, USA*; E. Cumberbatch, *CGU, USA* ; H. Morris, *CGU, USA* ; V. Tyree, *USC/ISI, USA*

4:20 PM - 4:40 PM **Microfabrication Process and Characteristic Testing of a MEMS-Based Preconcentrator**

Julia Aebersold, *University of Louisville, USA* ; Michael Martin, *University of Louisville, USA* ; Thomas J. Roussel, *University of Louisville, USA* ; Robert S. Keynton, *University of Louisville, USA* ; Kevin M. Walsh, *University of Louisville, USA*

4:40 PM - 5:00 PM **Design of a 32nm Independently-Double-Gated FlexFET SOI Transistor**

K. Modzelewski, *Tennessee Tech University, USA* ; R. Chintala, *Tennessee Tech University* ; H. Moolamalla, *Tennessee Tech University, USA* ; Stephen Parke, *Tennessee Tech University, USA* ; D. Hackler, *American Semiconductor Inc., USA*

5:00 PM - 5:30 PM **Bus transportation from The Brown Hotel to the UofL Campus**

5:30 PM - 7:00 PM **Tour of the University of Louisville Cleanroom, Metrology Facilities & Research Labs**

7:30 PM - **Symposium Banquet**

Tuesday, July 15

7:00 AM - 8:00 AM Conference Registration and Continental Breakfast

8:00 AM - 8:10 AM Informational Items

Invited Speaker

8:10 AM - 8:40 AM **Nanoparticles: A Route to Post-Shrink Information Systems**

S. A. Campbell, *University of Minnesota, USA*

Session 5 - University Micro-Nano Curriculum Development

Session Chairs:

Dr. Eric Martin, *Harvard University, USA*

John Shott, *Stanford University, USA*

8:40 AM - 9:00 AM **MEMS Fabrication Course for Pressure Sensors, Flow Sensors, Fluidic Channels and Micro-Pumps**

Robert E. Pearson, *Rochester Institute of Technology, USA* ; Lynn F. Fuller, *Rochester Institute of Technology, USA* ; Ivan Puchades, *Rochester Institute of Technology, USA*

9:00 AM - 9:20 AM **A Course for Designing Transistors for High Gain Analog Applications**

David W. Parent, *SJSU, USA* ; Eric J. Basham, *UCSC, USA*

9:20 AM - 9:40 AM **A New Test Chip for CMOS Manufacturing Laboratory Courses at RIT**

Burak Baylav, *Rochester Institute of Technology, USA* ; Lynn F. Fuller, *Rochester Institute of Technology, USA* ; Dhireesha Kudithipudi, *Rochester Institute of Technology, USA*

9:40 AM - 10:00 AM **MEMS Courses for Undergraduates**

Azad Siahmakoun, *Rose-Hulman Institute of Technology, USA* ; Aaron Miller, *Rose Hulman Institute of Technology, USA*

10:00 AM - 10:20 AM **Coffee Break**

Session 6 - MEMS Sensors and Actuators

Session Chairs:

Dr. Greg Cibuzar, *University of Minnesota, USA*

Dr. Tim Betzner, *Delphi, USA*

10:20 AM - 10:40 AM **Development of Ultra-Miniaturized Piezoresistive Pressure Sensors for Biomedical Applications**

Usha Gowrishetty, *University of Louisville, USA* ; Kevin M. Walsh, *University of Louisville, USA* ; Julia Aebersold, *University of Louisville, USA* ; Douglas Jackson, *University of Louisville, USA* ; Huntly Millar, *Huntly Millar Instruments, Inc., USA* ; Tommy Roussel, *University of Louisville, USA*

10:40 AM - 11:00 AM **Design and Evaluation of a MEMS Bimetallic Thermal Actuator for Viscosity Measurements**

Ivan Puchades, *Rochester Institute of Technology, USA* ; Lynn F. Fuller, *Rochester Institute of Technology, USA*

11:00 AM - 11:20 AM **A High Gauge Factor Capacitive Strain Sensor and its Telemetry Application in Biomechanics**
 Ji-Tzuoh Lin, *University of Louisville, USA* ; Douglas Jackson, *University of Louisville, USA* ; Julia Aebersold, *University of Louisville, USA* ; Kevin M. Walsh, *University of Louisville, USA* ; John Naber, *University of Louisville, USA* ; William Hnat, *University of Louisville, USA*

11:20 AM - 11:40 AM **Vacuum Cold Cathode Emitter Electronic Devices Comprised of Diamond or other Carbons**
 J. L. Davidson, *Vanderbilt University, USA* ; W. P. Kang, *Vanderbilt University, USA* ; K. Subramanian, *Vanderbilt University, USA* ; Y. M. Wong, *Vanderbilt University, USA*

11:40 AM - 12:00 PM **Theoretical Efficiency of a Microfabricated Knudsen Pump**
 Davor Copic, *University of Louisville, USA* ; Ellen Brehob, *University of Louisville, USA* ; Shamus McNamara, *University of Louisville, USA*

12:00 PM - 1:30 PM **Lunch**
UGIM Steering Committee Meeting *if Needed*

Invited Speaker

1:30 PM - 2:00 PM **Nanotechnology and Cyberinfrastructure: The nanoHUB Experience**
 Mark Lundstrom, *Purdue University, USA*

Session 7 - Wireless MEMS / NEMS

Session Chairs:

Katalin Voros, *University of California at Berkeley, USA*

Dr. Stephen Parke, *Tennessee Tech University, USA*

2:00 PM - 2:20 PM **Development of Piezoelectric RF MEMS Switch and Phase Shifter**
 Tracy D. Hudson, *U.S. Army RDECOM AMRDEC, USA*

2:20 PM - 2:40 PM **Penta-Band Planar Inverted F-Antenna (PIFA) Integrated by RF-NEMS Switches**
 Bedri A. Cetiner, *Utah State University, USA* ; Necmi Biyikli, *Utah State University, USA*

2:40 PM - 3:00 PM **Interfacing Microfabricated and Nanomaterial-Based Sensors with a Modular Environmental Monitoring System**
 Cindy Harnett, *University of Louisville, USA*

3:00 PM - 3:20 PM **Coffee Break**

Session 8 - Optical Devices

Session Chairs:

Dr. Zhi Chen, *University of Kentucky, USA*

Dr. Peide Ye, *Purdue University, USA*

3:20 PM - 3:40 PM **Fabrication and Preliminary Characterization of a Parabolic Copuler for Photonic Crystal Waveguides**
 Scott A. Masturzo, *University of Cincinnati, USA* ; Joseph T. Boyd, *Univeristy of Cincinnati, USA* ; Jan M. Yarrison-Rice, *Miami University, USA* ; Howard E. Jackson, *University of Cincinnati, USA*

3:40 PM - 4:00 PM **Compact Thermally Tunable Silicon Wavelength Switch**
 X. Wang, *Florida International University, USA* ; J. A. Martinez, *Florida International University, USA* ; M. S. Nawrocka, *Florida International University*, R. R. Panepucci, *Florida International University, USA*

4:00 PM - 4:20 PM **Investigation of the Interaction of Surface Plasmons (SP) with an Electro Optic Polymer and Development of SP Optical Devices**
 Milan C. Buncick, *Aegis Technologies, USA* ; Paul R. Ashley, *US Army AMRDEC, USA* ; M. Scalora, *US ARMY AMRDEC, USA* ; Neset Akozbek, *US Army AMRDEC, USA* ; Maria Antonietta Vincenti, *University of Rome, Italy* ; Marco Centini, *University of Rome, Italy* ; Jason D. Fowlkes, *ORNL, USA* ; Iliia N. Ivanov, *ORNL, USA*

4:20 PM - 4:40 PM **Waveguide Microgripper with Optical Feedback for Microassembly**
 R. R. Panepucci, *Florida International University, USA*; J. A. Martinez *Florida International University, USA*

Session 9 - Posters

Session Chairs:

Dr. Shamus McNamara, *University of Louisville, USA*

Mark Crain, *University of Louisville, USA*

4:40 PM - 5:20 PM **Flash Nano Session**

5:20 PM - 7:00 PM **Poster Session with Refreshments and Light Food**

Wednesday, July 16

7:00 AM - 8:00 AM Conference Registration and Continental Breakfast

8:00 AM - 8:10 AM Informational Items

Session 10 - Processing and Materials for Micro-Nano Technology

Session Chairs:

Dr. James Davidson, *Vanderbilt University, USA*

Dr. Laura Morris Edwards, *ORNL, USA*

8:10 AM - 8:30 AM **Bottom Up Microsystem Construction Strategies Built Upon 3D Directed Self-Assembly of Metallic and Polymeric Nanostructures**
 Robert W. Cohn, *University of Louisville, USA*

8:30 AM - 8:50 AM **Electrospun Biopolymer-Based Micro/Nanofibers**
 Nick Bedford, *University of Cincinnati, USA* ; Daewoo Han, *University of Cincinnati, USA* ; Andrew J. Steckl, *University of Cincinnati, USA*

8:50 AM - 9:10 AM **A Novel Class of High-Tc Ferromagnetic Semiconductors: Novel Ferromagnetic Semiconductors**
 L. V. Shylk, *University of Kentucky, USA* ; S. A. Kryukov, *University of Kentucky, USA* ; L. E. De Long, *University of Kentucky, USA* ; B. Schüepf-Niewa, *T. U. Muenich, Germany* ; R. Niewa, *T. U. Muenich, Germany* ; J. W. Lynn, *NIST Gaithersburg, USA*; Qing Huang, *NIST Gaithersburg, USA* ; E. Arenholz, *Lawrence Berkeley Nat. Lab., USA* ; C. Piamonteze, *Lawrence Berkeley Nat. Lab., USA*

9:10 AM - 9:30 AM **Process Model Varification for Dopant Segregation and Oxidation Enhanced Diffusion**
Robert E. Pearson, *Rochester Institute of Technology, USA* ; Karl D. Hirschman, *Rochester Institute of Technology, USA* ; Robert Manley, *Rochester Institute of Technology, USA*

9:30 AM - 9:50 AM **Sorbent Coatings and Precessing Techniques for Trace Analysis of Hazardous Materials in Micro/Nano Sensors**
R. S. Pai, *U.S. Naval Research Laboratory, USA* ; R. A. McGill, *U.S. Naval Research Laboratory, USA* ; D. L. Simonson, *U.S. Naval Research Laboratory, USA* ; B. A. Higgins, *U.S. Naval Research Laboratory, USA* ; E. J. Houser, *U.S. Naval Research Laboratory, USA* ; M. R. Papantonakis, *U.S. Naval Research Laboratory, USA* ; V. Nguyen, *U.S. Naval Research Laboratory, USA* ; S. V. Stepnowski, *U.S. Naval Research Laboratory, USA* ; T. H. Stievater, *U.S. Naval Research Laboratory, USA* ; W. S. Rabinovitch, *U.S. Naval Research Laboratory, USA* ; N. A. Papanicolau, *U.S. Naval Research Laboratory, USA* ; R. Bass, *U.S. Naval Research Laboratory, USA* ; J. L. Stepnowski, *Nova Research, Inc., USA* ; M. T. Rake, *Nova Research, Inc., USA*

9:50 AM - 10:10 AM **Synthesis of Single-Wall Carbon Nanotubes by Atmospheric Thermal CVD**
Jyu-Hua Ting, *National Nano Device Laboratories, Taiwan, R.O.C.* ; Jhih-Yuan Lyu, *National Central University, Taiwan, R.O.C.* ; Fuang-Yuan Huang, *National Central University, Taiwan, R.O.C.* ; Tsung-Lung Li, *National Chia-Yi University, Taiwan, R.O.C.* ; Cho-Lun Hsu, *National Nano Device Laboratories, Taiwan, R.O.C.* ; Chien-Wei Liu, *National Nano Device Laboratories, Taiwan, R.O.C.*

10:10 AM - 10:20 AM **Coffee Break**

Session 11 - Lab-on-a-Chip Devices and Systems

Session Chairs:

Dr. Cindy Harnett, *University of Louisville, USA*

Dr. Robert Pearson, *Rochester Institute of Technology, USA*

10:20 AM - 10:40 AM **Electrical Control of Debye Screening in Liquid Microchannels for Ionic Separations**
M. Dhindsa, *University of Cincinnati, USA* ; J. Heikenfeld, *University of Cincinnati, USA* ; S. Kwon, *University of Tennessee, USA* ; J. Park, *University of Tennessee, USA* ; P. D. Rack, *University of Tennessee, USA*

10:40 AM - 11:00 AM **Carbon Nanotube Meshes for Separating Proteins Electrophoretically**
Rathish Dorairaj, *University of Louisville, USA* ; Thomas J. Roussel, *University of Louisville, USA* ; Gamini Sumanasekera, *University of Louisville, USA* ; Palaniappan Sethu, *University of Louisville, USA* ; Carolyn M. Klinge, *University of Louisville, USA* ; Robert S. Keynton, *University of Louisville, USA*

11:00 AM - 11:20 AM **On-Chip Fluorescence Detection Using Organic Thin Film Devices for a Disposable Lab-on-a-Chip**
Yun Shuai, *University of Cincinnati, USA* ; Ansuman Banerjee, *University of Cincinnati* ; David Klotzkin, *University of Cincinnati, USA* ; Ian Papautsky, *University of Cincinnati, USA*

- 11:20 AM - 11:40 AM **A High Throughput Multiplexed Micro Coulter Counter Using Amplitude Modulation**
Ashish V. Jagtiani, *The University of Akron, USA* ; Joan Carletta, *The University of Akron, USA* ; Jun Hu, *The University of Akron, USA* ; Jiang Zhe, *The University of Akron, USA*
- 11:40 AM - 12:00 PM **High-Sensitivity MEMS Based On-Chip Fluorescence Detection Systems: Measurement and Analysis of Ultimate Sensitivity Limits**
Ansuman Banerjee, *University of Cincinnati, USA* ; Yun Shuai, *University of Cincinnati, USA* ; David Klotzkin, *University of Cincinnati, USA* ; Ian Papautsky, *University of Cincinnati*
- 12:00 PM - 12:20 PM **PhotoPDMS: Photodefinable PDMS for Rapid Prototyping**
Preetha Jothimuthu, *University of Cincinnati, USA* ; Ali Asgar S. Bhagat, *University of Cincinnati, USA* ; Ian Papautsky, *University of Cincinnati, USA*
- 12:20 PM - 12:30 PM **Final Comments and Thanks**
- 12:30 PM - **Official End of the Symposium**