



# INSTITUTE FOR MICROMANUFACTURING

## NEWS OF THE INFINITESIMAL

Louisiana Tech  
University

Volume 1, Issue 3  
October 1, 2004

### Message from the Executive Administrative Coordinator

The Institute for Micromanufacturing (IfM) Administrative Team consists of administrative personnel who are here to assist the IfM faculty, staff, and students with all aspects of fiscal, purchasing, and accounting needs. The team is trained in accounting procedures for state and federal grants, as well as travel related procedures and policies, and is dedicated to staying abreast of advancements in their specific areas of work responsibilities.

It is the responsibility of the IfM Administrative Team to develop and implement policies and proce-

dures for all funds, grants, and contracts that relate to the operation of the IfM. The team monitors and communicates on a regular basis, accounting, purchasing, budgetary, and other related matters with faculty and students at the IfM, as well as with other personnel and offices within and outside the university.

As the Executive Administrative Coordinator for this team, I welcome any suggestions that would further enhance the administrative operations of the IfM.

Marie Bennett,  
Exec. Admin. Coordinator



**Mrs. Marie Bennett**  
Executive  
Administrative  
Coordinator

Phone: (318) 257-5133  
Fax: (318) 257-5104  
E-mail: [mbennett@latech.edu](mailto:mbennett@latech.edu)

#### Inside this issue:

DoE-IfM Workshop	2
New Faculty	3
News Grants	3
Upcoming Events	3
Student/Staff Recognitions	3
Staff Promotion	3
Vision & Mission	4

### Biotechnology Center Grant Workshop August 9-10, 2004

A two-day workshop hosted by the Institute for Micromanufacturing was held to assist participants from Louisiana universities to identify biotechnology and nanotechnology research areas of interest and prepare competitive proposals. Invited to share their experiences were Dr. Michael Matthews, Professor of Chemical Engineering at the University of South Carolina and Dr. Vicki Colvin, Director of the Center for Biological and Environmental Nanotechnology of Rice University. The workshop provided a forum for discussion of collaborative research efforts with emphasis on nanobiotechnology which refers to the use of nanoscale materials and phenomena applied to research and engineering to study and solve biological/medical problems. The goal was to share ideas, network, and

make contact with potential collaborators, and plan joint proposals. Additional meetings between participants are being held to prepare applications for major NIH and NSF funding for research in Louisiana.



Some Workshop Attendees: From Front to Back, Left to Right: Dr. Sami Nazzal-ULM, Dr. James Palmer-La Tech Univ., Dr. Yuri Lvov-La Tech Univ., Dr. Michael Matthews-USC, Dr. Karen Briski-ULM, Mr. Jim Gershey-BoR, Dr. Sidney Sit-La Tech Univ., Dr. Steven Jones-La Tech University, Dr. Michael McShane-La Tech Univ., Dr. Josef Hormes-LSU, Dr. Mark DeCoster-LSUHSC-New Orleans.

#### Special points of interest:

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

#### Newsletter Editor

Mrs. Jeanette Futrell  
jfutrell@latech.edu

Comments are welcomed!



## IfM Hosts Workshop Addressing National Needs on Nanotechnology for Nuclear Nonproliferation Applications

On July 26 and 27, Louisiana Tech's Institute for Micromanufacturing (IfM) hosted a workshop addressing national needs on Nanotechnology for Nuclear Nonproliferation Applications. The two day workshop, which was co-sponsored by the U.S. Department of Energy (DOE), brought together over 35 researchers from the IfM and the DOE's national laboratories. The first day of the workshop was held at the Louisiana Tech's Technology Transfer Center, in Shreveport, and the second day was held at the IfM's research and development center on Tech's campus in Ruston. Central to the workshop was the unveiling of a roadmap on nanotechnology research and development for nuclear nonproliferation applications, with emphasis on the detection of radiation and radioactive species, and of chemical and other signatures associated with nuclear materials and systems. This roadmap had been prepared by researchers at the IfM, in collaboration with representatives from the U. S. Department of Energy. The Institute's efforts were carried out by a team of IfM faculty, staff, and students, headed by Dr. Kody Varahramyan, the Institute's Director. Through discussions generated at the workshop, the roadmap was further refined and readied for implementation by the IfM and its collaborating DOE partners. Nanotechnology for nuclear nonproliferation applications is an area of utmost importance to national security. Nanotechnology coupled with micromanufacturing offer much promise for mitigating the nuclear proliferation threats through the realization of mic-



*Some faculty and staff who assisted with the workshop implementation:*  
From Left to Right: Seated: Liliana Norby, Marie Bennett, Jeanette Futrell  
Standing: Dee Tatum, Dr. Kody Varahramyan, Scott Williams, Dr. Pedro Derosa

ro/nanosystems for the effective detection in the given nuclear application areas. The new technologies will allow economical mass-production of easily concealed micro/nanosystems for a wide range of nuclear detection applications, including in battlefields, airports, residential and office complexes, subways, etc. These new technologies are greatly needed for reducing the threats to the U.S. national security and world peace.

The Institute for Micromanufacturing is an integrated nanomanufacturing and micromanufacturing center, dedicated to the research, development, and commercialization of micro/nano scale systems for biomedical, biological, environmental, chemi-

cal, information technology, and other applications. Nanotechnology is the emerging field centered on the science and engineering of materials, structures, devices and systems with feature sizes in the scale length of 1 to 100 nanometer range (dimensions in the atomic and molecular to macromolecular range), which have novel properties and highly useful functions due to their small size. Over the past five years, the Institute for Micromanufacturing has been in the forefront of nanotechnology research and development, carrying out significant efforts concentrated on nanotechnology, including pioneering work in the layer-by-layer nanoassembly technique, and its applications in the devel-

opment of a broad range of nanoengineered materials, structures and devices, including unique materials for coating applications, macromolecules and capsules for drug delivery systems, and nanosensors and detectors for a wide range of biomedical and environmental applications. For the layer-by-layer nanoassembly of macromolecules and nanocapsules, the IfM is considered to be the only center in the United States, and one of only two centers in the world that has been developing and advancing polyion nanocapsule fabrication technology. The other center is the Max Planck Institute for Colloids, in Germany.



## New Faculty

### The IfM welcomes new faculty this Fall

**Dr. Scott Gold**, Assistant Professor of Chemical Engineering received his Ph.D. in Chemical Engineering from Arizona State University in 2002. Specializing in micro-chemical systems and surface chemical engineering, his current work focuses on the development of micro-scale fuel cell technologies and micro-scale chemical and biological sensors. Other interests include microscale chemical separations as well microreaction engineering.

Dr. Gold also received his M.S. in Chemical Engineering from the Georgia Institute of Technology and his B.S. in Chemical Engineering from the University of Kentucky.

Before coming to Louisiana Tech University, Dr. Gold was a Post Doctoral Research Associate with the University of Illinois at Urbana-Champaign.



Dr. Scott Gold

## Upcoming Fall Events

**All IfM Meeting**, October 15th, 3:30 p.m., IfM 101

**IfM Fall Retreat**, October 21st, 5:00 p.m., East Grounds and East Atrium

### Nanoassemblies Seminar

2:00 p.m. IfM Auditorium 201

- October 5th, "In situ investigation of glucose oxidase activity within microcapsules"
- October 20th, "Micro- and Nano-Particulate Systems for Drug Delivery"
- November 2nd, "Nanocapsules with Lipid Coating"
- November 16th, "Construction and characterization of a microcapsule-based fluorescent lactate biosensor"

## Staff Promotion

We'd like to congratulate Ms. Marie Bennett on her promotion to Executive Administrative Coordinator. Ms. Bennett has a Bachelor of Art from Louisiana Tech University and has extensive administrative experience at Louisiana Tech University and with Industry.

The cover page of the

current issue of this newsletter provides a highlight of the IfM's administrative team, supervised by Ms. Bennett.

Congratulations Marie!



## New Grants

**Dr. Frank Ji**, *Multilayer Modifications of Microcantilevers for Ca<sup>2+</sup> Measurement*, NASA LURA.

**Dr. Debasish Kuila**, *An Environmental Fuel Solution-Storage in Nanotube Composites*, J.B. Johnson Science Foundation.

**Dr. Daniela Mainardi**, *Acquisition of a SGI Origin 350 for Nano/Bio-Technology Computational Research & Student Training*, NSF MRI.

**Dr. Michael McShane**, *Nano-scale Cellular Response to Microfluidically Delivered Chemical Signals*, NASA-LSU.

**Dr. Andrei Paun**, *Simulating Cells Globally*, BoR RCS.

## 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 their achievements. This tradition began in the Spring quarter of 2002. Criteria established for student nominations take into consideration scholarly activities (e.g. journal publications), demonstrated initiative, and productivity in research efforts.

This past Summer quarter

those recognized were:

M.S. student Ms. Jing Zhang, and Ph.D. student Mr. Mangilal Agarwal, who were presented with a certificate for Excellence in Scholarly Work and Research and a monetary award. Ms. Zhang was nominated by her advisor, Dr. Frank Ji, Assistant Professor of Chemistry and IfM. Mr. Agarwal was nominated by his advisor Dr. Alfred Gunasekaran, Assistant Research Professor at IfM.

IfM Staff Ms. Debbie Wood, who was presented with a certificate for Distinctive Professional Performance and Conduct plus a monetary award.



## 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”



**We're On The Web!**

**[latech.edu/tech/engr/ifm/](http://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, Environmental Technology, and Information Technology** constitute the four 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*