What's happening in the CSN?

August 5, 2016

Volume 1, Issue 11

Sustainable Nano reader question

Please contact Miriam (krau0067@umn.edu) if you can provide answers to the following questions recently submitted by a Sustainable Nano reader: "What happens if we make Cu and Ag nanoparticles separately and then allow them to mix in any liquid? Are all the properties exhibited by this resultant nanofluid? Will this nanofluid possess more stability than sliver nanofluids? Will there be any enhancement in the heat transfer (industrial application)?" (Answers can be in the form of a brief email or a full blog post!)

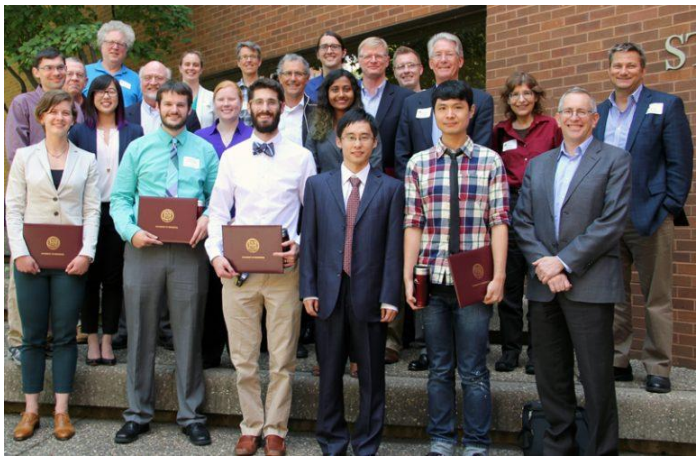
Celebrations

Good news!

Congratulations to **Julianne Troiano** (**Geiger** group), who successfully defended her thesis, titled "Surface Specific Investigation of the Nano-Bio Interface by Second Harmonic Generation Spectroscopy," on July 27th! Juli accepted a postdoc at MIT, which she will be starting this fall.

Milestones and awards

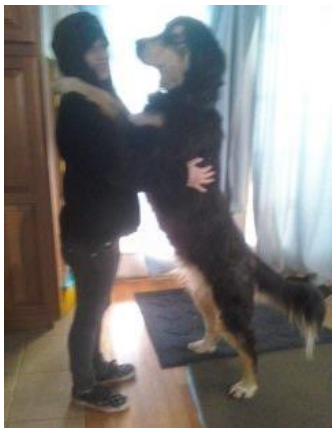
Congratulations to **Sunipa Pramanik** (**Haynes** group), who won honorable mention at the Graduate Student Research Symposium held by the University of Minnesota Department of Chemistry! Graduate Students presented 20-minute talks about their research to an audience of peers, faculty, alumni, and guests. Panels of judges including faculty and distinguished guests granted one first place and one honorable mention for each of the four presentation tracks.



Bob Hamers will be among the 57 American Chemical Society members honored as 2016 ACS Fellows. According to the announcement in *C&E News*, "The fellows program began in 2009 as a way to recognize and honor ACS members for outstanding achievements in and contributions to science, the profession, and ACS." Congratulations Bob!

Meet the Students/Postdocs

Liz Laudadio (**Hamers** group). I am a first-year graduate student in the Hamers group at UW-Madison. I'm currently working on optimizing in-situ Attenuated Total Reflection FT-IR monitoring of supported lipid bilayer formation and interaction with nanomaterials, and I am also working on getting our Flame Spray Pyrolysis system up and running! I grew up about an hour outside of New York City in Fairfield, Connecticut. My interest in science was sparked by a forensic science course during my junior year of high school, and continued to grow through senior year AP chemistry. I started at Mount Holyoke College in 2011, and got involved in chemistry research during my first summer, in the same lab as Mimi Hang! Over the next few years, I remember seeing Mimi share Sustainable Nano blog posts on Facebook, and thinking that the CSN was so cool. Needless to say, it is only sort-of a coincidence that I ended up here!



(Left) Liz dancing with a tall gentleman circa 2009.
(Right) Liz sizing up a Christmas tree circa 2014.

My immensely positive time at Mount Holyoke has inspired me to eventually teach at a primarily undergraduate institution. Impactful mentorship has been such an important facet of my education; I've experienced first-hand the invaluable effect that mentors can have on a student's career. I hope to have the same positive influence on students that my own mentors have had on me, and to play a positive role in the lives of undergraduate learners in the future. Outside of research, I also enjoy long car rides, hanging out with my cat, partaking in light outdoor activities, and comparing my height with various things.

The picture is me after a choral concert of VocalPoint, a local choir that raises money for charities.

Tian (Autumn) Qiu (**Haynes** group). I was born and grew up on an island called Zhoushan, located on the Eastern China Sea. Before the trans-oceanic bridges were built, it took about 40 minutes for the ferry to bring us to the mainland. My hometown, which consists of thousands of islands, is a famous destination for tourists because of the national scenic areas and one of the four sacred mountains in Chinese Buddhism, so don't miss it if you are visiting the southeastern coast of China!

My interest in science originated from my strong motivation to understand how and why the world runs like it does, and later it developed into a wish to contribute to a better world. After 18 years on the beautiful island I headed north to Beijing for my undergraduate study at Peking University to pursue a degree in chemistry. During my time as an undergraduate, I worked on protein purification and microfluidics in two different labs. After that, I joined the Chemistry program at University of Minnesota – Twin Cities, where I have been working with Prof. Christy Haynes and the CSN.

I'm currently a fourth-year graduate student in the Haynes lab, working on probing the mechanisms of bacterial-nanoparticle interaction using *Shewanella oneidensis* MR-1 as a model organism.

Outside the lab, I spend time in music and reading. I enjoy almost all kinds of music. As a chorus lover I have served or am serving with several local choirs and an a cappella group. I play the Erhu and am also learning violin. Sci-fi and mystery usually get my pick when it comes to reading or watching a movie. The Haynes lab holds movie night every two weeks and it has been great to watch sci-fi movies with friends in the lab! I also like staying home with my cat, who is a beautiful tuxedo. Entering my fifth year, I'm planning to look for a postdoc position in a nano/bio-related, but also brand new field.

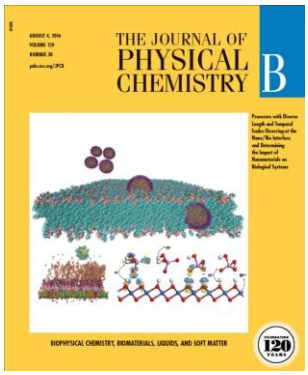
Susan Pham (right) spent the summer as an REU student working in **Christy Haynes'** lab this summer, where she synthesized carbon dots and characterized their toxicity. She's a triple major in Chemistry, biochemistry, and mathematics at Oklahoma State University, and likes hiking and looking at dinosaurs (going to dinosaur museums).

Hello! My name is **Nicole Moehring** (**Murphy** group, left). I grew up in Madison, Wisconsin and am currently a junior at the University of Wisconsin – Stout. I am majoring in Applied Science with a concentration in Material Physics and Nanoscience and minoring in Business (and potentially Math). For the past two years, I have worked in the lab of Dr. Kirk, exploring self-assembled monolayers and using SERS to detect molecules attached to gold nanoparticles within a gold/silica matrix. I am currently working in the CSN as an REU student in Dr. Murphy's lab at UIUC, under the guidance of **Cassie Zhang**, synthesizing a heck of a lot of gold nanoparticles and assisting her in her research project on lipid and gold nanoparticle interactions. Outside of the lab, I love traveling, visiting museums, playing volleyball, cooking, and eating food. I hope to someday make it to Australia where I can fulfill my lifelong dream of holding a koala, even though I've been told koalas are not very nice.

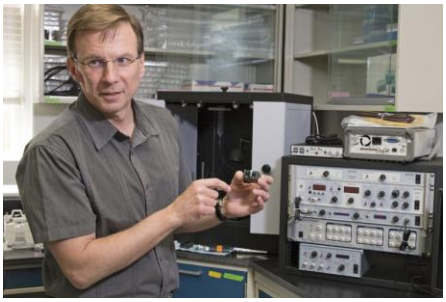
[***CSN note: Don't be alarmed, but I think that dinosaur moved***.]

CSN Productivity

Congratulations to **Cathy Murphy**, **Sam Lohse**, and **Jonathan Eller** for receiving the CSN's first patent! The patent describes a "*Continuous Flow Reactor and Method for Nanoparticle Synthesis,*" and was issued on June 28. You can read more about the benchtop reactor in Sam's blog post, "Designing a Simple, Easy-to-Build Reactor for Making Nanoparticles."



A CSN paper written by CSN faculty (and an international collaborator) has been published in *The Journal of Physical Chemistry B*. The review discusses opportunities for applying computational and theoretical approaches to understand the nano-bio interface, and was featured on the cover! **Q. Cui, R. Hernandez, S.E. Mason, T. Frauenheim, J.A. Pedersen and F. Geiger (2016). "**Sustainable Nanotechnology: Opportunities and Challenges for Theoretical/Computational Studies." *The Journal of Physical Chemistry B*. 10.1021/acs.jpcb.6b03976



Joel Pedersen was recently featured in *Grow*, a magazine published by the UW-Madison College of Agricultural and Life Sciences. The article, titled "Safer Nanotech: A CALS researcher is investigating the biological impacts of nanomaterials," highlights the goals of the CSN and work being done in the Pedersen lab to understand how nanomaterials interact with model membranes. Photo Credit: Sevie Kenyon.

Mike Curry hosted four teachers from the Research Experience for Teachers (RET) program this summer, and they developed a really cool video on Sustainable Electronics, which features Mike and CSN student **Donald White**. Check out the video on YouTube!

The **Haynes** lab (and friends!) did their 11th annual chemistry outreach event at a community center in St. Paul. **Natalie Hudson-Smith** coordinated the entire event and it took 30 volunteers to do all the demonstrations and hand-on activities, including **Autumn Qiu, Sunipa Pramanik, Peter Clement, Bo Zhi, Nathan Klein, Stephanie Mitchell, Josh Kuether, Rodrigo Tapia Hernandez, Christy Haynes, Erin Carlson**, and **Vivian Feng**.

Looking Ahead

Several CSN students and faculty will be presenting at national meetings in August.

252nd ACS National Meeting in Philadelphia

Quite a few CSN students and faculty are presenting at the ACS meeting (and many more are attending), so here's a detailed schedule and locations so we can make our presence known!

Langmuir Lecturer Award Presentation (honoring our esteemed Director!)

Tuesday, Aug 23

Diamond at the extremes

Robert Hamers

2:00pm - 2:50pm Room 121A - Pennsylvania Convention Center

Sun, Aug 21

24 - Lipopolysaccharide density and structure governs the interaction between the bacterial outer membrane and engineered nanoparticles

Christy Haynes

9:30am - 10:05am Room 104B - Pennsylvania Convention Center

153 - Ab initio approach for the study of incongruent NMC metal dissolution in aqueous environment

Chi-Ta Yang, Xu Huang, Mimi Hang, Robert Hamers, Sara Mason

6:00pm - 8:00pm Halls A/B - Pennsylvania Convention Center

264 - Synthesis and environmental studies of ZnSe/ZnS quantum dots

Denise Williams, Sunipa Pramanik, Christy Haynes, Nicholas Niemuth, Jared Bozich, Rebecca Klaper, Zeev Rosenzweig

6:00pm - 8:00pm Halls A/B - Pennsylvania Convention Center

Mon, Aug 22

297 - NMR-based characterization of nanoparticle-polymer interactions

Robert Hamers, Yongqian Zhang, Charles Fry, Thomas Kuech, Joel Pedersen

9:25am - 9:45am c Room 122B - Pennsylvania Convention Center

211 - Insights into nanoparticle interaction with cell surfaces from model systems

Joel Pedersen

2:00pm - 2:30pm Washington A - Loews Philadelphia Hotel

255 - Influence of chemical composition on the photodegradation and photostability of carbon dots: A sustainable fluorescent nanoparticle

Miranda Gallagher, Bo Zhi, Benjamin Frank, Joseph Da, Taeyjuana Curry, Christy Haynes, Howard Fairbrother

3:50pm - 4:15pm Congress B - Loews Philadelphia Hotel

121 - New models to study nanoparticle interaction with biological membranes

Joel Pedersen

4:20pm - 4:45pm Commonwealth Hall A2 - Loews Philadelphia Hotel

SciMix - Synthesis and environmental studies of ZnSe/ZnS quantum dots
Denise Williams, Sunipa Pramanik, Christy Haynes, Nicholas Niemuth, Jared Bozich, Rebecca Klaper, Zeev Rosenzweig
8:00pm - 10:00pm Halls D/E - Pennsylvania Convention Center

Tue, Aug 23

394 - Role of local charge density in polycation-wrapped nanoparticle interactions with model cell membranes
38 - Influence of pH and natural chelating agents on the transformation of nanoscale lithium nickel manganese cobalt oxide
Debra Garvey, Joel Pedersen, Mimi Hang, Robert Hamers
8:05am - 8:45am Grand Ballroom Salon A - Philadelphia Marriott Downtown

Julianne Troiano, Laura Olenick, Alicia McGeachy, Thomas Kuech, Ariane Vartanian, Catherine Murphy, Qiang Cui, Joel Pedersen, Franz Geiger
8:50am - 9:10am Room 122A - Pennsylvania Convention Center

413 - Fluorescence lifetime spectroscopy studies to monitor the stability of luminescent semiconductor quantum dots-containing polymer films used in consumer electronics
Taeyjuana Curry, Richard Brown, Denise Williams, Zeev Rosenzweig
10:50am - 11:10am Room 123 - Pennsylvania Convention Center

Wed, Aug 24

453 - Second harmonic generation spectroscopy for probing oxidized multiwalled carbon nanotubes at supported lipid bilayers
Alicia McGeachy, Laura Olenick, Julianne Troiano, Ronald Lankone, Eric Melby, Thomas Kuech, Eseohi Ehimaghe, Joel Pedersen, Howard Fairbrother, Franz Geiger
8:50am - 9:10am Room 122A - Pennsylvania Convention Center

456 - Influence of peripheral membrane proteins on nanoparticle interaction with model cell membranes
Joel Pedersen, Eric Melby, Thomas Kuech, Arielle Mensch, Marco Torelli, Ariane Vartanian, Catherine Murphy, Robert Hamers
10:05am - 10:25am Room 122A - Pennsylvania Convention Center

457 - Supported lipid bilayers containing lipids with varying transition temperatures studied by vibrational sum frequency generation spectroscopy
Laura Olenick, Alicia McGeachy, Merve Dogangun, Julianne Troiano, Eric Melby, Joel Pedersen, Franz Geiger
10:25am - 10:45am Room 122A - Pennsylvania Convention Center

523 - Single cell analysis uncovers unique cellular responses to distinct nanoparticle properties (Non-CSN talk)
Galya Orr, Hugh Mitchell, Meng Markillie, William Chrisler, Dehong Hu, Craig Szymanski, Yumei Xie, Alejandro Heredia-Langner
3:35pm - 3:55pm Room 122A - Pennsylvania Convention Center

526 - Alteration of membrane compositional asymmetry by LiCoO2 nanosheets
Merve Dogangun, Mimi Hang, Julianne Troiano, Alicia McGeachy, Eric Melby, Joel Pedersen, Robert Hamers, Franz Geiger
4:35pm - 4:55pm Room 122A - Pennsylvania Convention Center

Thu, Aug 25

731 - Transformations and biological impact of emerging energy storage materials
Mimi Hang, Ian Gunsolus, Jared Bozich, Hunter Wayland, Eric Melby, Joel Pedersen, Rebecca Klaper, Christy Haynes, Robert Hamers
8:00am - 8:25am Congress A - Loews Philadelphia Hotel

579 - Direct views of the nano-bio interface
Franz Geiger
11:05am - 11:25am Room 122A - Pennsylvania Convention Center

783 - Theoretical predictions of stable LiCoO2 (001) surface and phosphate anion adsorption at the oxide-water interfaces
Xu Huang, Chi-Ta Yang, Mimi Hang, Robert Hamers, Sara Mason
3:10pm - 3:30pm Congress A - Loews Philadelphia Hotel

11th International Conference on the Environmental Effects of Nanoparticles and Nanomaterials in Golden, CO

J.T. Buchman, K.L. Xiong, A.M. Vartanian, L. Jacob, X. Zhang, E.R. Caudill, J.A. Pedersen, C.J. Murphy and C.L. Haynes. Assessing the Environmental Impact of Nanoparticles and Evaluating a Redesign Strategy.

E.R. Caudill, J.T. Buchman, H. Frew, K.P. Johnson, C.L. Haynes, Z.V. Feng and J.A. Pedersen. Interaction of Nanoparticles with Model Gram-Negative and Gram-Positive Bacterial Surfaces.

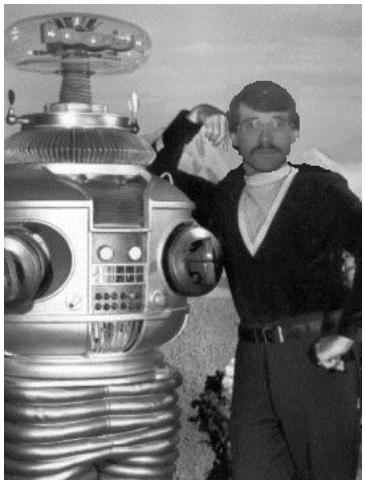
B. Curtis, M. Hang, R. Hamers, X. Zhang, C. Murphy and R. Klaper. Nanotoxicology of NMC, PAH-AuNP, Citrate-AuNP and D. melanogaster.

A.C. Mensch, E.S. Melby, T.R. Kuech, M.D. Torelli, D. Hu, G. Orr, J.A. Pedersen and R.J. Hamers. Investigating Nanoparticle Interactions with Supported Lipid Bilayers using Atomic Force Microscopy.

Lost in Cyber-Space?

HOME ABOUT US OUR TEAM NEWS EDUCATION & OUTREACH WORKING WITH THE CSN PUBLICATIONS RESEARCH MEMBERS

Links to frequently requested CSN documents and information sources



For these documents and more, visit the Center Resources page on the CSN website (requires login though Members page, contact Miriam if you need help).

Newsletter topic suggestions (awards, highlights, lab exchanges, publications, etc.)**:** link

CSN Documents and Downloads

- **CSN calendar** (RFA, All-hands, professional development)**:** link
- **CSN Operations Guide:** link
- **CSN participants list** (Names, group, and email addresses)**:** link
- **List of all CSN researchers and project names** (google-sheet)**:** link
- **Approved projects for all students/postdocs:** link
- **Download the Webex player (choose the player for .ARF files)**: link

CSN Request and Reporting Forms

- **Requests for the Executive Committee:** link
- **Report lab exchange activities:** link
- **Nanoparticle availability** (Listing of NPs available center-wide)**:** link
- **Suggestion-ox** (completely anonymous comments/suggestions to CSN staff):
  Director (Bob): link
  Associate Director (Christy): link
  Managing Director (Mike): link
  E/O Director (Miriam): link