INSTITUTE FOR MICROMANUFACTURING

NEWS OF THE INFINITESIMAL

Louisiana Tech University

Volume 2, Issue 2

April 1, 2005

One Million Dollar DoD Grant Received

Louisiana Tech University has received a million dollar grant from the U.S. Department of Defense, to carry out research at the Institute for Micromanufacturing (IfM). The funding will support work on the development of technology platforms for the realization of miniaturized micro/nano scale-based systems for civilian and defense applications. The systems under consideration include micro/nanosystems for sensing and surveillance in battlefields and other locations, such as airports and subways. Since its inception over a decade ago, IfM has been in the forefront of interdisciplinary research and education. Starting from its original micromanufacturing emphasis, the Institute's research and educational efforts have greatly grown and expanded to its current five thrust areas of emphasis, identified as Nanotechnology, Biotechnology, Biomedical Nanotechnology, Environmental Technology, and Information Technology. The newly funded project will be carried out by an interdisciplinary team of science and engineering faculty, staff, and students, who are associated with the given thrust areas.

For further information contact:
Mrs. Jeanette Futrell,
at 318-257-5107 (Tel),
318-257-5129 (Fax),
or jfutrell@latech.edu

Inside this issue:

Louisiana Academy of Sciences Annual Conference

On March 18, 2005, the Louisiana Academy of Sciences held its 79th Annual Meeting at Grambling State University. Presentations were given by many of the IfM faculty and students. Invited presentations were given by IfM faculty members Pedro Derosa and Debasish Kuila. Three IfM students participated in the Best Student Paper competition: R. Dikshit, R. Norhia, and S. Girish. Other students submitted oral and poster presentations. The oral presentations given by IfM students were well received by the conference participants.

Other students presenting posters were Q. Zhang, S. Karanam, R.

Continued on pg 2

L-R: Ejiroghene Uzezi Oteri (Undergraduate IfM Student) and Madhuri Guduru (M.S. - EE) during poster presentation
Z. Liu (Ph.D. -Engr) during oral presentation in Materials Science session
Edward Bruster (M.S. - Physics) during the poster presentation

Special points of interest:

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

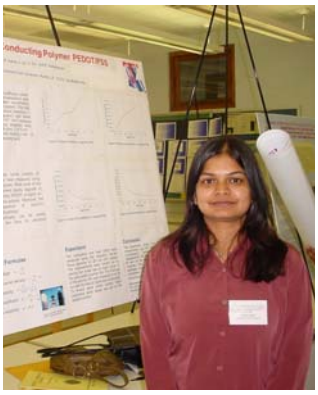
Newsletter Editor
Mrs. Jeanette Futrell
jfutrell@latech.edu
Comments are welcomed!

Louisiana Academy of Sciences Annual Conference

(Continued from pg 1)

Rajesh, and V.D. Hathaway. Students giving oral presentations were: F. Zue *(Memory Effect of Conducting Polymers Characterization by C-V and I-V Techniques),* R. K. Khillan *(Novel Inkjet Printing Dispensing Techniques for Fabricating Various Micro-optoelectronic and Polymer Sensor Devices),* and Z. Liu *(Bistable Memory Devices Based on Spin-Coated Molecular Complex Thin Films).*

Faculty advisors for students representing Louisiana Tech University were Drs. Pedro Derosa Tabbetha Dobbins, Debasish Kuila, Sandra Selmic, and Yi Su.



L-R: *. N. Goel (M.S. EE) during poster presentation.*
F. Zue (Ph.D. – Engr) during oral presentation in Materials Science session.
R.K. Khillan (Ph.D. – Engr) during oral presentation in Materials Science session

Distinguished Visitors

U.S. Senator David Vitter and Congressman Rodney Alexander visited IfM on Friday February 25, 2005. They were accompanied by Louisiana Tech University Vice President Leslie Guice, Dean Stan Napper, and IfM Director Kody Varahramyan who provided them with an overview and a tour of the Institute.

(L-R) Dean S. Napper, Vice President L. Guice, Senator D. Vitter, Congressman R. Alexander, Director Kody Varahramyan

Mr. Duane Blumberg, Deputy Secretary of the Louisiana Economic Development Department, visited the IfM on February 15, 2005. Mr. Blumberg was accompanied by Mr. Ray Watson, the Economic Development Administrator of the City of Ruston. Mr. Blumberg, who met with Drs. Varahramyan, Lvov, and McShane, was provided with an overview of the Institute and its research and development efforts in the realization of commercially viable micro/nano-technologies for biomedical, biological, chemical, environmental, information technology and other applications.

NSF Career Grant

Dr. Daniela Mainardi, Assistant Professor of Chemical Engineering and IfM has been awarded with a National Science Foundation Career Grant for her proposal on *Modified-Methanol Dehydrogenase Enzymatic Catalysts for Fuel Cell Devices.* This is a nationally prestigious award that recognizes and supports junior faculty in their innovative work.

Three main components characterize Dr. Mainardi's career development plan: fundamental research on fuel cells, effective integration of research and education, and dissemination of research and educational outreach. First, Dr. Mainardi proposes to advance fundamental research on "bio-inspired" catalysts using state-of-the-art molecular simulations to understand the behavior of biological components in fuel cells. Second, she plans to attract, train, and stimulate undergraduate and graduate students to conduct competitive research by designing and implementing a novel course on "Nanosystems Modeling". Finally, she envisions the effective integration of research and education through learning kits designed by students for students, educators, and a general audience as part of a final course project. Dr. Mainardi's career development plan will serve to complement ongoing collaborative efforts on nano/bio-technology-related doctoral, master, & baccalaureate degree programs to enhance teaching and research efforts in these areas. The educational activities will have direct impact on K-12, high school, and prospective students from rural and small town schools in the region, contributing to increased teacher quality, improved classroom instruction, and ultimately improved student achievement.

Dr. Daniela Mainardi

Student and Staff Recognitions

Each quarter the IfM hosts an All IfM Meeting, prior to which faculty and staff nominate deserving M.S. and Ph.D. students, as well as a staff person for recognition of his/her achievements. This tradition began in the Spring Quarter of 2002. The criteria established for student nominations take into consideration scholarly activities (e.g. journal publications), demonstrated initiative, and productivity in research efforts.

This past Winter quarter those recognized were: Ph.D. student Mr. Rajneek Khillan, M.S. student Mr. Anand Francis and IfM staff member Mr. Scott Williams.

Mr. Khillan was presented with a certificate for Excellence in Scholarly work and Research and a monetary award. Mr. Khillan was nominated by his advisor, Dr. Yi Su, Assistant Professor of Electrical Engineering and IfM. Mr. Khillan has 10 publications and 7 conference presentations. Mr. Francis was presented with a certificate for Excellence in Scholarly Work and Research and a monetary award.

Rajneek Khillan

Mr. Frances was nominated by his advisor, Dr. Cheng Luo, Assistant Professor of Biomedical Engineering and IfM. Mr. Francis has 6 publications to his credit.

Anand Frances

Mr. Scott Williams, Assistant Facilities Engineer was presented with a certificate for Distinctive Professional Performance and Conduct and a monetary award. Mr. Williams is responsible for the security and access of the IfM facility, AutoCad requests, operates and maintains the machine shop as well as performing conventional and precision machining, mechanical design and fabrication. He is also involved with facilities planning, installation and upkeep of lab equipment. Mr. Williams serves on the IfM Space Team.

Scott Williams

Louisiana Tech University

Institute for Micromanufacturing
P. O. Box 10137
911 Hergot Avenue
Ruston, LA 71272

Phone: 318-257-5100
Fax: 318-257-5104
Email: ifm-marketing@latech.edu

"Smaller, Lighter, More Functional, Higher Quality, and Less Expensive Consumer Products, Industrial Machines, Instruments… Possibilities Limited Only by One's Imagination"

IfM

We're On The Web!

latech.edu/tech/engr/ifm/

Vision and Mission

The vision of the IfM is to be a world-class resource for the realization of commercially-viable micro- and nanosystems, 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