

OTHER NNI@UI News and Updates

Nanoscience and Nanotechnology Institute at UI Fall 2007 Symposium Series *Bridging the River through Nanoscience and Nanotechnology*

■ Thursday, September 27 – West Side of the Iowa River – 2117 MERF

12:30 – 1:00	Check in	
1:00 – 1:10	Welcome and Overview	Richard Hichwa and Vicki H. Grassian
1:10 – 2:00	“Nanomedicine: The Promise and Major Barriers”	Donn M. Dennis*
2:00 – 2:30	“Nanoparticles that Immunotherapeutically Prevent and Treat Cancer”	Aliasger Salem
2:30 – 3:00	Break	
3:00 – 3:30	“Engineering Nanostructures for Enhanced Biomedical Sensing Applications”	Amanda Haes
3:30 – 4:00	“Nanostructured Polymeric Hydrogels for Ophthalmic Stent Devices and Neovascularization”	Allan Guymon
4:00 – 5:00	Panel Discussion	
	<i>NanoHealth: Nanoscience and Nanotechnology in Clinical and Translational Medicine</i>	
	Donn Dennis	Alan Guymon
	Aliasger Salem	Clark Stanford
		David Wiemer
		Vicki H. Grassian (moderator)
		Gary Hunninghake
		George Weiner

*Keynote Speaker: **Donn M. Dennis, MD, FAHA** University of Florida College of Medicine
The Joachim S Gravenstein, MD Professor in Anesthesiology, and Director, Nanomedicine
Departments of Anesthesiology, Psychiatry, and Pharmacology & Experimental Therapeutics

■ Friday, October 12 – East Side of the Iowa River

3:30 – 4:30 “The Effects of Particle Aggregation on the Fate and Reactivity of Carbonaceous and Iron Oxide Nanomaterials”
Peter Vikesland, Virginia Tech 3505 SC

■ Friday, November 2 – East Side of the Iowa River

3:30 – 4:30 “Multivalent Polymer Nanoparticles for Targeted Drug Delivery”
Mark Banaszak Holl, University of Michigan 104 IATL

FROM THE DIRECTOR

Welcome to the second newsletter from the Nanoscience and Nanotechnology Institute at UI (NNI@UI). In this issue we focus on research and educational highlights in *Nanoengineering*. As you will see on page two of this issue, faculty, staff and students in the College of Engineering are engaged in a number of projects covering a broad range of research and educational initiatives in nanoscience and nanotechnology.

In addition to the exciting activities going on in the College of Engineering,

I also want to update you on some of the other research, educational and outreach highlights that have occurred in 2007.

Professor Amanda Haes, Department of Chemistry, College of Liberal Arts and Sciences, was named a Naval Research Young Investigator for her work on engineering novel plasmonic nanoparticles for optimized surface enhanced Raman spectroscopy. Professor Haes also received the 2007 Victor K. LaMer Ph.D. Dissertation Award from the Colloid and Surface Chemistry Division of the American Chemical Society. She presented her award lecture in Delaware at the 81st ACS Colloid and Surface Science Symposium this June.



Vicki H. Grassian
Director of NNI@UI

Professor Michael Flatté in the Department of Physics and Astronomy

continues his cutting edge research and scholarship in nanoscience. This past year he published a number of important articles on semiconductor nanomaterials and spintronics including a Review Article “Challenges for Semiconductor Spintronics” in *Nature Physics*.

Other highlights include **Dr. Russell Larsen**, Department of Chemistry and Outreach Coordinator for NNI@UI, being named to the Editorial Board of *The Journal of Nano Education* (<http://www.aspbs.com/jne/>). Results from Dr. Larson’s UI Department of Chemistry course development project related to nanoscience and nanotechnology were highlighted on the cover of the *Journal of Chemical Education*

(Continued next page)



Russell Larsen's work on quantum dots featured on the cover of "Journal of Chemical Education"

August 2007 issue. Professor Patrick O'Shaughnessy, Department of Occupational and Environmental Health, participated as a judge for Lego League's NANO QUEST Challenge state championship and Dr. Jun Ni hosted the highly successful International Multi-Symposiums on Computer and Computational Sciences 2007, which included a very interesting talk by Professor Gerhard Klimeck

from Purdue on NanoHub (<http://www.nanohub.org/>). I want to end by extending an invitation to The University of Iowa's community of scholars to participate in the Fall Symposium Series—*Bridging the River through Nanoscience and Nanotechnology* which begins on September 27th. The symposium series will feature a number of internationally recognized scholars. The first event will include

four speakers and a panel discussion on *NanoHealth: Nanoscience and Nanotechnology in Clinical and Translational Medicine*. The keynote speaker, Dr. Donn Dennis, MD, will lead off the event and present a talk entitled "Nanomedicine: The Promise and Major Barriers". Details on the Fall Symposium Series are on back of this newsletter. I hope to see you there!



NNI@UI recognizes graduate student Jason Clapper (center) in the Department of Chemical & Biochemical Engineering and his research advisor, Professor Allan Guymon (right) for outstanding research in nanoscience and nanotechnology at the College of Engineering Research Open House Poster Session. As part of this recognition, Vicki H. Grassian presented Jason with a textbook on nanotechnology.

NANOENGINEERING @ IOWA –

College of Engineering faculty leading efforts in nanoscience and nanotechnology

Faculty, staff and student colleagues in the College of Engineering are engaged in a number of exciting research projects. For example, Shaoping Xiao, Mechanical and Industrial Engineering, is using advanced computational tools to better understand carbon nanotubes. Carbon nanotubes have unique properties including high tensile strength and are beginning to be used in far ranging applications, such as fillers for car doors to increase mechanical strength, as well as in biomedical devices. Shaoping, along with Jun Ni, ITS, recently received a \$240,000 NSF grant entitled "A Merging Multi-scale Model for Simulation of Crystallization/Solidification of Nanostructured Materials on Large-scale Parallel Computing Systems". Allan Guymon,

Chemical and Biochemical Engineering, is collaborating with Steven Russell and Robert Mullins, Ophthalmology, investigating nanostructured degradable hydrogels for use in ophthalmic stent applications. Professor Guymon will be presenting a talk on his work at the September 27th symposium. Furthermore, at the 2007 Spring College of Engineering research days, Jason Clapper, Ph.D. student with Professor Guymon, was given the award for outstanding research in nanoscience and nanotechnology for his poster entitled "Design of a Nanostructured Biodegradable Device to Promote Targeted Ocular Vascularization". Jennifer Fiegel, with joint appointments in Pharmacy and Engineering, is using nanoscience to focus on the

development of novel drug delivery systems for diseases of the lung, with special emphasis on infectious diseases. Her laboratory designs medical aerosols with an improved ability to target the delivery of therapeutics within the lungs and explores the complex physical interactions between these delivery systems and various cells and fluids native to the lungs. Charles Stanier, Chemical and Biochemical Engineering, has a research goal to support society's efforts to understand and manage potential health effects of air pollution and atmospheric particles by constructing computational source-receptor and exposure models for ultra-fine aerosols that are on the nanoscale. This will be extensively supported by field measurements, and used for

the prediction of human exposures and their changes due to changes in precursor emissions, combustion technologies, and the growth of nanomaterial use. Michelle Scherer, Civil and Environmental Engineering, has several applied projects underway looking at the reduction of environmental contaminants by various forms of ferrous iron that might occur in aquifers, soils, or iron metal reactive barriers. (See the "Faculty Profile" on Michelle for more about her research.) Engineering colleagues have also played an important role in the educational and outreach activities supported by NNI@UI. We thank them for their efforts.

Michelle Scherer, Civil and Environmental Engineering

FACULTY PROFILE



Michelle

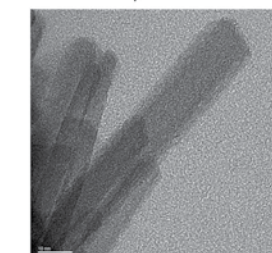
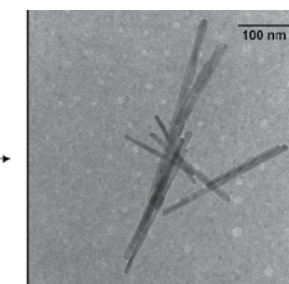
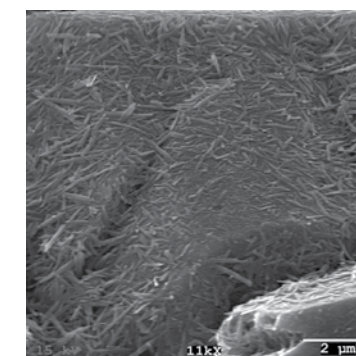
Scherer is leading a group of University of Iowa researchers to understand the formation and behavior of nanoparticles in air, water, and soil. Her group's research is in the general area of Environmental Geochemistry within the Environmental Engineering and Science (EES) Program. Much of her recent work focuses on how very small iron minerals interact with toxic chemicals that have been released into the environment. Michelle is investigating the kinetics of both redox reactions and adsorption/complexation occurring at the surface of the iron oxide nanoparticles using a variety of experimental approaches including Mössbauer spectroscopy, electrochemistry, X-ray diffraction, and electron microscopy.



Michelle Scherer, with daughters Josephine and Kelsey during a recent trip to Tuebingen, Germany where Michelle engaged in interdisciplinary and collaborative work on nanoscale materials in the environment.

An image of a local Iowa soil is shown below (taken by Drew Latta, a Ph.D. student is Michelle's research group). The ochre colored coating is an iron oxide mineral typically found in soils and one we regularly synthesize at various particle sizes in order to investigate size-dependent properties.

For more on Michelle's research, please check out the Scherer Research Group website at <http://www.cee.engineering.uiowa.edu/scherer/>.



Three images of an iron oxide synthesized in Michelle's lab ranging from about 2 micrometers down to about 10 nanometers.



Iron oxide in an Iowa soil.

NEXT NEWSLETTER: Public Health Colleagues look into any occupational health issues associated with nanoscience and nanotechnology.