

FALL 2014

Message from the Chair

Since 2003, NSEF has provided a key forum within AIChE for members to exchange ideas and expertise in the area of nanoscale science and technology, and I have been honored to serve as chair of the forum for the past two years. As we move into the latter stages of 2014, I will be transitioning to past chair of NSEF. My tenure in office ends December 31st, and I will be succeeded by Jessica Winter. For those who do not know Jessica, I hope you can meet her by joining us at the NSEF Reception & Awards Presentation (Wednesday, November 19, 2014, 7:00 - 9:00 pm, Hilton Atlanta Room 211) during the AIChE National Meeting in Atlanta. She is an incredible person and will do an outstanding job as NSEF chair. In addition to the chair position, a number of other NSEF officer positions are coming to a close. The elections were just completed, and I am happy to announce our new officers for 2015-2016:

Vice chair: Geoffry Bothun

Treasurer/Secretary: Michael Harris

Directors (at-large members): Hebab Quazi and Marc Keleman

In this edition of the newsletter, we highlight all of the events at the upcoming AIChE Annual Meeting in Atlanta. There are numerous scientific sessions and other activities hosted by NSEF as detailed below. We hope to see most of you there. Lastly, I want to personally thank the current officers that are about to step down for their exceptional service to NSEF. Kurt Rindfusz has done an outstanding job of leading our forum over the last six years as vice chair, chair, and most recently past chair. Virginia Davis has also done an outstanding job serving as the NSEF Secretary-Treasurer for the last few years. In addition, Hebab Quazi and Thomas Mensah have played key roles in the NSEF executive committee as Directors (at-large members) for the last few years. Thanks to all of them for their service to NSEF.

News and Announcements

NSEF Programming for 2014 AIChE Annual Meeting:

NSEF is pleased to announce many exciting scientific sessions at the 2014 Annual Meeting in Atlanta, Georgia from November 16 - 21, 2014. Highlights of the programming activities are included below.

2014 NSEF Award Winners:

NSEF is honored to present **Lynden A. Archer** with the 2014 NSEF Forum Award for pioneering and sustained research on nanoparticle-polymer hybrid materials and their applications in electrochemical energy storage technologies and **Ali Khademhosseini** with the 2014 NSEF Young Investigator Award for significant advances in nanoscale engineering for regenerative medicine. The award winners will be highlighted in the NSEF Plenary Session at the AIChE Annual Meeting: Session #76 Plenary Session: Chemical Engineering Principles for Nanotechnology, 8:30 AM-11:00 AM, Marriott: International 6 (Marriott Marquis Atlanta). Their short bios are included below:

Lynden Archer is the William C. Hooey Director and Professor of Chemical and Biomolecular Engineering and co-Director of the KAUST-Cornell Center for Energy and Sustainability. His research focuses on transport properties of polymers and



polymer/particle hybrids and their applications for electrochemical energy storage. Professor Archer is a fellow of the American Physical Society and the recipient of the 2013 National Science Foundation, Division of Materials Research, Award for Special Creativity. Archer received his Ph.D. in chemical engineering from Stanford University in 1993 and the bachelor of science degree in chemical engineering (polymer science) from the University of Southern California in 1989. He has been recognized with various awards, including the National Science Foundation Award for Special Creativity, the James & Mary Tien Excellence in Teaching Award, and the American Institute of Chemical Engineer's MAC Centennial Engineer and the 2014 Nanoscale Science and Engineering Forum award. Read more at:

<https://archergroup.cbe.cornell.edu/>

Ali Khademhosseini is Professor of Medicine at Harvard Medical School and Director of the Biomaterials Innovation Research Center at Brigham and Women's Hospital. He is also a faculty at the Harvard-MIT Division of Health Sciences and Technology as well as an Associate Faculty at the Wyss Institute for Biologically Inspired Engineering and a Junior PI at Japan's World Premier International-Advanced Institute for Materials Research at Tohoku University where he directs a satellite laboratory. He is recognized as a leader in combining micro- and nano-engineering approaches with advanced biomaterials for regenerative medicine applications. In particular, his laboratory has pioneered numerous microfabrication technologies for controlling the architecture and function of engineered vascularized tissues. He has authored over 350 journal papers (H-index = 65, >15500 citations) and 50 books/chapters. In addition, he has delivered 250+ invited/keynote lectures. Dr. Khademhosseini's interdisciplinary research has been recognized by over 30 major national and international awards. He is a recipient of the Presidential Early Career Award for Scientists and Engineers, the highest honor given by the US government for early career investigators. He is also a fellow of the American Institute of Medical and Biological Engineering (AIMBE) and the American Association for the Advancement of Science (AAAS). Currently he serves on the editorial board of numerous leading journals as well as an Associate Editor for ACS Nano (IF: 12) and a permanent member of NIH BTSS study section. He received his Ph.D. in bioengineering from MIT (2005), and MAsC (2001) and BAsC (1999) degrees from University of Toronto both in chemical engineering. Read more at: <http://www.tissueeng.net/>



2014 AIChE Annual Meeting Graduate Student Award Sessions:

NSEF is sponsoring two award sessions at the 2014 AIChE Annual Meeting in the areas of Bionanotechnology and Carbon Nanomaterials. These sessions honor graduate students whose research achievements are in these areas and who demonstrate a high level of excellence in their work. At the end of each session, a panel of judges will determine 1st - 3rd place awards. The two sessions will be held at the following times and locations:

- Bionanotechnology: Tuesday, November 18th, 8:30 - 11:00am,
- Carbon Nanomaterials: Tuesday, November 18th, 12:30 - 3:00pm,

2014 AIChE Annual Meeting Poster Session:

Also, the NSEF poster session will be Tuesday evening from 6:00 – 8:00 pm. Numerous high quality posters addressing fundamental science and engineering issues associated with nanoscale science, engineering and technology will be presented. The poster session will be judged, and student awards will be given to the best three posters.

Summary of Programming Activities

Sunday, November 16th:

3:30pm - 6:00pm:

#14, Inhomogeneous Polymers

#22, Nanofabrication and Nanoscale Processing

#25, Nanostructured Scaffolds for Tissue Engineering

Monday, November 17th:

8:30am - 11:00am:

#76, Plenary Session: Chemical Engineering Principles for Nanotechnology
12:30pm - 3:00pm:
#107, Area Plenary: Bionanotechnology
#133, Graphene and Carbon Nanotubes: Characterization, Functionalization, and Dispersion
3:15pm - 5:45pm:
#167, Area Plenary: Bionanotechnology
#189, Graphene and Carbon Nanotubes: Absorption and Transport Processes

Tuesday, November 18th:

8:30am - 11:00am:
#241, Bionanotechnology Graduate Student Award Session
#268, Micro and Nanofabricated Sensors
#273, Nanostructured Particles for Catalysis I
#290, Synthesis of Graphene and Carbon Nanotubes: Kinetics, Mechanisms and Reactor Design
12:30pm - 3:00pm:
#309, Carbon Nanomaterials Graduate Student Award Session
#328, Graphene and Carbon Nanotubes: Separations, Materials, and Applications I
#341, Nanostructured Particles for Catalysis II
3:15pm - 5:45pm:
#383, Graphene and Carbon Nanotubes: Separations, Materials, and Applications II
#391, Nanomaterials and Nanotechnology Sustainability
#404, Self and Directed Assembly at the Nanoscale
6:00pm - 8:00pm:
#420, Poster Session: Nanoscale Science and Engineering

Wednesday, November 19th:

8:30am - 11:00am:
#449, Magnetic Nanoparticles in Biotechnology and Medicine I
#455, Nanoscale Materials As Catalysts I
#457, Nanowires: Synthesis and Modeling
12:30pm - 3:00pm:
#503, Magnetic Nanoparticles in Biotechnology and Medicine II
#513, Nanomaterials Manufacturing
3:15pm - 5:45pm:
#582, Nanoscale Science and Engineering in Biomolecular Catalysis
#583, Nanowires: Processing and Applications
7:00pm - 9:00pm:
NSEF Reception & Awards Presentation, Hilton Atlanta Room 211

Thursday, November 20th:

8:30am - 11:00am:
#618, Bionanotechnology for Gene and Drug Delivery I
#646, Nanostructured Biomimetic and Biohybrid Materials and Devices
12:30pm - 3:00pm:
#674, Bionanotechnology for Gene and Drug Delivery II
#703, Self-Assembled Biomaterials
3:15pm - 5:45pm:
#732, Nanoscale Structure in Polymers
#733, Nanotechnology and Nanobiotechnology for Sensors and Imaging
#734, Nanotechnology for Biotechnology and Pharmaceuticals

Member Awards & Highlights

We plan to highlight member research highlights in future newsletters. If you have a recent high impact publication, honor, or award that you would like to have highlighted in the NSEF Newsletter please submit these to the Newsletter Editor at smeenach@uri.edu.

Nanotechnology News

Researchers wrap qubits in silicon

Researchers at Australia's University of New South Wales have come up with a method of improving qubit accuracy and performance by wrapping them in a silicon shell. "This has shown that quantum bits in silicon are a truly viable option for quantum computers," said Andrea Morello of UNSW. "What's exceptional is how the perception of what we are doing has changed over the years. Ten years ago, the things we are doing now were really seen as borderline science fiction." [Computerworld](#) (10/23)

Researchers develop 2D material that generates power

Researchers at Columbia University and the Georgia Institute of Technology have come up with a two-dimensional material made from molybdenum disulfide that can be configured to produce electrical power from motion. "This material -- just a single layer of atoms -- could be made as a wearable device, perhaps integrated into clothing, to convert energy from your body movement to electricity and power wearable sensors or medical devices, or perhaps supply enough energy to charge your cellphone in your pocket," said James Hone, co-leader of the research team, in a statement. [GigaOm](#) (10/15)

Researchers boost output of organic solar cells by 32% with "nanograss"

Researchers at three universities collaborated on the development of vertical nanopillars, a dense nanostructure that they dubbed "nanograss," to improve the energy-conversion efficiency of organic solar cells. With the "nanograss," the research team was able to increase the cells' efficiency to 2.9% from 2.2%, they report. [Gizmag](#) (10/13)

Researchers develop self-assembling nanoparticles using DNA

Researchers at the University of Munster in Germany have come up with a method of making gold nanoparticles through self-assembly with DNA molds. The technique resorts to DNA origami, getting the DNA to fold into a specific pattern. [Chemistry World magazine online](#) (10/9)

Upcoming Events

The **2015 Spring AIChE Meeting and 11th Global Congress on Process Safety** is quickly approaching. This event will be held from April 26 - 30, 2015 in Austin, Texas. Abstracts are due November 24, 2014.

<http://www.aiche.org/conferences/aiche-spring-meeting-and-global-congress-on-process-safety/2015>

Membership Column

Not a member of AIChE or NSEF? In order to guarantee that you are included in our current email list so that you will have updated access to NSEF materials and award eligibility make sure you are a current NSEF and AIChE member. NSEF membership is an additional \$10/year to the AIChE membership. You can follow the steps of one of the following options below to join:

1. Visit AIChE's membership website to sign up online: <http://www.aiche.org/membership>
2. Download the following file from the AIChE website: Membership Application PDF and send your application and payment directly to AIChE.

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