



IfM Receives \$400,000 Grant for Nanotechnology Research and Education

After receiving a \$525,000 grant from the Major Research Instrumentation (MRI) Program of the National Science Foundation, the Institute for Micromanufacturing (IfM) has received a \$400,000 grant from the same program for the second year in a row. The \$525,000 grant has allowed the acquisition of a leading-edge field emission scanning electron microscope, currently used for nanotechnology research and education at Louisiana Tech University. The new \$400,000 grant is intended for the acquisition of a state-of-the-art sputtering system. This system will further enhance nanotechnology research 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 tool for research, educational, and industrial needs. Director of IfM Dr. Kody Varahramyan said that the new sputtering system will be housed in the Cleanroom section of the Institute, and it will enable the realization of highly desirable nanometer scale range structures that are made of a wide range of materials. Moreover he said that besides aiding in research, the new system will be used in edu-

cational 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 field emission microscope and sputtering system, coupled with the existing leading edge resources available at the IfM, will enable Louisiana Tech University to maintain its national lead in micro/nanotechnology education, currently ranked third in the nation, based on a recent Small Times survey.

Start-Up Companies from IfM Research

As reported in Volume 3, Issue 2 of the News of the Infinitesimal, our series featuring start-up companies continue with the Sensacoil, Inc., highlighted below. Future newsletters will highlight other start-up companies based on technology developed at the Institute for Micromanufacturing.

Sensacoil Inc.

Sensacoil Inc. was formed in 2004 by Dr. Haifeng Ji. The mission of Sensacoil is to develop microsensor devices for detection of chemical and biological species for environmental and biomedical monitoring, with emphasis on homeland security applications. Chemical warfare agents are one of the major threats to homeland security. Research that leads to a clear path for the development of low cost, fast, rugged, and extremely sensitive sensors for real-time

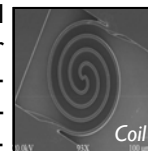
monitoring is of high demand for national security. The company has recently received a Phase I SBIR grant from U S D A , at \$100,000, to validate the feasibility of the microcantilever and recently patented microcoil technology for fabrication of microsensor devices for the detection of nerve agents. The ultimate goal in phase II will be to develop a handheld microsensor array based



Dr. Haifeng "Frank" Ji
 Stewart Associate Professor

detection system for selective detection of known toxic chemical species with low false alarm rates. Requirements such as sensitivity, small size, low power consumption, and low cost make the microcantilever sensor approach very attrac-

tive for on site air/water sampling and medical diagnosis for homeland security and environmental applications.



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Special points of interest:

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

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 Comments are welcomed!



7th Louisiana Materials and Emerging Technologies Conference

The 7th annual Louisiana Materials & Emerging Technologies (LMET) Conference will be held at Louisiana State University, Baton Rouge on October 23 & 24, 2006; Sponsored by Louisiana Board of Regents and NSF EPSCoR, with local arrangements and sponsorships by LSU-Baton Rouge.

Keynote speakers will be:

- Dr. Vicki Colvin, Rice University;
- Dr. Nicholas Kotov, University of Michigan;
- Dr. John Pardue, Louisiana State University;
- Dr. Marek Urban, University of Southern Mississippi

The conference brings together participants from universities, industry and

government agencies in Louisiana and the nation for 1) improved communication and networking among the participants, and 2) to encourage and enhance opportunities for collaborative research and development efforts and initiatives that benefit Louisiana and the nation.

The conference will start with a plenary session, on the morning of October 23, 2006 and end in the afternoon on October 24. Further information about the conference (e.g. program, local lodging information, and travel directions) is available through the conference website: <http://www.camd.lsu.edu/lmet/lmet.htm>

A representative group of IfM faculty and students will participate in the conference and present papers on a wide range of research topics under investigation at the Institute.

LMET Conference Advisory Committee:
Pratul Ajmera (LSU) - 2006 Conference Chair, Pradeep Bhattacharya (SU, BR), Karen Briski (UL Monroe), John Clements (Tulane), Elia Eschenazi (Xavier), Gary Glass (Louisiana Accelerator Center, UL Lafayette), Josef Hormes (CAMD, LSU), Vijay John (Tulane), Charles O'Connor (AMRI, UNO), Jim Landry (LDED), Naidu Seetala (GSU) and Kody Varahramyan (IfM, LaTech)

IfM Faculty Receives Outstanding Louisiana Researcher Award

Dr. Yuri M. Lvov has been selected by the Awards Subcommittee of the 7th Louisiana Materials & Emerging Technologies (LMET) Conference to receive the conference's annual "Outstanding Louisiana Researcher Award." A plaque portraying his name will be displayed at the hosting

university throughout the year.

The award will be presented on Tuesday, October 24 (8:15 -8:50 AM) at LSU, Baton Rouge, during the 7th LMET Conference. Following the award ceremony, Dr. Lvov will make a presentation on "Nanotechnology

and our Niche: Self-Assembly, Biomimetics, Nano- Micro Integration".

Please join us in congratulating Dr. Yuri Lvov.

Dr. Yuri Lvov, T.C. Pipes Endowed Chair, Professor of Micro and Nanosystems. President of NP&P



The IfM Welcomes New Faculty This Fall



Dr. Mark DeCoster

Dr. Mark A. DeCoster, Associate Professor of Biomedical Engineering, received his Ph.D. in Biochemistry and Molecular

Biophysics from The Medical College of Virginia/VCU in Richmond, Virginia in 1989, specializing in neuroscience and neurochemistry. Other research interests include cellular imaging, signaling, integration of nanotechnology and the nervous system at the cellular level, and lipid-derived signaling molecules. Dr. DeCoster received his B.S. in Biology from the College of William and Mary in Williamsburg, Virginia. Before coming to Louisiana Tech University, Dr. De-

Coster was an Assistant Professor with the Department of Ophthalmology and the Neuroscience Center of Excellence at Louisiana State University Health Sciences Center in New Orleans.

Dr. Kaajakari, Assistant Professor of Electrical Engineering, received his Ph.D. from the University of Wisconsin-Madison in 2002. Before coming to Tech, Dr. Kaajakari worked at VTT Technical Research Center on micromechanical resonators for cell phones and



Dr. Ville Kaajakari

MEMS sensors. Dr. Kaajakari's other research interests include new applications and processing methods for micromechanics.



Summer 2006 Educational Outreach Program



Ejiroghene (Ej) Oteri



Kristan Moore

The Summer 2006 Educational Outreach Program has been successfully carried out at the Institute for Micromanufacturing at Louisiana Tech University. The efforts reported have been supported by a grant from the Louisiana Board of Regents. These efforts consisted of the recruitment of under-represented students from Grambling State University and Louisiana Tech University, who, as part of their summer internship program, have carried out research projects under the direction of the JFAP faculty associated with the IfM.

The JFAP faculty are on joint appointments be-

tween Louisiana Tech University and Grambling State University. These faculty are Drs. Tabbetha Dobbins and Pedro Derosa.

The recruited students are Kristan Moore (Junior Physics major at Grambling State University), Ejiroghene (Ej) Oteri (Senior Mechanical Engineering major at Louisiana Tech University), Mario Sanders (Sophomore double majoring in Industrial and Engineering Technology and Physics at Grambling State University), and Brandon Howard (Junior Computer Science major at Grambling State University). The former two students

performed their research with Dr. Dobbins on the hydrogen storage program at IfM, and the latter two students conducted their research with Dr. Derosa on the conductive polymers program at IfM.

By all indications, the given outreach program has been highly successful, and of great benefit to all of the participants. The four 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.

Nano TX 2006



L-R: Dr. Alfred Gunasekaran, Assistant Professor Research
Dr. Mangilal Agarwal, Research Associate



L-R: Dr. Hisham Hegab, Academic Director
Dr. Alfred Gunasekaran, Assistant Professor Research



L-R: Nanosystems Engineering Students
Joe Nealy, John Sutton, Judson Stevens, and Daniel Scoggin

The College of Engineering and Science (COES) and the Institute for Micromanufacturing exhibited the Nanotechnology based educational activities and the on-going research programs at Lou-

isiana Tech University, at the NanoTX conference held in Dallas, TX, on September 26-28, 2006. The Louisiana Tech delegation at NanoTX consisted of Drs. S. Napper, H. Hegab, M. Agarwal,

and A. Gunasekaran, and several students. Many visitors were attracted to the COES/IfM booth. Among them several high school science teachers from various parts of Texas learned about the undergraduate

and graduate programs at Tech, and were very impressed by the quality of the undergraduate education, and particularly by the undergraduate research activities.



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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.



*Institute for Micromanufacturing
Louisiana Tech University
Ruston, LA*