What's happening in the CSN?

July 9, 2018

Volume 3, Issue 8


Wikipedia commons

Sustainable Nano reader question

"Which nano containment is major problem in developed as well as in developing countries as per air pollution concern?" Have any ideas about how to answer this question in a blog post? Contact Miriam (mkrause@umn.edu) or Alicia (aliciamcgeachy2013@u.northwestern.edu)!

Celebrations

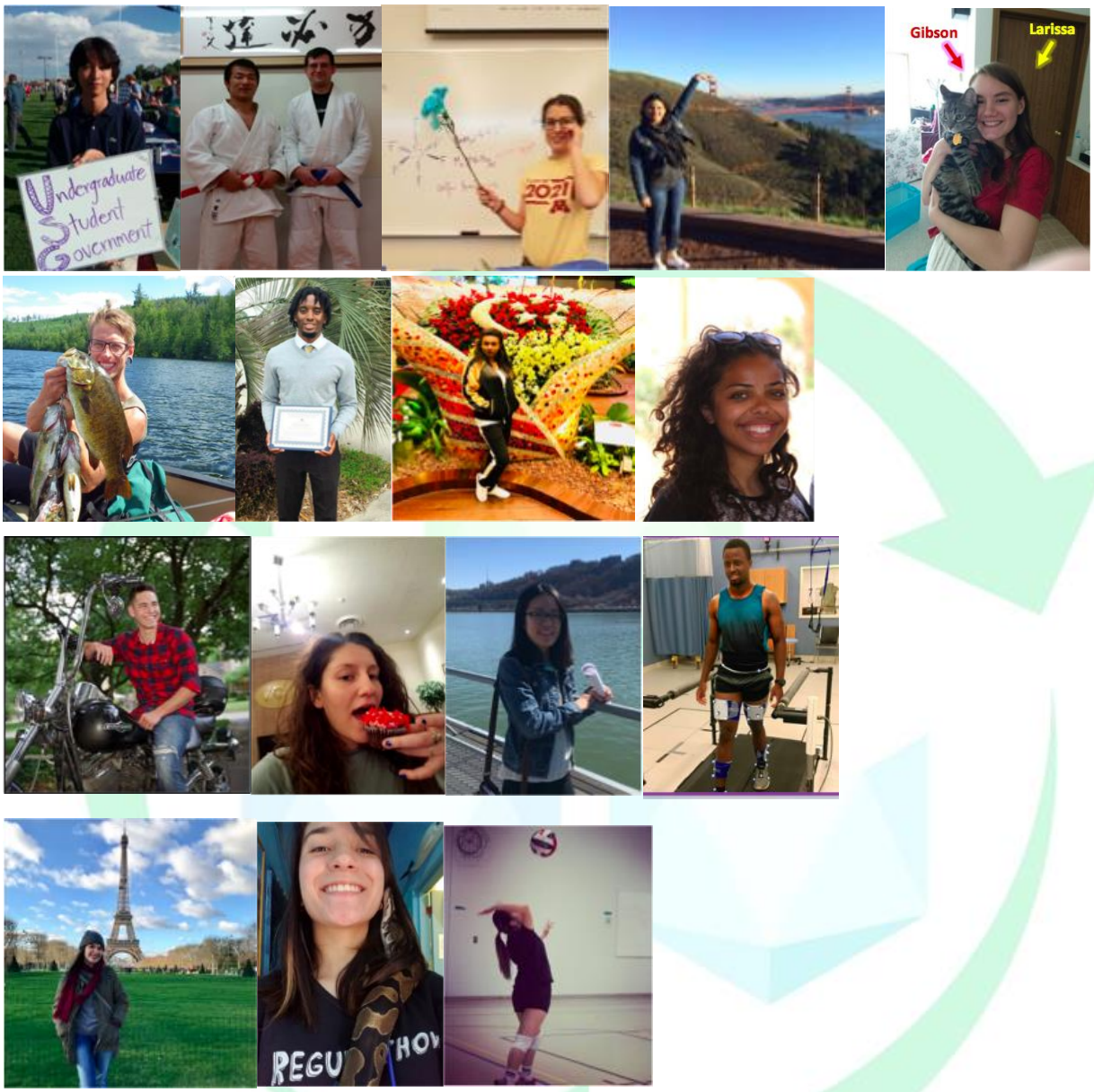
Good news!

Congratulations to **Dr. Miranda Gallagher** (**Fairbrother** group), who defended her dissertation at Johns Hopkins University on June 29. Her thesis was titled "Nanoparticle polymer composite applications and environmental impacts."

Welcome to New CSN Members

Welcome to all of our REU/REV students who are joining us for the summer and other undergraduate researchers who are joining the CSN! Our summer 2018 class of REU/REV students includes **Andy Bei** (**Hernandez** group), **Eric Bias** (**White** group), **Jennifer Cerda** (**Carlson** group), **Christian Freeman** (**Pedersen** group), **Stephan Harruff** (**Rosenzweig** group), **Micaela Homer** (**Hamers** group), **Beichen Liu** (**Fairbrother** group), **Takunda Masike** (**Hamers** group), **Zulmari Silva** (**Hamers** group), Larissa Davis (**Hamers** group), and returning REU student Anaeli Shockey (**Murphy** group). We also welcome undergraduates **Liz Haberland-Ervin** (**Hamers** group), **Meghan Cahill** (**Haynes group**), **Seth Frand** (**Feng** group), **Salena Yang** (**Feng** group), and **Metti Gari** (**Feng** group).

CSN students and staff visit the University of Minnesota's Nano Center during the REU/REV kickoff meeting.
Left to Right (names may be approximate): Metti Gari, Miriam Krause, Selena Yang, Christian Freeman, Micaela Homer, Takunda Masike, Larissa Davis, Andy Bei, Beichen Liu, Stephan Harruff (aka clean room ninja), Anaeli Shockey, Eric Bias, Jennifer Cerda, Alicia McGeachy, and Meghan Cahill.



Top: Andy Bei (Hernandez group), Eric Bias (White group), Meghan Cahill (Haynes group), Jennifer Cerda (Carlson group), Larissa Davis (Hamers group).
Second row: Seth Frand (Feng group), Christian Freeman (Pedersen group), Metti Gari (Feng group), Liz Haberland-Ervin (Hamers group).
3rd Row: Stephan Harruff (Rosenzweig group), Micaela Homer (Hamers group), Beichen Liu (Fairbrother group), Takunda Masike (Hamers group).
4th row: Anaeli Shockey (Murphy group), Zulmari Silva (Hamers group), Salena Yang (Feng group).

Milestones and awards

Congratulations to **Merve Dogangun** (**Geiger** group alum, pictured 3rd from right) for receiving the 2018 Young Scholar Award selected by the TASSA (Turkish American Scientists and Scholars Association). These awards are given every 2 years to recognize the achievements and extraordinary performance of young Turkish scientists doing research in the US. As an awardee, Merve presented a TED-style talk at the TASSA conference.

Congratulations to **Liz Haberland-Ervin** (**Hamers** group) for winning the a Welton Sophomore Honors Summer Apprenticeship, for "Study of Lithium Nickel Manganese Cobalt Oxide Nanoparticles (NMC or $LiNi_{0.6}Mn_{0.2}Co_{0.2}O_2$) Interaction with a Phosphate Heavy Environment." The Welton is a university-wide award for summer research at UW-Madison.

For the second year in a row, **Christy Haynes** has been named as a National Finalist for the Blavatnik National Awards for Young Scientists. This means that she is one of the top 10 candidates in the chemistry category. Read the University of Minnesota press release **here** and the Blavatnik Award press release **here**.

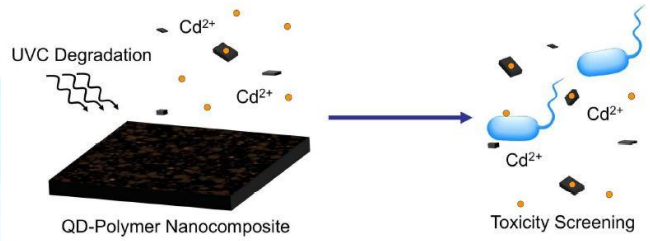
Mike Curry and grad student **Demetrius Finley** were featured on blackengineer.com for their nano-agriculture work. Read the online article **here**.

Kyle Johnson, a CSN undergraduate researcher in the **Haynes** group for the past 4 years, just accepted an exciting new position with Ecolab. Congratulations Kyle!

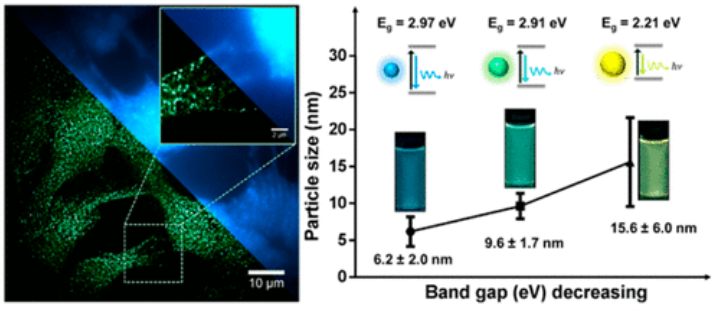
On May 30, **Laura Satterfield** (**Rosenzweig** group) presented and passed her literature review entitled "The measurement of protein corona formation on nanoparticles".

Christy Haynes recently joined **Cathy Murphy** and **Rigoberto Hernandez** as CSN faculty who have their own Wikipedia pages. Check out Christy's here, Cathy's here, and Rigoberto's here .

CSN Productivity



Miranda J. Gallagher, Joseph T. Buchman, Tian Autumn Qiu, Bo Zhi, Taeyjuana Lyons, Kaitlin M. Landy, Zeev Rosenzweig, Christy Haynes and Howard Fairbrother (**2018**). Release, detection and toxicity of fragments generated during artificial accelerated weathering of CdSe/ZnS and CdSe quantum dot polymer composites. *Environmental Science: Nano*, Advanced Article. Read the online version **here**.



Bo Zhi, Yi Cui, Shenyang Wang, Benjamin Frank, Denise N. Williams, Richard Patrick Brown, Eric S. Melby, Robert J. Hamers, Zeev Rosenzweig, D. Howard Fairbrother, Galya Orr and Christy L. Haynes (**2018**). Malic Acid Carbon Dots: from Super-Resolution Live-Cell Imaging to Highly Efficient Separation. *ACS Nano*, 12 (6), 5741-5752. Read the online version **here**.

Did You Know…?

A Well-Intentioned Mistake: Good Riddance to the "Diversity Corner"

From Miriam –

A recent anonymous comment from Suggestion Ox suggested that our introduction of a "Diversity Corner" had the unintended negative consequence of relegating diversity as an add-on or afterthought to our regular newsletter content. My first automatic thought was, "But that's not what we meant!" However, this was followed closely by a second thought, which was that this is a situation where it doesn't really matter what was intended. In fact, that knee-jerk defensiveness is a classic characteristic of many poor responses to diversity concerns. So how can we respond differently? Rather than trying to explain our original thought processes (or lack thereof), I will simply thank the person who submitted the comment, acknowledge that we may have been off the mark, and take this opportunity to talk a bit about how we'll address the concerns that were raised.

First, we — that is, myself, the Newsletter editors, and the members of the Diversity committee — apologize to anyone who felt that the "Diversity Corner" in previous newsletters implied a lack of genuine concern for diversity. Diversity is in fact one of our core values; we will strive to not make new mistakes in our future attempts to champion diversity and inclusion, and I hope you will provide feedback on whether we are successful! Our CSN Diversity Committee spent some time discussing the newsletter, and we decided we should introduce a section for information that is of interest to Center members but does not naturally fit in one of the other newsletter categories. This new section will be called "Did you know…?" and may include information on DISC moment themes (Diversity, Innovation, Safety, and Communication) as well as information or commentary on other topics. We welcome your submissions and suggestions for topics to highlight here or anywhere in the Newsletter.

The First International Day of LGBTQ+ People in Science, Technology, Engineering, and Maths

July 5, 2018 was the first #LGBTSTEMDay. The motivation behind LGBTSTEM Day is explained on the official web page:

"LGBTQ+ people in science, technology, engineering, and maths (STEM) continue to struggle to openly be themselves (see: 2013 Queer in STEM survey, 2014 Factors Impacting The Academic Climate, 2015 American Physical Society survey, 2018 Coming out in STEM: Factors affecting retention of sexual minority STEM students). We believe that a day of recognition could go a long way in helping raise awareness and increase support. We want this to be a new and important component of the global push to increase diversity and inclusion in STEM."

Read more about LGBTSTEM Day in this press release.

Global production of complex oxides: Which nanomaterials to study ?

There are a number of factors that go into our decisions about which nanomaterials to research in the CSN. Many studies of nanomaterials and environmental implications refer back to a 2014 paper by Arturo Keller that examines the predicted flow of engineered nanomaterials. In that and most other papers examining nanoparticle environmental impact, SiO2 and TiO2 are described as being produced in the largest quantities, with production of 85,000-95,000 tons/year worldwide. Fast forward to 2016, and we find that the amount of Co used in lithium-ion batteries in 2016 was 125,000 metric tons, which translates to 207,000 metric tons of LiCoO2, or even more if the Co was used in LiNiMnCoO2. Earlier this year one company alone (Umicore), announced it was expanding capacity to 175,000 metric tons/year of NMC materials. At the present time, only about 3% of lithium ion battery materials are recycled. While some complex oxides are manufactured as nanoparticles sintered into larger aggregates, we know that such aggregated materials degrade into their primary nanoparticles while in use and as a result of chemical dissolution.

For more information:

- A. Keller and A. Lazareva, Predicted releases of engineered nanomaterials: From global to regional to local, *Environ. Sci. Technol. Lett.*, **2014**, 1, 65. Link to online article.
- E.A. Olivetti, G. Ceder, G.G. Gaustad, and X. Fu, Lithium-ion battery supply chain considerations: Analysis of potential bottlenecks in critical metals, *Joule*, **2017**, 1, 229. Link to online article.
- A.H. Tkaczyk, A. Bart, A. Amato, V. Lapkovskis, and M. Petranikova, Sustainability evaluation of essential critical raw materials: Cobalt, niobium, tungsten and rare earth elements, Journal of Physics D: Applied Physics, 51, 203001. Link to online article.
- X. Zheng, Z. Zhu, X. Lin, Y. Zhang, Y. He, H. Cao, Z. Suna, A mini review on metal recycling from spent lithium ion batteries, *Engineering*, **2018**, 4, 361. Link to online article.

CSN Talks and Presentations

Arielle Mensch (**Orr** lab) and **Miranda Gallagher** (**Fairbrother** lab) gave an invited presentation and **Natalie Hudson-Smith** (**Haynes** lab) presented a poster at the Green Chemistry & Engineering Conference in Portland, OR June 18-20. Arielle and Miranda's talk was "Bringing sustainable nanotechnology to the classroom: Examples from a Center for Chemical Innovation," and Natalie's poster, co-authored with **Emily Caudill** (**Pedersen** lab), was "Communicating and Outreach Through the Sustainable Nano Blog."

Arielle & Miranda presenting their talk. Natalie presenting her poster (photos by Natalie and Arielle).

Eric Bias (REV student, **White** group), met with Dr. Christian Dimpka of the International Fertlizer Development Center (IFDC) and explained the nano-ag experiment he's running with watermelon and mesoporous silica. Eric (right) is pictured with **Wade Elmer** (middle) and Dr. Dimpka (left).

Joe Bennett (**Mason group**) presented CSN work at the 50th Annual Midwest Theoretical Chemistry Conference, held at the University of Chicago. The talk was titled "Thermodynamics of Complex Metal Oxide Transformations." Joe Bennett participated in an outreach event at the Graduate Women in Science Annual National Conference at the University of Iowa. He was in charge of the prism goggle bean bag toss and also got to make homemade slime with volunteers from the Children's Museum of Iowa City. **Sara Mason** also volunteered as a judge for the poster session at the conference.

Joe (right) demonstrating prism goggles with Amina Grant (a PhD Candidate from another department) at the UIowa Graduate Women in Science outreach event.

Jason White was one of the keynote speakers at the 4th International Symposium on "The Environmental Impact of Engineered Nanoparticles" which was held in Wuxi China on May 10-11, 2018. He presented a lecture entitled "Nanotechnology in Agriculture: A Current Perspective on Applications and Implications" which highlighted CSN work.

The CSN had excellent representation at this year's Nanoscale Science and Engineering for Agriculture and Food Systems Gordon Research Conference: **Jason White**, **Joel Pedersen**, **Jaya Borgatta** (**Hamers** group) and **Christy Haynes** all attended the meeting.

Joel Pedersen & **Jaya Borgatta** (**Hamers** group) hiking on Mt. Tom in Massachusetts during GRC (photo by **Christy Haynes**).

Bob Hamers gave an invited talk entitled "Surface Functionalization of Carbon Nanomaterials: Characterization and Biological Impact" at the European Materials Research Society in Strasbourg, France. The symposium was organized by CSN Innovation Council member **Olga Shenderova** (Adámas Nanotechnologies).

Latest from Sustainable Nano

See **sustainable-nano.com** for all the CSN blogs and podcasts

Blog posts and podcast episodes since the last newsletter

- June 6: ¿Cuántos moles de gas contiene un Pokémon Gastly? (Nano Sostenible translation of "How many moles of gas are in a Pokémon Gastly?" by Natalie Hudson-Smith)
- June 11: Snapshots of the Cytoskeleton by Solaire Finkenstaedt-Quinn (public-friendly article summary)
- June 15: What is the USA Science and Engineering Festival? by Miranda Gallagher
- June 20: La ciencia detrás de la Exhibición Pixar: Una revisión (Nano Sostenible translation of "The Science Behind Pixar Exhibit: A Review" by Josh Kuether)
- June 25: El Reciclaje: ¿Una Estrategia para la nanotecnología sostenible? (Nano Sostenible translation of "Recycling: A Strategy for Sustainable Nanotechnology?" by Howard Fairbrother)
- June 26: Recommended Reading: The NAS Report on Sexual Harassment by Miriam Krause
- June 28: Podcast Ep 25. Finding the Next Fix for the World's Problems: More from the Connecticut Agricultural Experiment Station (interview of Wade Elmer by Natalie Hudson-Smith & Jaya Borgatta)

Opportunities

ACS Webinar: Become a Science Advocate: How to Engage Your Elected Officials

Thursday, July 12 at 2pm Central

From the website: "Communicating science to policymakers effectively has taken on new urgency. As scientists and even science itself is thrust into a place of high visibility in the U.S. popular media and in the national policy debate, it is crucial for scientists to get out of the lab and speak to their elected officials. Join ACS Immediate Past President, Allison A. Campbell and Laura Pence, a Professor of Chemistry at the University of Hartford and Member of the ACS Board of Directors, as they share why science is an invaluable component in making laws and regulations and how we can engage our elected officials with stories conveying the impact, importance, and excitement of the work that we do."

For more information & registration see this page.

NanoEarth at Virginia Tech in Blacksburg, VA is seeking a TEM Specialist. About NanoEarth:

About NanoEarth: NanoEarth is the leading destination for earth and environmental nanoscience discovery. We serve the scientists and engineers solving our greatest environmental challenges. NanoEarth supports researchers across academia, government, and industry to enable critical discoveries at the nanoscale. We provide the advanced tools and expertise to guide nanotechnology research and propel environmental solutions. The Virginia Tech National Center for Earth and Environmental Nanotechnology Infrastructure is a node of the National Nanotechnology Coordinated Infrastructure (NNCI), an NSF-funded network of 16 centers spread throughout the United States serving as user facilities for cutting edge nanotechnology research. NanoEarth is part of Virginia Tech's Institute for Critical Technology and Applied Science (ICTAS), and proudly headquartered in Blacksburg, Virginia.

See job posting for more details: https://listings.jobs.vt.edu/postings/87825

Position Summary: The position involves: (a) operation of TEM and SEM instruments, (b) support of TEM and SEM data analysis, (c) sample preparation and management, (d) participation in education and outreach activities, and (e) implementation of directed pilot projects, for mainly external users of the Virginia Tech National Center for Earth and Environmental Nanotechnology Infrastructure (NanoEarth) under the direct supervision of the NanoEarth Director. NanoEarth is housed in Virginia Tech's Nanoscale Characterization and Fabrication Laboratory (NCFL). The main requirement of this position is electron microscopy operation, but practical research/service experience in powder X-ray diffractometry is helpful. Day to day activities related to TEM operation may include: 1) interacting with internal and external users to understand the objectives of their work, scheduling suitable sample preparation and training, and coordinating necessary instrument/staff time; 2) managing day-to-day maintenance support of instruments, calibrating the instruments and keeping them in good functioning condition, arranging the purchase of consumable supplies, and being first responder for hardware problems; and 3) maintenance and supervision of related shared data analysis computers including, but not limited to, operating system updates, anti-virus updates, file maintenance.

2nd Quantifying Exposure to Engineered Nanomaterials from Manufactured Products (QEEN II) Workshop: A technical workshop to highlight recent advances in characterizing and quantifying exposure to engineered nanomaterials in manufactured products.

Registration is scheduled to open on **July 9, 2018**.

This workshop is free and open to the public with registration on a first-come, first-served basis. Registration will be capped at 180 attendees. The workshop will also include a poster session. Find out more on the QEEN II Workshop **Website**.

From Jason White: "There will be a nano-ag session, which I will be involved in. The focus is clearly on exposure but the topics are pretty far-reaching. They have a poster session (most speakers are specifically invited) and they have funding to support graduate student/post-doc travel. Let me know if you have any questions or are interested."

Looking Ahead

Upcoming professional development activities

- July 16 at 2:30pm Central – center-wide – Maximizing Your LinkedIn Presence. Speakers: Whitney Moore & Samantha Tiemens-Anderson, U of MN
- July 23 at 12:00 Central – center-wide – The Importance of Failure. Speaker: Jen Heemstra, Emory University
- August 3 at 10:30 Central – REU/REV students – Introduction to Computational Chemistry. Speaker: **Sara Mason**
- August 6 at 2:00 Central – Center-wide – Post-doc Panel. Speakers: **Arielle Mensch** (**Orr** group), **Oluwaseun Mesele** (**Cui** group), & **Emily Tollefson** (**Carlson** group)

SPRING Board meeting time change

Note that SPRING Board meetings for the rest of the summer will be every other Wednesday at 2:00 Central, beginning July 11.

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 submissions (awards, highlights, lab exchanges, publications, FUN, etc.)**:** **link**

CSN Documents and Downloads

- **Nanodatabase Login:** link
- **Nanodatabase Help page**: link
- **CSN calendar** (RFA, All-hands, professional development)**:** link
- **CSN Operations Guide:** link
- **CSN participants list** (Names, group, and email addresses)**:** link
- **CSN Projects Documents:** CSN Projects **-** % Effort sheet

CSN Reporting Forms

- **Report lab exchange activities:** link
- **New CSN Presentations:** link
- **Report Outreach Activity:** link
- **CSN Safety Verification form:** link
- **Nanoparticle availability** (Listing of NPs available center-wide)**:** link

CSN Feedback Forms

- **Requests for the Executive Committee (meeting agenda):** link
- **SuggestionOx** (completely anonymous comments/suggestions to CSN staff):
  Director (Bob): link
  Associate Director (Christy): link
  Managing Director (Mike): link
  E/O Director (Miriam): link

Find the most recent list of all our publications on the **CSN Google Scholar** page.