



IfM Receives Third Consecutive NSF MRI Grant for Nanotechnology Research and Education

After receiving \$925,000 through two consecutive grants from the Major Research Instrumentation (MRI) Program of the National Science Foundation (NSF), the Institute for Micromanufacturing (IfM) has received a new \$350,000 grant from the same program for the third year in a row. The previous two grants have allowed the acquisition

of a leading-edge field emission scanning electron microscope, and a state-of-the-art sputtering system. The new grant is intended for the acquisition of a new x-ray diffractometer (XRD) instrument. This new tool further enhances nanotechnology research and education at Louisiana Tech University. It

will also allow neighboring institutions and users in north Louisiana and the region to have access to this tool for research, educational, and industrial needs. Drs. Tabbetha Dobbins, Scott Gold, and Alfred Gunasekaran were the lead authors of the successful proposal that has resulted in the funding for the XRD instrument.

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New \$3.6 Million Grant for Cyberspace Initiative

The Computer Science Program and the Institute for Micromanufacturing at Louisiana Tech University, in collaboration with the Computer Science Department and the Center for Computation and Technology at Louisiana State University have partnered in the realization of the newly

launched Center for Secure Cyberspace (CSC). Funding for the center includes a \$3.6 million grant recently received from the Louisiana Board of Regents. The principal and co-principal investigators of this initiative include LaTech's Dr. Vir Phoha (Professor of Computer Science) and Dr. Kody

Varahramayn (Director of the Institute for Micromanufacturing), and LSU's Dr. S. S. Iyengar (Chair of Computer Science). The goal of the CSC is to establish a national center of excellence dedicated to education and research in integrated smart cyber-centric sensor surveillance systems.

IfM Welcomes New Faculty This Fall



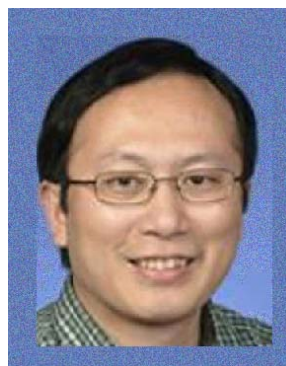
Dr. Despina Davis

Dr. Despina Davis, Assistant Professor of Chemical Engineering, received her Ph.D. in Engineering Science from Louisiana State University-BR in 2006. Her research interests include electrochemical

engineering, nanofabrication, magnetic and thermoelectric materials, sensors, and thin films. Dr. Davis received her M.S. from Louisiana State University-BR in Chemical Engineering and her B.S. from Texas Tech University-Lubbock in Chemical Engineering.

Dr. Long Que, Assistant Professor of Electrical Engineering, received his Ph.D. in Electrical Engineering from the University of Wisconsin-Madison in 2000. Before coming to Tech, Dr. Que worked with GE-Global Research Center. His research interests include advanced micro and

nanoscale materials, devices, and systems for nanoscience, biotechnology, and life science applications. Dr. Que received his B.S. and M.S. from Peking University, Beijing, China in Physics and Communication Engineering.



Dr. Long Que

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Special points of interest:

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

Newsletter Editor

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 Comments are welcomed!



Nanoscience Education & Research Outreach (NERO) Summer Program



**Dr. David K. Mills
with Workshop Participants**

High school teachers Janie Hamby and Sandra Pena took a summer break from teaching to put on their thinking caps and learn about bionanotechnology and tissue engineering during a four-week visit to Louisiana Tech University. They participated in the NERO program, sponsored by a National Science Foundation (NSF) program called Research Experiences for Teachers (RET). The NERO RET program has as its focus the disciplines of molecular science and nanotechnology and encourages teachers to learn about engineering and science through hands-on activities and

direct interactions with Louisiana Tech researchers associated with the Institute for Micromanufacturing (IfM). Dr. David Mills, professor of biology and IfM faculty, is the principal investigator of the NERO program. A key objective of the program is that knowledgeable high school teachers will make better science teachers and spark student's interest in biotechnology and nanotechnology.

Ms. Hamby and Ms. Pena worked in the laboratory of Dr. David Mills and his two collaborators, Dr. Sidney Sit and Dr. Yuri Lvov, on the projects. Specifically, Ms. Hamby, a middle school science teacher from Morehouse Parish, worked with Drs. Mills and Sit, to develop a collagen coated PCL scaffold for use as a repair tissue in TMJ disorders. Ms. Pena, a High School teacher from Bossier, worked closely with Skylar Stewart, a Biomedical Engineering doctoral student and NSF GK-12 Teaching Fellow, to continue research on nanoencapsulated stem cells for regenerative medicine applications, a collaborative project of Drs. Mills and Lvov.

"I think they both really got a feeling for what research is all about: having an idea, and to make it work one has to go through a number of iterations, trials and errors," comments Dr. Mills. "They also learned how complex even the simplest experiment can be and sometimes the brightest ideas don't work out in reality." "Science does not beat a metronome!"

At the conclusion of their visit, the teachers gave final presentations of their work to an audience of GK-12 Teaching Fellows, colleagues, lab mates, and research mentors. Their final days in the NERO program were devoted to translating their research experiences into curricular activities for their students. Research mentors and their teachers will convene during the academic year to pilot, test and retest their curricular materials and laboratory modules.

Drs. Mark Decoster, Steve Jones, Daniela Mainardi, and Patrick O'Neal also served as research mentors and contributed greatly in terms of time, lectures and seminars developed specifically for the NERO program.

ANNOUNCEMENT

Academic Engagement Workshop

An Academic Engagement Workshop, funded by the National Science Foundation through the grant Creating Connections GK-12 Teaching Fellows, will be held on November 2, 2007, from 2 to 5 pm, in Room 107 of the Biomedical Engineering Building, adjacent to the Institute for Micromanufacturing Building. The first workshop is on how to design and develop an educational outreach program. Contact Dr. David K. Mills at x5204 or 2604 for further information.



Joint Faculty Appointment Program (JFAP) Summer Educational Outreach Program



Back Row: Kristan Moore, Jasma Batham, Nenian Charles
Middle Row: Joy Walker, Dr. Pedro Derosa, Dr. Kody Varahramyan, Jonah Ukpai
Front Row: Michael Lewis, Dr. Tabbetha Dobbins, Brandon Howard, and Whitney Fisher



Dr., Tabbetha Dobbins with student Kristan Moore

Dr., Pedro Derosa with students Michael Lewis and Brandon Howard

For the third consecutive year, the Louisiana Board of Regent has provided funds to IfM for the JFAP Summer Educational Outreach Program. Through this program, undergraduate students, particularly underrepresented minorities, from Grambling State University (GSU) and Louisiana Tech University (LaTech) are recruited to conduct research under the direction of the JFAP faculty. The JFAP faculty are Dr. Pedro Derosa and Dr. Tabbetha Dob-

bin, who hold joint appointments with Grambling State University and Louisiana Tech University.

A total of 10 students were recruited and completely or partially supported by the program. Specifically, the recruited students were Nicholas Dailey (GSU), Whitney Fisher (LaTech), Kristan Moore (GSU), Nenian Charles (GSU), Brandon Howard (GSU), Michael Lewis (LaTech), Jasma Batham (LaTech), Leonid Kukuy (LaTech), Joy Walker

(GSU), and Jonah Ukpai (LaTech). Of the above-mentioned students, the first 3 worked with Dr. Dobbins, the next 5 with Dr. Derosa, and of the remaining two, one with Dr. Yuri Lvov (an IfM faculty collaborator of Dr. Dobbins) and one with Dr. Steve Wells (a LaTech Physics Program faculty collaborator).

The results from this Summer's activities have been remarkable. Four presentations were accepted for the 2008 TMS national meeting, and a minimum of two journal papers will be prepared based on the

generated research results.

As indicated by Dr. Kody Varahramyan, the IfM Director, "this has been an outstanding year for the JFAP Summer Educational Outreach Program. By all indications, the program has been highly successful, and of great benefit to all of the participants. All the students have indicated that, as a result of their summer internship experience, they have gained a better idea as to what they can accomplish in the real world with respect to what they have learned as part of their academic studies."

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Dr. Kody Varahramyan, Director of IfM said that this new instrument will be housed in the Measurements and Characterization Section of the Institute, and while it will contribute to meet the research needs for characterization of nanoscale materials, structures, and devices, it will also serve as a key instrument for nanotechnology training and educational initiatives. As part of this, the new system will be used in educational training of undergraduate and graduate students from a wide range of engineering and science programs, including the BS in Nanosystems Engineering, the MS in Molecular Science and Nanotechnology, and the Ph.D. programs in Engineering and Biomedical Engineering. The availability of the new XRD system, coupled with the existing leading edge resources available at the IfM, will enable Louisiana Tech University to maintain its lead in nanotechnology research, education, and commercialization.

Upcoming Nanotechnology Seminars

#96, Oct 16, Tuesday, 2 p.m. David Mills, Biology and IfM, Nanotechnology Educational Outreach: Making Nanotech Relevant at the K-12 Level.

#97, Oct 23, Tuesday, 2 p.m. Paul Turner (Biology/IfM), Physical

Characterization of Electrospun PCL Scaffolds and Preliminary Cell Viability Studies With Bovine Fibrochondrocytes

#98, Oct 30, Pedro Derosa Physics and IfM, Monte Carlo

Study of particle diffusion in nanostructures.

#99, Nov 6, Neven Semicevic, Physics/CAPS, Beyond Nanotechnology into the Pico-second Domain: Exposure of Biological Materials to Picosec-

ond Electromagnetic Pulses.

#100, Nov 13, Erwin Vogler, Materials Science and Engineering, Penn State University, Protein Adsorption Mechanisms and Modeling of breast cancer metastasis.



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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:

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

- ✧ To transfer new technology and provide technical training to industry and government
- ✧ 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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