



Louisiana Materials and Emerging Technologies Conference

The sixth in a series of Louisiana Annual Conferences, sponsored by the Louisiana Board of Regents and National Science Foundation Experimental Program to Stimulate Competitive Research will be held December 12-13, 2005, at the Institute for Micromanufacturing, at Louisiana Tech University.

The focus of this conference is on materials and emerging technologies under research and development in Louisiana. The conference aims at bringing together participants from universities, industry, and government agencies in Louisiana and the nation. It is meant to provide

an opportunity for communication and networking among the participants, leading to the development of collaborative efforts and initiatives benefiting Louisiana and the nation. Due to hurricane Katrina, the conference will also emphasize: "Katrina-Challenges and Opportunities.

Invited speakers for this conference are:

- *Dr. Leigh Abts, National Science Foundation and John Hopkins University*
- *Dr. Michael Khonsari, Louisiana Board of Regents*
- *Dr. Kevin Lyons, National Science Foundation*

- *Dr. Blake Simmons, Sandia National Laboratories*

Everyone receiving this newsletter is invited to the conference. To register please submit your name and affiliation information via email to jfutrell@latech.edu, by no later than December 1, 2005. There is no registration fee, but due to limited seating, participants must confirm attendance by registering.

Detailed information about the conference including lodging and directions is available via the following website.

www.ifm.latech.edu

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Secretary Mike Olivier Visits IfM



Secretary Mike Olivier, head of the Louisiana Department of Economic Development, accompa-

nied by Deputy Secretary Duane Blumberg, visited the IfM, on July 14, 2005. They were met by Louisiana Tech University representatives, including President Reneau, Vice President Guice, and IfM Director Varahramyan. The visitors were briefed about the University efforts in the area of technology development and commercialization, and received a tour of the IfM

facilities, meeting with faculty and students, and receiving information about their research efforts in the realization of commercially viable micro/nanotechnologies for biomedical, biological, chemical, environmental, information technology and other applications.

By the completion of the tour, Mr. Olivier appeared pleased with the efforts occurring at the Institute.

Special points of interest:

- Nanotechnology
- Biotechnology
- Biomedical Nanotechnology
- Environmental Technology
- Information Technology

Newsletter Editor

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Comments are welcomed!

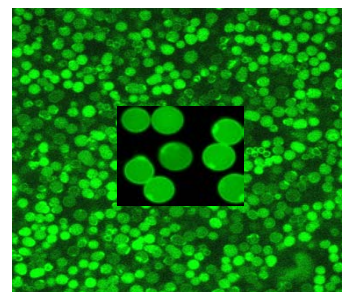


IfM Receives \$525,000 NSF Grant for FESEM

The Institute for Micro-manufacturing has been awarded a \$525,000 grant from the National Science Foundation for the acquisition of a Field Emission Scanning Electron Microscope (FESEM). This instrument will enhance nanotechnology research, training, and education at Louisiana Tech University. Moreover, it will allow neighboring institutions and

users in north Louisiana and the region to have access to this instrument for research, educational, and industrial needs. The new FESEM will be housed in the Measurements & Characterization Laboratory in the Institute's modern 41,000 sq. ft. R & D building. It will enable high resolution microscopy to characterize nanoscale materials

and structures at 1 nm resolution, with the ability to determine chemical information and spatial distributions of elements. In addition to aiding in research, the new FESEM will also be used in educational training and outreach efforts, affecting undergraduate and graduate students from a wide range of engineering and science programs.



Example of nanoshells developed at IfM to be imaged by the new FESEM

Summer 2005 JFAP Educational Outreach Program

The Joint Faculty Appointment Program (JFAP), consists of joint full-time faculty positions between Louisiana Tech University and the neighboring Grambling State University. Drs. Tabbetha Dobbins and Pedro Derosa are the current JFAP faculty, who for their research efforts are associated with the Institute for Micromanufacturing. These faculty have been instrumental in carrying out the JFAP Educational Outreach Program for Summer 2005, at the Institute for Micromanufacturing. These efforts have also been supported by a grant from the Louisiana Board of Regents. The activities carried out consisted of the recruitment of under-represented students from Grambling State University, who as

part of their summer internship program, recruited students Juvet Che (Junior in Biology and Chemistry), Anthony Rugege (Senior in Computer Science), and Antwan Lawrence (Senior in Mathematics). The first student, guided by Dr. Dobbins, contributed to

the project Cytotoxicity Studies of Covalent & Noncovalent Functionalized Carbon Nanotubes (CNTs), and the remaining two students, guided by Dr. Derosa, contributed to the project Optimization of Monte Carlo Multilayer Code. These students carried out and completed

their assignments in a responsible and satisfactory manner. By the completion of their internship, they each wrote a report, highlighting their accomplishments.

By all indications, the given outreach program has been highly successful, and of great benefit to all participants. The three students have indicated as a result of their summer internship experience, they have a better idea of what they can accomplish in the real world with respect to what they have learned as part of their academic studies. Moreover, two of the students would like to pursue graduate studies at Louisiana Tech University. All of them plan to continue with their research experience under the direction of Drs. Dobbins and Derosa.



Top Row L-R: Anthony Rugege, Dr. Pedro Derosa, Dr. Tabbetha Dobbins; Middle Row L-R: Dr. Kody Varahramyan - Director; Juvet Che; Bottom Row: Antwan Lawrence



New Faculty

This fall, IfM welcomes new Chemistry and Biomedical Engineering faculty. These are Dr. Sven Eklund and Dr. Patrick O'Neal, respectively.

Dr. Sven Eklund, Assistant Professor of Chemistry, received his Ph.D. in Analytical Chemistry from the University of Tennessee in Knoxville.

Specializing in Electrochemistry and nanotechnology, his current work focuses on the development of micro-scale bio-fuel cells for implantable devices and measurement of cellular metabolic processes with micro-scale chemical and biological sensors. Other interests include chiral catalysis at modified platinum surfaces and electrodeposition from room temperature ionic liquids.

Dr. Eklund also received



Dr. Sven Eklund

his B.S. in Science Education from Bob Jones University.

Before coming to Louisiana Tech University, he taught at Tennessee State University and was a post-doctoral researcher and research assistant professor at Vanderbilt University.



Dr. Patrick O'Neal

Dr. D. Patrick O'Neal, Assistant Professor of Biomedical Engineering, received his Ph.D. in 2001 in biomedical optics from Texas A&M University.

Specializing in nanoparticle-based systems for cancer detection and treat-

ment, other interests include using the same core nanotechnologies for optical sensing modalities such as surface-enhanced Raman spectroscopy.

Dr. O'Neal also received his M.S. in Biomedical Engineering from Texas A&M University and his B.S. in Biomedical Engineering from Louisiana Tech in 1994.

Before coming to Louisiana Tech, he served as primary investigator on several NIH, NSF, and NIST funded projects at Nanospectra Biosciences, Inc. in Houston, TX.

Recent IfM Grants

Dr. Kody Varahramyan

Acquisition of a Field Emission Scanning Electron Microscope for Nanotechnology Research, Training & Education, National Science Foundation, \$525,000.

Dr. Tabbetha Dobbins

Understanding the Local Atomic-Level Effect of Dopants in Complex Metal Hydrides Using Synchrotron X-ray, Department of Energy, \$300,000.

Dr. Cheng Luo

Sensors: Two types of Suspended Silicon-Nanowire Based Sensors of Ultra-high Sensitivity National Science Foundation, \$240,000.

Dr. Cheng Luo

NER: An Innovative Intermediate Layer Lithography Approach for Patterning conducting Polymers, National Science Foundation, \$83,000.

Dr. Chester Wilson

Measurement and Calibration of MEMS Based Neutron Detectors, NASA/LSU LaSPACE, \$5,000.

Dr. Scott Gold

Microscale HPLC for Portable Medical Testing Applications, NASA/LSU LaSPACE, \$5,000.

2005 Fall Seminars

Functional Nanoassemblies: Fundamentals and Applications

October 11, 2005: "Sequential Reactions in Microcapsules: Modeling and Experimental Investigation to Improve Longevity of Smart Tattoos" *E. Stein and M. McShane*

October 25, 2005: "Conclusions and New Developments after Insulin Nanoencapsulation Work" *G. Krishna, N. Pargaonkar, Y. Lvov*

November 8, 2005: "Nanoporous Silicon and its Applications: *S. Gold*

November 22, 2005: "'Swell' Gels - Environmentally-Responsive Bioassemblies with Optical Readout" *J. Mao, M. McShane*

December 6, 2005: "Inkjet Microprinting and its Combinations with Nanoassembly" *Y. Su*

**All Seminars will be held at 2:00 p.m.
in the IfM Auditorium 101**



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and Less Expensive Consumer Products,
Industrial Machines, Instruments...
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Vision and Mission

The vision of the IfM is to be a world-class resource for the realization of commercially-viable micro- and nano-systems, contributing to the economic infrastructure of Louisiana and the nation and benefiting humanity as a whole.

The mission of the IfM is:

- h To research and develop novel micro and nanosystems for biomedical, biological, environmental, chemical, information technology, and other applications
- h To generate and harness commercially viable intellectual property
- h To partner with industry, government, and academia in economic development

- h To transfer new technology and provide technical training to industry and government
- h To develop curricula and educate students in micro/nano scale technologies and systems

The IfM offers a wide range of microtechnology capabilities for the realization of micro electro mechanical systems (MEMS), as well as a complementary array of nanotechnology capabilities for MEMS and other applications. **Nanotechnology, Biotechnology, Biomedical Nanotechnology, Environmental Technology, and Information Technology** constitute the five major research and development thrust areas and centers of excellence of the IfM.

Examples of projects include:

BioMEMS efforts aimed at the development of select commercially viable micro and nanosystems for biomedical and biological applications; EnviroMEMS efforts aimed at the development of select commercially viable micro and nanosystems for environmental and chemical applications; Nanotechnology efforts directed at the development of select commercially viable nanotechnologies for BioMEMS, EnviroMEMS, and other applications; Information technology efforts are directly supportive of the State of Louisiana IT Initiative and current efforts include projects for the realization of enabling micro/nanotechnologies for information sensing, storage and processing.



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