

Mark your calendars for the 2009 NNI@UI Symposium on February 19, 2009. The symposium will feature a number of internationally recognized scholars and a poster session. More details will be provided in our NANO@IOWA weekly. Be sure to look for them.



Photo by Jackie Jensen

2008 REU Students

FROM THE DIRECTOR

Welcome to the third newsletter from the Nanoscience and Nanotechnology Institute at UI (NNI@UI). At this time, the University of Iowa is in the process of recovering from the summer floods, a natural disaster that resulted in the emergency evacuation of the Iowa Advanced Technology Laboratories (IATL), home of NNI@UI.

On June 13, the quickly rising Iowa River brought research to an unexpected screeching halt in the IATL. Over three months later, faculty, students, and staff are still displaced from their IATL labs and offices and working in numerous locations across the UI campus. The struggles encountered by researchers in the IATL have been documented and written up in *Chemical & Engineering News* (August 4, 2008, Volume 86, pp 38-41) and on-line newsletter *Photonics* (www.photonics.com/content/news/2008/June/18/92117.aspx). The incredible effort put forth by IATL occupants and the Office of the Vice President for Research staff to evacuate as much as possible from IATL was truly impressive. Temporary labs were set up in the Chemistry Building, Seamans Center and Van Allen Hall. Researchers continue to assess damages to equipment



Vicki H. Grassian
Director of NNI@UI

and await final word on a date to reoccupy IATL (target date is now set for October 1). There is an effort to make

the best of a difficult situation and trying to minimize the impact on students, postdoctoral associates and visiting scholars, as well as faculty members and staff. The IATL first floor occupants have been the most impacted and we hope they can come back in full force as soon as possible.

In addition to briefing you on how the flood impacted NNI@UI and researchers in IATL, I'd like to also use this issue to update you on some of the highlights of the past year, prior to the floods of 2008. Members of NNI@UI have both led and participated in many successful major grant applications over the course of the last year. Their efforts have helped further the development, infrastructure, education and research of nanoscience and nanotechnology on

the University of Iowa campus.

NNI@UI Executive Committee member Tom Peters, Assistant Professor of Occupational and Environmental Health, received a \$300,000 NIOSH grant for his proposal to study personal exposure to engineered nanoparticles in August, 2007. For more on Tom's current research, please see this issue's "Faculty Profile."

In Fall 2007, the NIH announced its funding of a \$33,000,000 Center for Translational Science Award (CTSA) to the Institute for Clinical and Translational Science at the University of Iowa (ICTS)—one of the largest awards ever received at the University of Iowa. Clark Stanford, NNI@UI Executive Committee member, Associate Dean of the College of Dentistry, and Key Function Director of the ICTS, and I participated in writing the section on the Development of Novel Technologies. A major compo-

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ment of this involved a Nano-Health initiative. Under this initiative the Nanoscience and Nanotechnology Institute hosted a symposium entitled "Bridging the River with Nanoscience and Nanotechnology." At this symposium Assistant Professor of Chemistry, Amanda Haes, gave a presentation entitled "Engineering Nanostructures for Enhanced Biomedical Sensing Applications." Professor Haes recently received one of the first pilot grants funded through the ICTS for her research in developing enhanced biomedical sensors for Parkinson's disease.

In January, 2008, the Roy J. Carver Charitable Trust Foundation provided \$1,000,000 toward a grant written by NNI@UI members for the acquisition of a Field Emission Transmission Electron Microscope (FETEM). The FETEM is quickly becoming a critically important imaging instrument. The microscope will be used extensively throughout campus and will enhance research in nanoscience and biomedicine. The Board of Regents approved the purchase of this instrument this past August. Ken Moore, Director of the Central



North side of IATL after 21-24 inches of water invaded the building. (Photo by Mark Arnold)

Microscopy Research Facilities (CMRF), has led the effort in this acquisition. The FETEM will be housed in the CMRF. Installation is expected in early 2009.

UI Professor of Physics and Astronomy and NNI@UI Executive Committee member, Michael E. Flatté is the leader of a five-university consortium that was awarded a \$6.25 million nanotechnology research grant by the U.S. Department of Defense in March, 2008. The consortium includes researchers from the University of Iowa, New York University, University of California-Berkeley, University of Missouri-Columbia, and University of Pittsburgh. Consortium advances using hybrid structures of different materials may lead

to more efficient devices, including laptops and cell phones.

In April, 2008 a \$1,200,000 grant from the National Institutes of Health (NIH) to investigate the potential toxicity of inhaled nanomaterials was funded. The proposal is a collaboration with researchers in the Nanoscience and Nanotechnology Institute, College of Public Health, and Environmental Health Sciences Research Center members. Professors Vicki Grassian, Peter Thorne and Patrick O'Shaughnessy, and Dr.'s Andrea Adamcakova-Dodd and Julie Park will work toward establishing a relationship between health outcomes and the properties of nanoparticles.

A number of successful educational and outreach activities have led to new programs and student recognition, as described in this newsletter. One significant highlight, Sarah Larsen, Professor of Chemistry and NNI@UI Associate Director was notified early in 2008 that the National Science Foundation had selected her proposal to host a Research Experiences for Undergraduates (REU) site. The NNI@UI REU program provides

undergraduate students, specifically, with an opportunity to spend the summer conducting research in faculty laboratories on environmental and health aspects of nanoscience and nanotechnology. Despite challenges the students encountered from the Flood of 2008 (including living in three different dorms in a three-week time period, evacuation from Iowa City, and several days with only cold water in the dorms), surveys and review of the program indicate students benefitted enormously from their experience this summer and thought the program was a huge success. The success of the program reflects highly on the mentors, graduate students and postdoctoral associates who worked hard to make this a great experience for these REU students. It also reflects the Herculean effort that Sarah Larsen and Jackie Jensen put forth in getting students to Iowa City, out of Iowa City, and back again. I can't praise Sarah, Jackie and Russell Larsen enough for aiding the REU students. Equally amazing were the REU students for their resilience and "can do" attitudes.

Thomas M. Peters, PhD Department of Occupational & Environmental Health

FACULTY PROFILE

As nanoscience and nanotechnology continue to grow, there is growing interest in the monitoring of nanomaterials in the environment and in occupational settings. Tom Peters' research group develops and uses novel methods to assess personal exposure to airborne nanoparticles. Most of the method development work occurs in his laboratory on the Oakdale Campus, while proof-of-concept studies demonstrate real-world application of these new methods in environmental (e.g., assessing exposure to ambient particles) and occupational settings (e.g., assessing exposure to airborne nanoparticles in manufacturing facilities).

These measurements are providing insight to help prioritize studies



in toxicology and epidemiology, as well as helping to evaluate engineering controls to better protect workers. His vision is that one day these methods will be suitable for routine use to protect the public and workers from excessive exposure to particulate matter, including airborne nanomaterials.

The work of his research group is receiving national recognition and is being implemented in many other researchers' work. Dr. Peters' method to passively sample ambient particles is now being used by the EPA in their concentrated study to establish why Cleveland does not comply with US air pollution standards.

More about Tom Peters' research may be found at his website: <http://myweb.uiowa.edu/tpeters/>.

EDUCATION AND OUTREACH

REU in Nanoscience and Nanotechnology Summer 2008

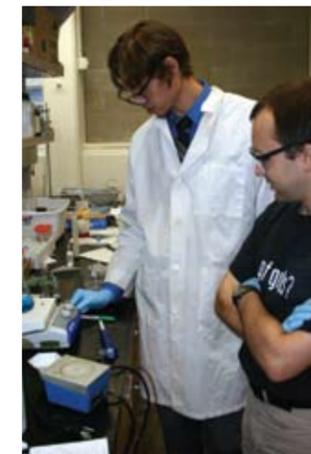
Starting in late May 2008, 10 undergraduates spent the summer on the UI campus as part of the Research Experience for Undergraduates (REU) in Nanoscience and Nanotechnology program, funded by the National Science Foundation (NSF). The program paired the undergraduates with faculty mentors from the departments of Chemical and Biochemical Engineering, Civil and Environmental Engineering, Chemistry, Pharmacy, and Occupational and Environmental Health. The REU students worked with their mentors, graduate students, and postdoctoral associates to gain research experience in cutting edge topics related to environmental and health aspects of nanoscience and nanotechnology.

Part of the program included a workshop on "Communicating Science", led

by Jessica Renaud, Director of the Judith R. Frank Business Communications Center in the Tippie College of Business. This helped students with their public speaking and presentation skills and the students felt this enabled them to improve their communication skills. Participants presented their research at a university-wide poster session and also gave oral presentations to their colleagues, mentors and other university personnel during a seminar in the Chemistry building.

The NSF grant provides funding for the REU program; and additional support for local students was received from ICRU (Iowa Center for Research by Undergraduates). The application process for next summer's program will begin early in 2009 and will be posted on the NNI@UI website.

REU students at work in UI research laboratories.
Photos by Jackie Jensen



2008 College of Engineering Research Open House Poster Session

Graduate student Sherrie Elzey (below) in the Department of Chemical and Biochemical Engineering was recognized for outstanding research in nanoscience and nanotechnology at the College of Engineering Research Open House Poster Session. As part of this recognition, Russell Larsen presented Sherrie with a textbook of her choice on nanotechnology.

Photo by Jackie Jensen



Future Cities



Shown at left is "Team Celestial", from Harding Middle School in Cedar Rapids with their award-winning model of a future city. Preparing to compete in the National Engineers' Week Future City Competition, students from all over eastern Iowa contacted NNI@UI to request information on nanoscience and nanotechnology in Fall, 2007.

NNI@UI happily responded with presentations by NNI@UI faculty Sarah Larsen, Vicki Grassian, and Russell Larsen, along with tours of the UI Central Microscopy Research Facility (CMRF) led by Russell Larsen, Tim Paschkewitz (Chemistry Grad Student), Randy Nessler (CMRF) and Jonas Baltrusaitis (CMRF Postdoctoral Associate).

The Harding Middle School team subsequently won the Iowa Regional Future Cities Competition and represented Iowa at the National Competition. Their project received the Peer's Choice award at both the Iowa and National Competitions. They sent us this photo to share their good news.