



INSTITUTE FOR MICROMANUFACTURING

NEWS OF THE INFINITESIMAL

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University

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Message from the Director

As we move into the new year, 2005, I would like to take this opportunity to recognize all the stakeholders who have contributed in making 2004 an exceptional year for the Institute for Micromanufacturing, and in creating the conditions that are indicative that 2005 may become the best year yet for the Institute. These stakeholders include the Institute faculty, staff, and students, the University administrators, and other partners and supporters. It is through their collective and coordinated efforts that the vision of the Institute is being realized. The Institute's vision 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.

Since its inception over a decade ago, the Institute has been carrying out leading-edge research and development efforts, resulting in micro- and nanosystems for biomedical, biological, environmental, chemical, information technology, and other applica-

tions. The Institute's activities in its five main research and development thrust areas of Nanotechnology, Biotechnology, Biomedical Nanotechnology, Environmental Technology, and Information Technology are firmly established, and are expected to vigorously progress and further grow during 2005. Each of these thrust areas is headed by a faculty leader, who aids in the development, planning, and coordination of efforts within and across the thrust areas. These faculty leaders also serve on the Institute's Leadership Team, which is headed by the

Institute's Director, and includes the Associate Director of Operations, the Executive Administrative Coordinator, and a senior member of the technical staff. This team leads the Institute in the achievement of its goals and objectives.

I trust that you will find this and future issues of this newsletter to be informative, as you are updated about the Institute for Micromanufacturing, and its accomplishments. I also welcome your comments and feedback.

Kody Varahramyan, Ph.D.
Director



IfM Leadership Team

L-R Seated: Marie Bennett (Executive Admin. Coordinator), Kody Varahramyan (Director and Interim Information Technology Thrust Leader), Philip Coane (Assoc. Director Operations); L-R Standing: David Mills (Biotechnology Thrust Leader), Mike McShane (Biomedical Nanotechnology Thrust Leader), Frank Ji (Environmental Technology Thrust Leader), Yuri Lvov (Nanotechnology Thrust Leader); Not Shown: Ji Fang (Senior Research Engineer)

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Special points of interest:

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

2005 IfM Calendars are Available
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Comments are welcomed!



Governor Kathleen Blanco Tours IfM

On Thursday, November 4, 2004, Louisiana Governor Kathleen Blanco toured the Institute for Micromanufacturing, to review the nanotechnology and some of the related leading edge research and development efforts getting carried out at the Institute. During the tour, Dr. Les Guice, Louisiana Tech's Vice President for Research and Development, highlighted how nanotechnology applications can contribute to economic development, and noted some of the Institute's efforts in the development of the commercial applications of nanotechnology, ranging from medicine to the pulp and paper industry. Dr. Kody Varahramyan, the Institute Director, while demonstrating to Governor Blanco the Institute's resources and

facilities, highlighted the close integration of the nanotechnology and the micromanufacturing efforts, resulting in the development of innovative and highly desirable miniaturized systems for biomedical, chemical, information technology, and other applications. Dr. Dan Reneau, Louisiana Tech's President, and Dr. Stan Napper, Dean of

Engineering and Science, were also present and accompanied the Governor during the tour. Dr. Reneau showed the Governor the architectural drawings for the new Biomedical Engineering Building, and pointed out its planned location, next to the Institute's R & D building.



*Governor Blanco
with President Reneau*



Front-L-R: President Dan Reneau, Governor Kathleen Blanco, Vice President Les Guice

Back-L-R: Representative Rick Gallot, Jr., Director Kody Varahramyan, COES Dean Stan Napper

At the conclusion of the tour, the Governor felt that the University and the Institute were moving in the right direction and provided words of encouragement for the continuation of the given efforts.

Distinguished Visitors

Representatives of the Louisiana Department of Economic Development, in conjunction with a group of the State legislative staffers and the economic development officials from the region, accompanied by the Mayor of the city

of Ruston, Mr. Dan Hollingsworth, visited the IfM, on December 1, 2004. They were met by Vice President Guice and IfM Director Varahramyan, who through a set of presentations and tour of the facilities, provided the visitors with an

overview of the Institute and its research and development efforts in the realization of commercially viable micro/nanotechnologies for biomedical, biological, chemical, environmental, information technology and other applications.

Similarly, the Louisiana Board of Commerce and Industry (LBCI) was provided with a presentation and tour of the IfM, during their October 27, 2004, visit to Louisiana Tech University, where the LBCI held its Board meeting and hosted a Business Incentive Workshop.



Faculty Recognition

Dr. Yuri Lvov has been appointed as the new Tolbert C. Pipes Endowed Chair of Micro and Nanosystems. Dr. Lvov has been associated with the Institute for Micromanufacturing and the Chemistry Program, since 1999. He is nationally and internationally known for his pioneering work in the area

of nanotechnology, particularly as it relates to the layer-by-layer nano-assembly technique. This new appointment will allow Dr. Lvov to continue and expand his research and scholarly activities, and to provide leadership, mentoring, and guidance to faculty and students.



Dr. Yuri Lvov

New Faculty

Dr. Pedro Derosa, JFAP Assistant Professor of Physics with Louisiana Tech University and Grambling State University. Dr. Derosa received his B.S., M.S. and Ph.D. in Physics from the National University of Cordoba in Argentina (Ph.D. in 1997). Dr. Derosa's research inter-

est include theoretical studies of nanotechnology-based effects and phenomena.

Prior to his selection to his current position, Dr. Derosa held an appointment as a Research Associate at Louisiana Tech University, since the Fall of 2003.



Dr. Pedro Derosa

Staff and Student 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 pro-

ductivity in research efforts.

This past Fall quarter those recognized were:

Ph.D. student Ms. Difei Qi, who was presented with a certificate for Excellence in Scholarly Work and Research and a monetary award. Ms. Qi was nominated by her advisor, Dr. Sandra Semic, Assistant Professor of Electrical Engineering and IfM. Ms. Qi's presentation was on

Conjugated Polymer-based Photodetectors and Photodiodes. She described the experimental results of the photodetectors based on MEH-PPV and Ethyl viologen dibromide. Ms. Qi has 7 publications to her credit.

IfM Postdoctoral Staff Dr. Tatsiana Shutava, was presented with a certificate for Distinctive Professional Performance and Conduct, plus

Upcoming Winter Events

Seminar Series IfM Auditorium 101

- January 11, 2 p.m.
"Comparison of Enzyme Encapsulation Methods for Biosensors Part I", Huiguang Zhu, IfM
- January 25, 2 p.m.
"Nanoassembly for Biomaterials", Dr. Hua Ai, Case Western University
- February 15, 2 p.m.
"Comparison of Enzyme Encapsulation Methods for Biosensors Part II", Suman Nayak, IfM
- March 8, 2 p.m.
"Drug Nanoencapsulation", Dr. Michael Pishko, Penn State University
- March 22, 2 p.m.
"Smart Tattoos: A Comprehensive Approach to Implantable Biosensor Design", Dr. Mike McShane

a monetary award. Dr. Shutava is working with Dr. Yuri Lvov. Her research interest include formation of ultrathin films and capsules using layer-by-layer (LbL) assembly of polyions, enzymes and nanoparticles, and development of approaches for fabrication of bio/nanoreactors, and application of the LbL films and capsules for drug delivery. Dr. Shutava has 19 publications to her credit.



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 and Less Expensive Consumer Products,
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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:

- 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.



*Institute for Micromanufacturing
 Louisiana Tech University
 Ruston, LA*