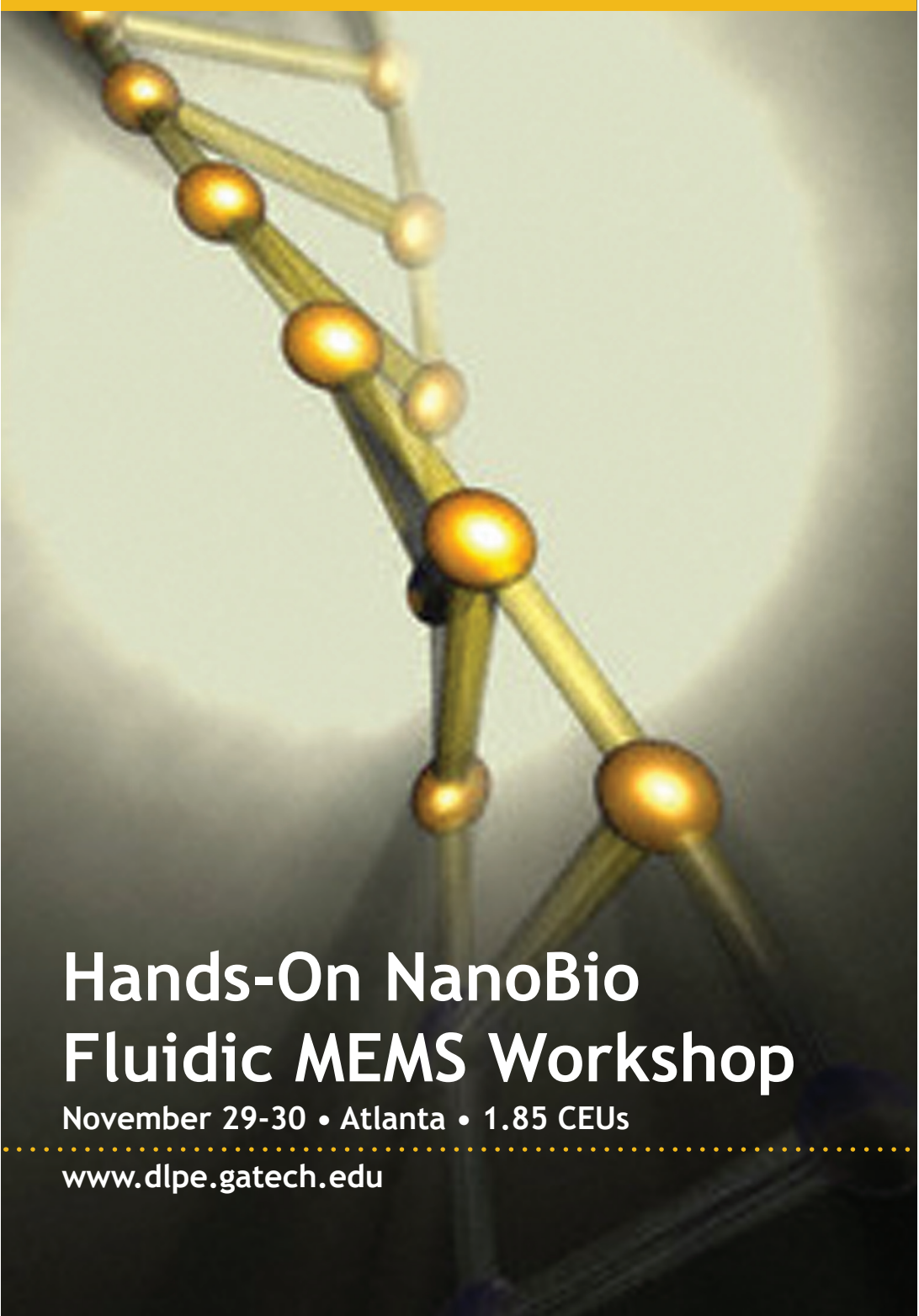


nanoBio

..... Connecting the Dots



**Hands-On NanoBio
Fluidic MEMS Workshop**

November 29-30 • Atlanta • 1.85 CEUs

.....
www.dlpe.gatech.edu

Program Details



Hands-On NanoBio Fluidic MEMS Workshop

November 29-30 • Atlanta • 1.85 CEUs

Explore the cutting-edge of nanotechnology with Georgia Tech's Hands-On NanoBio Fluidic MEMS Workshop. Build the needed foundation in materials synthesis, characterization, nanofabrication, integration and testing for of the next-generation of nanobiosensors in a microfluidic system.

Nanotechnology explores how nature works on the atomic scale and involves manipulation of mater at the atomic scale. Understand how nanotechnology can enhance the function of nanomaterials, interfaces and sensors. Nanowires and carbon nanotube based biosensors with high sensitivity have been recently demonstrated for immunassays demonstrated. The fabrication and integration of sensing with interfaces of nano dimensions enable detection of even single molecules or cells leading to early disease detection and other applications such as disease monitoring and support of the prevention strategies.

Detection of targets using individual sensing elements one-at-a-time has its limitations so that multiplexed biosensor systems are very important and offer the promise of ultracompact diagnostic systems able to detect several desired target or analyte molecules simultaneously. On chip microfluidics provide a means for sample preconcentration, injection, mixing all in a single chip microfluidic format. These new technologies will be discussed at this workshop.

Learn the basics of NanoBio Fluidic MEMS from the experts, Georgia Tech's research faculty. Our program covers the breadth of manufacturing – everything from materials, modeling, processing, packaging, testing, and reliability. We know nanotechnology.

Our two-day hands-on course, connecting all facets of nanotechnology and its application to sensors. It takes you through the four steps to biosensor fabrication:

1. Exposure to top-down manufacturing in a clean-room
2. Microfluidic systems realization, PDMS molding, and parylene deposition
3. Rapid prototyping of sensor packages
4. Testing and evaluation of an immunobiosensor

● How You Will Benefit

Professionals

- Discover where your company/research fits into the big picture of nanotechnology
- Gain hands-on biosensor fabrication experience
- Discover where to focus new research
 - Agriculture and biomedical
 - Homeland security
 - Environmental and disease identification
- Network with Georgia Tech experts and industry professionals, and develop contacts who can help you in developing products
- Be on the forefront of nanotechnology research
- Recruit and network with students working on the cutting edge of nanotechnology
- Work in Georgia Tech's state-of-the-art research facilities
- Earn 1.85 CEUs (This program meets criteria for the nationally accepted Continuing Education Unit.)

Students

- Be on the forefront of nanotechnology research
- Gain hands-on biosensor fabrication experience
- Highlight cutting-edge research to industry leaders
- Network with industry leaders and Georgia Tech experts
- Work in Georgia Tech's state-of-the-art research facilities

● Who Should Attend

- Scientists and mechanical and electrical engineers in industry/national labs
- Technical managers
- Faculty members who want to keep current in nanoscale science and engineering
- Post-doctorate researchers
- Graduate and senior graduate students

● Learn in Georgia Tech's State-of-the-art Facilities

Erskine J. Love Jr. Manufacturing Building

- Two-story bay space in the ME wing houses a water tank, an anechoic tank chamber and a 60-foot long wind tunnel

MEMS Clean Room

- 1,000/100 clean room for MEMS processing and device characterization
Microelectronics Research Center (MiRC), grover.mirc.gatech.edu
- 100/10 clean room

NSF Packaging Research Center, www.prc.gatech.edu

- Resources and facilities for developing the next generation of electronic packages

Computer-Aided Design Laboratory

- Individual workstations
- IBM Nifinity 5500 domain server

Program Outline

Thursday, November 29 • Atlanta

- 8-8:10 a.m. Introduction, M. Allen
- 8:15-9:00 a.m. Nanoelectronics, J. Meindl
- 9-10:00 a.m. Nanowire Impedance Based Biosensors S. Bhansali
- 10-11:00 a.m. Micromechanical Sensors, L. Degertekin
- 11-12 p.m. Thermal and Mechanical Properties of Thin Film and Nano Materials, S. Graham
- 12:00-1:00 p.m. Lunch
- 1-2:00 p.m. Micro/Nano Fabrication, P. Hesketh
- 2-3:30 p.m. Safety Class (Love Building)
- 3-5:30 p.m. Hands-On Laboratory
- 5:30-6:30 p.m. Lecture, R. Murali
- 6:30-7:30 p.m. Dinner

Friday, November 30 • Atlanta

- 8-9:00 a.m. Nanotechnology, Z. L Wang
- 9-10:00 a.m. Engineered NanoPores, S. Nair
- 10-11:00 a.m. MEMS technologies, B. Frazier
- 11-12 p.m. Bio and Microfluidics, H. Lu
- 12-1:00 p.m. Lunch and Student Posters
- 1-2:00 p.m. Stereolithography and Rapid Prototyping, D. Rosen
- 2-2:45 p.m. Nano/Micro Packaging, D. Ravi
- 2:45-6:00 p.m. Hands-on Laboratory
- 6-7:00 p.m. Dinner
- 7-7:30 p.m. Feedback

Course fees

Professionals (Handouts, a book and workshop note book will be provided)

- Hands-on labs: \$1,200
- Lecture only: \$800

Students (Only Handouts will be provided)

- Hands-on labs: \$200
- Lecture only: \$100

Featured Lecturers

Dr. Shekhar Bhansali is an associate professor of Electrical Engineering and member of the faculty of the Nanomaterials and Nanomanufacturing Research Center at the University of South Florida. Prior to joining USF, he was at the University of Cincinnati and the National Research Laboratory in Metrology, Japan, where he worked on microfluidics and shape memory alloys. He directs the USF IGERT Program on Sensory Knowledge-based Interface Science and The Sloan Foundation Program. He teaches courses in MEMS design, MEMS fabrication, and Chem/bio sensors. His research interests are in nanowire synthesis, growth and fabrication, chem-bio sensors (specifically impedance-based sensors), microfluidics, and application-specific MEMS sensors. He is the recipient of the NSF CAREER award and William R Jones Outstanding Mentor Award. He has published over forty-three papers. He is a member of the Sigma Xi, ECS, and IEEE.

Oliver Brand, associate professor in the School of Electrical and Computer Engineering, with research interests in microsensors and integration with CMOS electronics. His expertise is in the areas of CMOS-based microsystems, MEMS fabrication technologies, and microsystem packaging.

F. Levent Degertekin, associate professor of mechanical engineering, researches micromachined acoustic and opto-acoustic sensors, intravascular ultrasound imaging, MEMS metrology, and atomic-force microscopy. In atomic-force microscopy, he studies the elasticity of surfaces, thin solid films, and monolayer biological films at the nanoscale. These measurements yield important information such as film thickness, interface defects, and adhesion.

H. Lu, Dr. Hang Lu obtained her Ph.D. in Chemical Engineering at MIT on microfluidics and then went on to do a postdoc in neuroscience at U California - San Francisco and the Rockefeller University. Her research interest is in the broad applications of microfluidics and MEMS in biosciences including neurobiology, fundamental cell biology, and biotechnology. She is an awardee of an NIH Career Development Award, a DARPA Young Faculty Award, and a DuPont Young Faculty Award, and has been named one of World's Top 35 Technology Innovators Under 35 in 2005 by MIT Technology Review Magazine.

Ravi Doraiswami, manager of mechanical engineering clean room, has more than 15 years of experience in microsystems fabrication. His research interests are in nano/microsystem integration.

Bruno Frazier, associate professor in the School of Electrical & Computer Engineering and director of the Micro Instrumentation Research & Instructional Laboratories, has been responsible for the codevelopment and patents associated with key microsystems fabrication technologies including the "Poor Man's LIGA Process" and precision plastics technologies. Frazier has active research projects in the field of biomedical microinstrumentation and automotive microsensor systems.

Featured Lecturers (continued)

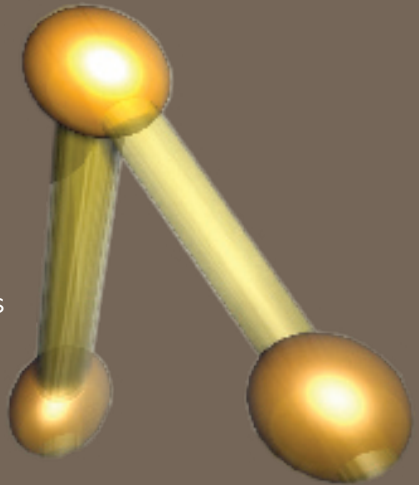
James Meindl, director of the Georgia Tech Microelectronics Research Center and professor in the School of Electrical and Computer Engineering, is a distinguished pioneer in the microelectronics industry, who has the vision to lead his colleagues into the next generation of nanoelectronics, and moreover to lead the development of the wide-ranging field of nanotechnology.

Raghunath Murali, research engineer in Microelectronics Research Center, is one of the primary engineers for the 100kV JEOL electron-beam lithography system. His research interests include e-beam lithography process development, post-CMOS device and circuit solutions, nanobiosensors, and MOSFET device modeling.

Sankar Nair, assistant professor in the School of Chemical and Biomolecular Engineering, is interested in nanostructured materials and devices for applications such as chemical or biomolecular sensing, separations, and energy management. He directs the nanomaterials and nanoengineering research group, which has important potential applications in biomolecule sensing, energy management, and separations.

David Rosen, professor of mechanical engineering and director of the Rapid Prototyping Institute, focuses on additive manufacturing. His research addresses the question, what is the role of prototyping in engineering design? He has three focus areas: configuration design, virtual prototyping, and rapid prototyping.

Zhong Lin Wang, Regents' Professor in the School of Material Science and Engineering and director of the Center for Nanostructure Characterization and Fabrication, is interested in the synthesis and properties of nanowire and nanotube materials; synthesis and characterization of photonic crystals; self-assembly of magnetic nanocrystals; and semiconductor quantum dots and wires. He focuses on the atomic dimension microstructures of materials of technological importance and their relationship with measured physical properties.



Registration Form

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4 Easy ways to register

Online: www.pe.gatech.edu (keyword search: nano) **Fax:** 404-894-8925

Mail: Georgia Institute of Technology, Professional Education—R, P.O. Box 93686, Atlanta, GA 30377-0686

Phone: 404-385-3501, between 9 a.m. and 4 p.m. EDT

Professionals Hands-on labs: \$1200 Lecture only: \$800

Students Hands-on labs: \$200 Lecture only: \$100 (Student ID required)

PLEASE PRINT

Please send my confirmation via e-mail

Legal Name: _____

Preferred Name: _____

Address: _____

City: _____ State: _____ Zip: _____

(Registration confirmation will be sent to this address, unless you prefer it by e-mail)

Daytime phone: _____ Fax: _____

E-mail: _____

(If you prefer the confirmation be sent via e-mail, please check the box above.)

Birthdate: ____/____/____

Last 4 Digits of Social Security Number (for identification purposes only): ____ _

Position: _____ Organization: _____

Amount Enclosed \$ _____ Check enclosed (payable to Georgia Tech)

Please include attendee's name, course number, and course date on all checks.

Charge: American Express VISA MasterCard Discover

Card Number: _____ Expiration Date: _____

Cardholder's Name: _____

Signature: _____

Course Fees

Course fees include snacks, lunch, dinner and all course materials. You will receive a letter confirming your registration from Georgia Tech's Distance Learning and Professional Education. Checks should be made payable to Georgia Tech. VISA, MasterCard, American Express or Discover are accepted. Your credit card will be charged as soon as your registration is received. You should make payment arrangements before the start of the program. Advance payment arrangements guarantee your place in the program.

Cancellations and refunds

Cancellations must be received in writing (e-mail, fax, or mail) 10 or more business days prior to a course start date for a full refund. If canceled less than 10 business days prior to a course start date, no refund will be issued.

Students may request a transfer to another course of equal or lesser value. This request must be received in writing (e-mail, fax, or mail) 10 or more business days prior to the original course start date. A transfer will not be granted if the student request is received less than 10 business days prior to the original course start date.

Substitutions may be made with written approval from the original registrant.

Georgia Institute of Technology reserves the right to cancel a course for any reason, including insufficient enrollment. If a course is canceled, all registration fees will be refunded or can be transferred to another course.