



JUNIOR SCHOLARS ACADEMY 2009

Nanomedicine: Small Medicine with a Big Impact

INSTRUCTORS:

Drs. Russell Larsen and Nicholas Ndiege

Register today
for the 44th Annual
Midwest Regional
Meeting of the
American Chemical Society



SYMPOSIUM Nanoscience and Nanotechnology: Environmental and Health Aspects

October 23, 2009

Sheraton Hotel & Conference Center
Iowa City, IA

www.mwrm2009.org

FROM THE DIRECTOR

Welcome to the fourth newsletter from the Nanoscience and Nanotechnology Institute at UI (NNI@UI). At the time of our last newsletter we were still displaced from our laboratories and offices in IATL, yet, along with our colleagues, continuing to forge ahead with research and education on the University of Iowa campus.



*Vicki H. Grassian
Director of NNI@UI*

While we were able to reoccupy IATL in the fall of

2008, unfortunately we, like so many others on the UI campus, are still feeling the impact of the flood. But the dedication and hard work of UI students, staff and faculty has been, and continues to be, admirable. All have been faced with new and unique situations, from documenting equipment damages to re-establishing acceptable conditions in laboratories. So many people should be commended for the progress made while handling these many extra responsibilities.

Our work continues, and NNI@UI, in collaboration with the Institute for Clinical and Translational Science (ICTS), hosted a Symposium, "Bridging the River through Nanoscience and Nanotechnology", on February 19, 2009. Dr. Samuel Wickline, Washington University, St.

Louis, was the keynote speaker. Dr. Wickline is a Professor of Medicine, Physics, Biomedical

Engineering & Cell Biology, and Physiology. He is also Director of the Siteman Center for Cancer Nanotechnology Excellence, and founder of the Consortium for Translational Research in Advanced Imaging and Nanomedicine (C-TRAIN). Dr. Wickline's presentation entitled "Targeted Nano-emulsion Theranostics for Cancer and Cardiovascular Disease" was well received as were the other talks in the symposium. Other speakers included Clark Stanford, Centennial Fund Professor of Clinical Research and Sarah Larsen, Professor of Chemistry and Associate Director of NNI@UI. A poster session for students, researchers and faculty was well-attended.

NNI@UI faculty are excited about the new and much-anticipated field emission

transmission electron microscope (FETEM) currently being installed in the Central Microscopy Research Facilities (CMRF) on the UI campus. Installation is expected to be completed by the end of 2009. The Roy J. Carver Charitable Trust Foundation provided \$1,000,000 of funding for the purchase of the FETEM. This microscope will enable researchers to study the properties of materials at the nanoscale in greater detail than currently available. Highly trained personnel in the CMRF will educate and train researchers in its use and benefits.

Other exciting news includes new fellowships, awards and grants awarded this past year. Two postdoctoral research scholars, Drs. Tim Brenza and Caitlin Lemke, in the UI College of Pharmacy, have been awarded fellowships for 2009-2010 by the Pharmaceutical Research and Manufacturers of America

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Foundation (PhRMA). Brenza and Lemke each receive a stipend of \$40,000 a year for two years. NNI@UI Core Faculty members, Aliasger Salem, and Jennifer Fiegel, serve as research mentors for Lemke and Brenza, respectively. Dr. Allan Guymon, NNI@UI Core Faculty Member and Professor in Chemical and Biochemical Engineering, was awarded a \$277,000 grant from the National Science Foundation (NSF) in March, 2009. The grant will be used to further polymer research that has shown promise in medical applications such as the ability to alter tissue growth

and development. In June, 2009, Julie Jessop, University of Iowa College of Engineering Assistant Professor of Chemical and Biochemical Engineering, and NNI@UI Core Faculty member, received a three-year, \$238,000 NSF grant to research new, light-activated materials. Her work is aimed at developing new processes for such things as adhesives and coatings that can be used in dentistry and other fields. In July, 2009, the National Science Foundation awarded Associate Professor of Chemistry, Mark Young, \$629,422 for development of a single particle mass spectrometer for field and laboratory

studies of the environmental impact of atmospheric aerosols and engineered nanoparticles. Co-PI's on the grant are Paul Kleiber, Professor of Physics and Astronomy, and Vicki H. Grassian, Professor, Departments of Chemistry and Chemical and Biochemical Engineering, and Director NNI@UI.

NNI@UI continues to develop educational and outreach activities. The institute's NSF-funded Research Experiences for Undergraduates (REU) in Nanoscience and Nanotechnology was a success for the second year. And, as explained on page three of this

newsletter, Dr. Russell Larsen and Dr. Nicholas Ndiege taught a course for the Belin and Blank International Center for Gifted Education and Talent Development at the UI, titled "Nanomedicine: Small Medicine with a Big Impact". Dr. Larsen also gave a presentation on nanoscience to a group of elementary students at a local summer day camp. His activities were a huge hit; and we're told the camp counselors and parents are now interested in learning more about nanoscience and nanotechnology!

Summer 2009 REU in Nanoscience & Nanotechnology



Summer 2009 REU Participants
May 26 - July 31, 2009

The NSF-funded Research Experience for Undergraduates (REU) in Nanoscience and Nanotechnology at the UI was a huge success again this summer. Fourteen undergraduates were selected from nearly 100 applicants to the program, which pairs students with NNI@UI faculty mentors.

This diverse and energetic group of undergraduate students (pictured on the left) spent 10 weeks on the UI campus working with their faculty mentors, graduate students, and post-doctoral associates, to gain research experience in cutting edge topics related to environmental and health aspects of nanoscience and nanotechnology and to learn about future opportunities for graduate study.

Two UI students participated with partial funding from the Iowa Center for Research by Undergraduates (ICRU) and NNI@UI also teamed up with the SROP/McNair program to pair 2 students with NNI@UI faculty mentors.

Two international students participated in the program and were supported by research grants from faculty. The program culminated with a research symposium in which students presented talks on their research and with the Summer Undergraduate Research Poster Session sponsored by the Graduate College.

The application process for next summer's program will begin early in 2010 and will be posted on the NNI@UI website.

EDUCATION AND OUTREACH

Junior Scholars Academy Nanomedicine: Small Medicine with a Big Impact

This past year, NNI@UI Education & Outreach Coordinator, Dr. Russell Larsen, in partnership with NNI@UI, the Institute for Clinical and Translational Science (ICTS), and the Department of Chemistry, developed a weeklong class for The Connie Belin & Jacqueline N. Blank International Center for Gifted Education and Talent Development at The University of Iowa.

The class, part of the center's "Junior Scholars Academy", was

titled "Nanomedicine: Small Medicine with a Big Impact" and was held June 21-26, 2009. Dr. Russell Larsen and Dr. Nicholas Ndiege, postdoctoral associate with NNI@UI, taught the class of 17 students. The participants were in grades 6 through 8 and members of the Belin-Blank Exceptional Student Talent Search (BESTS) program or past Belin-Blank Center Scholarship Programs.

The goals for the session were to promote research and increase awareness of the benefits of nanoscience in the environmental and health disciplines.

The outreach program taught kids the properties of nanoscience and, through the use of microscopes, demonstrated how a particle that is a billionth of a meter in size can achieve very large benefits in medicinal applications.

Dr. Larsen and Dr. Ndiege say "Their enthusiasm for lab work and nanoscience was inspiring!"



The 44th Annual Midwest Regional Meeting of the American Chemical Society (ACS) will be held

in Iowa City on October 21-24, 2009, at the Sheraton Hotel and Conference Center in Iowa City. The technical program begins Wednesday, October 21, at 1:00 pm.

A symposium entitled Nanoscience and Nanotechnology: Environmental and Health Impacts will be held all day on Friday, October 23rd.

To register please go to the website at www.mwrm2009.org.

FACULTY PROFILE

Aliasger K. Salem, Associate Professor,
Division of Pharmaceutics
College of Pharmacy, University of Iowa



Advances in nanoscience and nanotechnology continue to help scientists make breakthroughs in researching solutions to prevent health risks and offer viable treatments. New diagnostic and treatment methods are providing exciting and innovative developments for the medical and pharmaceutical communities.

Dr. Aliasger Salem, Associate Professor, has been with the University of Iowa College of Pharmacy since 2004. During this time, he has been engaged

in the development of innovative and potent vaccines for immune based treatment of a range of cancers, including prostate cancer, lymphoma, neuroblastoma and melanoma. One primary focus of Dr. Aliasger Salem's research group is to integrate materials based strategies to significantly improve the efficacy of these vaccines.

More about Aliasger Salem's research may be found at his website: <http://www.pharmacy.uiowa.edu/pharmaceutics/people/Salem.htm>.