



American Institute of Chemical Engineers

3rd Quarter 2007

## NSEF's 1st Distinguished Web Lecture Series

In NSEF's 1st Distinguished Web Lecture Series, Dr. Kristen Kulinowski of Rice University will lead the lecture and discussion on *"Environment, Health and Safety Aspects of Nanomaterials: From Research to Policy."* The Webinar will be held on Friday, October 19, 2007 from 12pm to 1:30pm EDT. Dr. Kristen M. Kulinowski is Faculty Fellow in the Department of Chemistry at Rice University and Executive Director for Policy for the Center for Biological and Environmental Nanotechnology (CBEN). She currently serves as the Director of the International Council on Nanotechnology (ICON), an international, multi-stakeholder organization whose mission is to develop and communicate information regarding potential environmental and health risks of nanotechnology thereby fostering risk reduction while maximizing societal benefit.

To attend, please make a reservation by emailing us at [nano@aiiche.org](mailto:nano@aiiche.org). Then, on the 19th, simply visit <http://aiiche.webex.com> a few minutes before noon. The web page will display the conference. You can then click through and login (no password needed). You will finally arrive directly at the meeting space where you will be provided with a toll-free phone number to dial into the meeting.

## AIChE's Annual Meeting is Rapidly Approaching. Plan Your Trip Now

NSEF is sponsoring or co-sponsoring over 50 sessions dedicated to nanoscale science and engineering. Special events include:

- **NSEF Awards Lectures** on Wednesday, November 7, from 8:30 – 11:00 am in the Downtown Marriott, Room M, Salon D. Professor Peter Cumming of Vanderbilt University will receive the Forum Award and give his lecture on "Computational and Theoretical Nanoscience – Emerging Tools for Nanoscience and Nanotechnology." Professor Joerg Lahann of the University of Michigan will receive the Young Investigator Award and speak about "Enabling Novel Technologies through Nano- and Meso-Scale Designed Materials."
- **NSEF Poster Session** on Tuesday, November 6 from 4:30pm – 6:30 pm in the Salt Palace Convention Center, Exhibit Hall B. <http://aiiche.confex.com/aiiche/2007/techprogram/S4389.HTM>
- **NSEF Luncheon & Planning Meeting**. Don't forget to get your ticket to attend the NSEF Luncheon and planning meeting on Wednesday, November 7 at 11:00 am in the Marriott Solitude. NSEF will review Forum business and achievements for 2007, discuss programming and plans for 2008, and present awards for the top three posters presented at the NSEF Poster Session. Tickets are \$10 and can be purchased at registration or [here](#).

A complete listing of NSEF's programs can be accessed at <http://www.aiiche.org/NANO/Events/AIChENationalMeeting.aspx>. In addition, you can print out a copy of all the nano programming (pdf). [Register](#) for the AIChE meeting now.

## AIChE Co-Locates its Spring 2008 Meeting in New Orleans with ACS

AIChE and ACS are pleased to announce that the Spring 2008 meetings will be collocated in New Orleans. Registered attendees of either society may attend technical sessions at both of the AIChE and ACS Meetings.

The organizing committees from AIChE and ACS have developed the following cosponsored sessions in nanotechnology:

### Directed Assemblies Using Surface Templates

Assembly of specific and ordered structures using directed assembly templates, e.g., nanoparticles, nanotube networks, block copolymers, micellar media, and DNA; Overview of common threads between chemistry and chemical engineering in directed assemblies with surface templates

### Functional Nano-Materials from New Polymer Synthetic Methodologies

Functionality and applications of synthetic nanomaterials

- Hybrid Nanotechnologies for Enhanced CO<sub>2</sub> Fixation.
- CO<sub>2</sub> utilization in the synthesis of methanol and fuels
- Gas to liquids (GTL) technologies
- CO<sub>2</sub> and methane co-processing
- CO<sub>2</sub> recovery from flue gases
- CO<sub>2</sub> fixation into organic molecular compounds (e.g., carboxylation reactions), polymers, inorganic compounds and hybrid materials
- CO<sub>2</sub> photoreduction to C<sub>1</sub> – C<sub>n</sub> molecules
- Technological applications of CO<sub>2</sub> as a fluid (e.g., dry washing, air conditioning, extraction processes)

### Nanostructured Materials

- Nanostructural fabrication
- Nanofunctional materials and synthesis

- Novel physical and chemical property characterizations of nanostructured materials
- Nanoscale device fabrication and testing

#### Understanding and Controlling Bacterial Adhesion at Molecular to Macro-Scales

- Interactions governing bacterial adhesion to surfaces
- Fundamental understanding of bacterial adhesion at the molecular-scale
- Fate and transport of bacteria in aquatic environments
- Novel experimental methods for understanding mechanisms of bacterial adhesion and transport
- Modeling bacterial adhesion and transport
- Effect of environmental, biological, physical, and chemical factors on bacterial adhesion and transport
- Bacterial biofilms.

Cosponsored sessions will appear in both the AIChE and ACS program books and should be well attended.

AIChE members who register for the Spring National Meeting can elect to pay an additional \$250 and receive a **full registration** to the 2008 Annual "Centennial" Meeting in Philadelphia on November 16-21, 2008. When registration opens in late December just opt for the "combo" registration package.

Please take a look at this exciting program and consider submitting a paper to one of the cosponsored symposia. Abstracts must be submitted by Sunday, October 28, 2007. Submit an abstract at <http://aiche.confex.com/aiche/s08/jointcfp.htm>.

## European Commission Funds One-Third of Publicly Supported Nanotechnology Research in the World

The European Commission has allocated €1.4 billion to 550 nanotechnology projects. Thus the 6th Research Framework Programme accounts for one-third of total public funding for nanotechnology making it the world's largest single funding agency worldwide. The program targets both fundamental and industrial research, as well as human resources, nanotechnology-specific infrastructures, safety and communication. However, the U.S. still surpasses the EU in private investment in nanotechnology. Learn more at [http://ec.europa.eu/nanotechnology/index\\_en.html](http://ec.europa.eu/nanotechnology/index_en.html).

## Nanotech News

- Nanocomposites composed of carbon nanotubes, cellulose, and ionic liquids have been used to create a thin, lightweight, flexible energy-storage device. It functions as both a lithium ion battery and supercapacitor. The sheets can be rolled, twisted, folded or cut without loss of efficiency and have a wide operating range. <http://www.pnas.org/cgi/content/abstract/104/34/13574>
- Researchers have shown that soot yields a water-soluble fluorescent nanoparticle. The soot yields a broad range of photoluminescent colors between 415 – 615 nm. These nanoparticles have potential applications as inexpensive biosensors. <http://www3.interscience.wiley.com/cgi-bin/abstract/114295080/ABSTRACT>
- The National Renewable Energy Laboratory collaborated with Innovalight to demonstrate that indirect band gap silicon nanoparticles generate multiple excitons. The discovery has important implications in solar cell applications since a single photon can generate multiple electrons for harvesting energy. Increased production of excitons improves the maximum theoretical efficiency from 33 to 44%. <http://pubs.acs.org/cgi-bin/abstract.cgi/nalefd/2007/7/i08/abs/nl071486l.html>
- Nanoparticles have long been anticipated as vehicles for the delivery of drugs. Recently, 2 nm gold nanoparticles were covalently functionalized with the cancer drug paclitaxel. Each nanoparticle has approximately 70 drug molecules attached, accounting for 67% of the weight of the particle. <http://pubs.acs.org/cgi-bin/abstract.cgi/jacsat/2007/129/i37/abs/ja075181k.html>
- Nanostructured alumina membranes emulate human kidneys better than current technology. The regular pore pattern maintains more consistent blood flow through the dialyzer and higher flow rates than standard technology. The membranes are also more resistant to the heat needed for sterilization. <http://asmedl.aip.org/dbt/dbt.jsp?KEY=JMD0A4&Volume=1&Issue=1>
- Public awareness of nanotechnology remains low. Despite the significant increase in nanotechnology consumer products, only 6% of Americans said they have 'heard a lot' about nanotechnology. Americans also continue to prefer that government oversee risk management rather than industry. <http://www.nanotechproject.org/138/9252007-poll-reveals-public-awareness-of-nanotech-stuck-at-low-level>

## Society News

NSEF is pleased to announce that it has established a system for **posting available jobs** on its website. To start your job search, go to <http://www.aiche.org/nano/careers/findjobs.aspx>. New jobs will be posted monthly. If you would like to post a job, send us the information at [nano@aiche.org](mailto:nano@aiche.org). The NSEF represents a wonderful pool of qualified engineers from which companies and universities can draw upon to fill their needs.

NSEF has recently started up a new feature of its website, **the NSEF Forum**, that will enable members to hold discussions and post important information for members on the website. To visit the Forum, go to <http://www.aiche.org/NANO/Forum/index.aspx>.

**RSS Feeds** is another new feature. These feeds contain summary content from an associated site and enable you to keep up with technical and industrial news in the world of nanotechnology. Articles are provided by Small Times and AZoNano.com. You can view at <http://www.aiche.org/NANO/rss.aspx>. If you have any more that you would like to add, please email us at [nano@aiche.org](mailto:nano@aiche.org).

## 4th International Conference on Bioengineering and Nanotechnology

NSEF will also be co-sponsoring SBE's **4th International Conference on Bioengineering and Nanotechnology**. Nicholas Abbott of the University of Wisconsin, Madison, and chair of NSEF along with Gil Lee of Purdue University, past chair of ICBN and of NSEF, will be co-chairing this conference. Mark your calendar to attend this wonderful program on July 22-24, 2008, at the University College Dublin, Ireland. Focal points for the conference are:

- **Nanosystems for Drug Delivery** (including gene delivery, nanopharma, siRNA, nanoparticle delivery, supramolecular and polymeric delivery systems)
- **Nanomaterials for Cellular Engineering** (including tissue engineering, biomaterials, implants, nanofabricated and nanopatterned surfaces, three-dimensional nanomaterials)
- **Nanotools for Bioengineering** (including molecular and nanoscopic tools for characterizing and engineering the intracellular environment, quantum dot technologies, labeling technologies, intracellular rheology, optical traps, single molecule force measurements).

## Comments and Feedback

Please let us know what you think of NSEF and its newsletter, or provide us with your suggestions by emailing: [nano@aiche.org](mailto:nano@aiche.org). Visit our website: <http://www.aiche.org/DivisionsForums/ViewAll/NSEF.aspx>

## Gold Level Sponsors

**Hielscher USA, Inc.: Ultrasonic Dispersing, Deagglomeration and Milling Equipment** Nanomaterials are currently on the way from lab to production. Very small powders and particles are available for materials, such as metal oxides, nanotubes or nanoclays. Often these materials need to be mixed into liquid formulations. This is where agglomeration and aggregation blocks surface area from contact with other matter. In particular very fine powders and carbon nanotubes are very cohesive and hard to disperse. As surface activity is a key aspect of nanomaterials, only well dispersed or single-dispersed particles allow utilization of the full potential of the nanomaterials. In result good dispersing reduces the quantity of nanomaterials needed to achieve the same effects. Conventional processing devices, e.g. high-shear or rotor-stator mixers, high-pressure homogenizers or colloid and disk mills fall short in separating the nanoparticles into discrete particles.

Ultrasonic cavitation is very effective in breaking agglomerates, aggregates and even primaries. When ultrasound is being used for the milling of high concentration batches, the liquid jets streams resulting from ultrasonic cavitation make the particles collide with each other at velocities of up to 1000km/h. This breaks van der Waals forces in agglomerates and even primary particles (milling).

Hielscher manufactures ultrasonic devices for the efficient dispersing, deagglomeration and milling of nanomaterials in lab, bench-top and production level. With devices from 50 to 16,000 watts you can select the appropriate device for quantities from 1mL to several tons/hour. There is more information available at: <http://hielscher.com/ultrasonics/nano.htm>



The advertisement banner for Nanophase Technologies features a top row of six images representing different industries: COSMETICS (a woman's face), COATINGS (a red car), ANTI-MICROBIAL (a hand being washed), ELECTRONICS (a circuit board), POLISHING (a car wheel), and PERSONAL CARE (a person wearing a hat). Below the images, the text reads: "Driving Product Innovation. TODAY. TO DELIVER REAL INNOVATION, YOU NEED REAL TECHNOLOGY." It then asks, "How do you reduce the time it takes to bring a real innovation to market?" and provides the answer: "Ask the leader in nanomaterials technology. At Nanophase, our integrated family of complementary nanomaterial solutions can help you accelerate every step of your product development cycle— with proven, commercially-scaled technology." The bottom section states, "Partnering with Nanophase Technologies means innovation in delivering real nanomaterial solutions that speed real products to market." The Nanophase logo is on the right, and the contact information "1319 MARQUETTE DRIVE | ROMEOVILLE, IL 60446 | 630.771.6700 | www.nanophase.com" is at the bottom.

## Silver Level Sponsors



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