



Seventeen Biosystems Engineering seniors presented the results of their semester-long Capstone Design projects on Monday 12/3/12. The wide range of topics illustrates the breadth and depth of the student's engineering education, interest and skills. The presentations were evaluated by a panel of engineering faculty and industry engineers. Congratulations Seniors on a job well-done!

*Design of irrigation system and surface water impoundment for the CU Student Organic Farm*—**Nick Cleveland, Kyle Corley, Richard Harvey**

*Design of a pilot sediment control facility*—**Lindsay Burton, Chip Wyatt**

*Artificial oyster reef establishment process design*—**Melissa DeSantiago, Sarah Galphin, Andy Gray and Heather Sprague**

*Biohydrogen pilot plant design*—**Scott McDonald, Kyle Mihaljevic, Taylor Wade, Cynthia Westmoreland**

*Sustainable Shed 2.0—A sustainable water, energy, food and shelter demonstration facility*—**Leigh Allison, Olivia Jenkins, Austin Johnson, Lauren Owen**

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**Shanna Estes** (EE&S PhD) was selected to receive the Roy G. Post Scholarship. Mr. Post was the founding chief executive of WM Symposia, the sponsor of the annual international Waste Management Conference. The Roy G. Post Foundation is a non-profit organization formed by his students, peers and protégés to provide scholarships to students to develop careers in the safe management of nuclear materials and to participate in the annual WM Symposium.





**Onur Apul** (EE&S PhD) attended "NSF Nanoscale Science and Engineering Grantees Conference" held December 2-4, in Washington DC with his advisor, **Dr. Tanju Karanfil**. **Onur** and **Dr. Karanfil** presented a poster titled "Quantitative Structure-Adsorbability Relationships for the Adsorption of Organic Chemicals by Carbon Nanotubes". Onur was awarded a Professional Enrichment Grant (PEG) through Clemson University's Student Government to support his travel to the Conference .



The Student chapter of the American Water Works Association (AWWA), the Biosystems Engineering Club and the Geology Club teamed up on September 13<sup>th</sup> to hold a picnic for all undergraduates in



the department. The picnic was held on campus in the Carillon Gardens.

Students from the three undergraduate majors as well as many of the faculty, and a few dogs, attended and enjoyed delicious grilled food and watermelon. Some students held a Frisbee game! Thank you to all the students who participated and helped plan the event!





The students hosted their annual Holiday party and as you can see, a great time was had by all!!



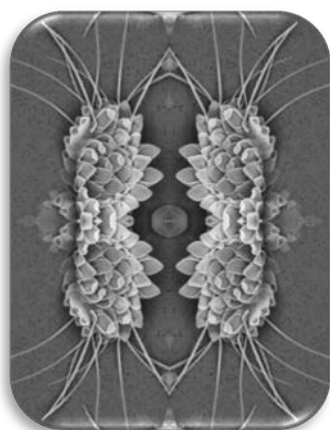
Thank you students!!



Three faculty and 2 undergraduate students (**Kim Gloersen** and **Alex Lefitz**) attended the Carolina Geological Society (CGS) meeting and field trip held in Greenville in October. The field trip visited several geologically interesting locations around the upstate, concluding at Table Rock State Park.

The National Geological Society of America Meeting GSA held its national meeting in Charlotte, and several Geology and Hydrogeology students were able to attend. One of our undergraduates, **Andrea Creighton**, presented initial data from her Creative Inquiry project at one of the poster sessions.

The Geology Club was very active this fall. Among other things, they organized tutoring and study sessions for students taking Geology 101, set up a booth at the Student Organizations Fair, helped **Jessica Economy** manage the department picnic, organized a camping trip (that was sadly rained out), and sponsored a seminar for geology majors on how to apply to graduate schools.



**Cassidy Laird** won 3<sup>rd</sup> prize in Clemson's Science as Art competition in Fall 2012. **Cassidy** was a part of the EUREKA! research program for incoming freshmen. She worked with **Muriel Steele** in **Dr. Ladner's** research group. **Cassidy's** picture, shown here, is entitled "sanomollaM," and is a mirrored image of a *Mallomonas* sp. algal cell on a microfiltration membrane captured with scanning electron microscopy.

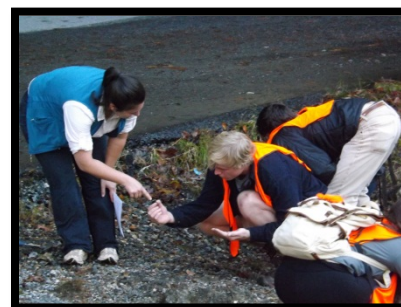


The Clemson Student Chapter of the American Water Works Association (AWWA) volunteered at the Tyger River Sweep in Greenville last fall to pick up trash from the river banks and surrounding woodland. Pictured here are some of the participants: Kingman Hodgkiss (dark blue, back), Anna Wells (white), Jessica Bush (orange), Kathryn Fauerby (white and blue), Carina Vargas (grey), and Jessica Whitaker (blue with Tiger paw), and two non-departmental students. The AWWA Chapter faculty advisor, **David Ladner**, is behind the camera.



**Amy Hixon** (EES PhD Candidate) gave an oral presentation titled "Investigation of uranium speciation and mineralogy associated with uranium in-situ recovery operations" in the symposium *Investigating the Future of Uranium in the Geosciences: an Examination of Environmental Studies and Applications* at the 2012 Geological Society of America Meeting in Charlotte, North Carolina in November 2012. **Amy's** advisor **Brian Powell** was a co-author on the presentation.

The Mineralogy and Petrology class took their annual field trip along Highway 64 through the Piedmont and Blue Ridge province. A highlight of the trip was our stop at Bridal Veil Falls, where students were able to collect garnets and garnetiferous mica schist. **Dr. Shuller-Nickles** and sophomore **Daniel Bagbey** are seen looking at a nicely faceted almandine (Fe-Al garnet).



**Mohammed Alzaydan** (EE&S MS) and his wife, Boshra Altuwajri were blessed with their first child, Mais Alzaydan, on September 16, 2012. Mais weighed 6 pounds. Congratulations Mohammed and Boshra!



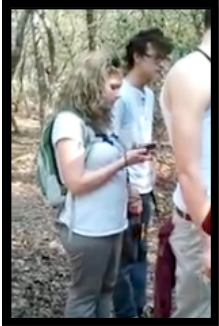
(Left to right) Tim DeVol, Lindsay Shuller-Nickles, Commissioner Magwood, Patrice Bubar, Brian Powell, Bob Fjeld.

The Honorable William D. Magwood, IV, U.S. Nuclear Regulatory Commission, visited campus on Friday, January 18<sup>th</sup>. He spent the day touring the department, talking with students, and gave the departmental seminar entitled, "Nuclear Power-A Regulatory Perspective Post Fukushima". It was an honor to be able to host Commissioner Magwood at Clemson. The U.S. Nuclear Regulatory Commission is the single largest employer of EEES alumni: *Cynthia Barr, David Brown, John Clements, Keith Compton, Cynthia Dinwiddie, Jennifer Foster, Chris Grossman, Amy Hixon, Merri Horn, Andy Imboden, Stacey Imboden, Jessie Muir, and Ryan Whited.*

The EEES department has recently completed construction on a new classroom in Brackett Hall. This classroom will hold many of the Environmental and Biosystems Engineering undergraduate courses beginning in the Spring of 2013.



We are pleased to announce that **Anne Cummings**, EEES Lab Manager, was recognized as one of the Technical Staff Award recipients at the COES Annual Holiday Staff Luncheon. This is a well-deserved recognition for **Anne**. Congratulations **Anne**, and thanks for all your hard work!

**Crystal Talley named 2012 "Outstanding Earth Science Teacher"**

Crystal Talley, an 8th grade science teacher at Code Academy in Seneca, South Carolina has worked with *Dr. John Wagner's* Schools Outreach Creative Inquiry project for the past two years. *Dr. Wagner* is an Emeritus Professor of Geology who continues to run the department's Geology K-12 Outreach programs from an office in Brackett Hall. This year, twelve different Clemson undergraduate students, three of them geology majors, brought hands-on natural history and environmental activities to the eighth grade class at Code, including a field trip to the Clemson Experimental Forest and to the Bob Campbell Geology Museum

on campus. The geology majors are **Corey Buchanan, Alex Grayson, and Hunter Santiago.**

Through her vision of using the outdoors to reach students in a non-traditional manner, Ms. Talley has been able to motivate and inspire a group of students who had not had much previous success in school. The Clemson students brought a new perspective on environmental science to the class as they led activities using handheld GPS units, surveying equipment, and digital cameras. The ultimate goal for this semester is to take a field trip to Devils Fork State Park on Lake Jocassee and create a guided trail map brochure for the Oconee Bell Trail using photographs taken by the students and narratives written with the help of the Clemson Creative Inquiry undergraduate students. A secondary goal is to create a 'geocache' site on the Code School grounds and register it online.

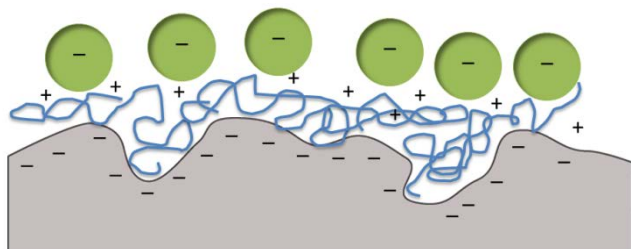
The 'Outstanding Earth Science Teacher Award' is presented by the National Association of Geoscience Teachers and is supported financially by the Mining Association of South Carolina and the Carolinas Section of the Society of Mining Engineers. The award was presented to Ms. Talley by *Dr. Wagner* at the February 18<sup>th</sup> meeting of the Oconee County School Board in Walhalla, South Carolina.



The department is increasing our social media presence. Check us out on LinkedIn, Facebook and Twitter. Direct links are available on the EEES website.

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**David Ladner** gave a presentation entitled "Carbonaceous nanomaterials, composite inorganic/organic nanoparticles, and dendritic polymers as regenerable membrane coatings for trace contaminant removal and fouling control," at the ACS national meeting in Philadelphia in September 2012. The presentation drew

connections among the work of two recently-graduated MS students, **Megan Smith** and **Jaclyn Ellerie**. Data from two undergraduate students, Colin Richards (University of Arizona) and Deidre Baker (Lehigh University), were also incorporated. Colin and Deidre were part of the 2012 Research Experience for Undergraduates (REU) program in Advanced Functional Membranes at Clemson. **Dr. Tanju Karanfil** was also a coauthor on the presentation. This image shows how some of our membrane coatings are made.

Drs. Xin Xu and **Beth Carraway's** article titled "Sonication-Assisted Synthesis of  $\beta$ -Mercuric Sulfide Nanoparticles" was recently published in *the Nanomaterials and Nanotechnology Journal*, Vol. 2, 2012;

[http://www.intechopen.com/journals/nanomaterials\\_and\\_nanotechnology](http://www.intechopen.com/journals/nanomaterials_and_nanotechnology)

**Dr. Carraway** is also involved in organizing a Symposium at the American Chemical Society Division of Environmental Chemistry at fall meeting in Indianapolis, IN (September 8-12, 2013) titled "Advances in Understanding the Aquatic Fate of Metals: Nanomaterials and Natural Organic Materials" which will focus on studies that advance our understanding of the fate of metals in aquatic environments through new or improved applications of techniques and through improved characterization of metal forms and speciation. Abstract submission for oral and poster presentations is open until March 18, 2013. See <http://envirofacs.org/ACS/envirofacs/newsite/DivisiobSymposia123.html> or [www.acs.org](http://www.acs.org).

**David Freedman** was invited to participate on a National Research Council (NRC, a division of The National Academies) committee to advise the U.S. Army's Assembled Chemical Weapons Alternatives (ACWA) program on the application of water recovery and brine reduction processes for the zero-liquid discharge facility under construction in Pueblo, Colorado. The purpose of this billion dollar facility is to destroy the mustard agent contained in nearly 800,000 projectiles. The Pueblo Chemical Agent Destruction Pilot Plant (PCAPP) will destroy the agent using chemical hydrolysis with hot water, and the resulting hydrolysate comprised primarily of thiodiglycol will be processed through 16 immobilized cell bioreactors (ICBs). Freedman participated in a review of the ICBs, including visits to the PCAPP in Pueblo and NRC headquarters in Washington, DC. An NRC report on the PCAPP will be published later this year.

**David Freedman** and colleagues were also involved in two recently published articles related to in situ remediation of halogenated solvents:

**Darlington, R., L. G. Lehmicke, R. G. Andrachek, and D. L. Freedman.** 2013. Anaerobic abiotic transformations of *cis*-1,2-dichloroethene in fractured sandstone. *Chemosphere* **90**:2226–2232.

**Yu, R., H. S. Peethambaram, R. W. Falta, M. F. Verce, J. K. Henderson, C. E. Bagwell, R. L. Brigmon, and D. L. Freedman.** 2013. Kinetics of 1,2-dichloroethane and 1,2-dibromoethane biodegradation in anaerobic enrichment cultures. *Appl. Environ. Microbiol.* **79**:1359-1367.

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**Dr. Brian Powell** and Yuji Arai have been awarded a \$110k one year project from Savannah River Remediation. **Dr. Powell** and Dr. Arai will examine the behavior of radionuclides within cementitious waste forms and in natural soils. The cementitious waste forms are to be used in the Saltstone facility at the Savannah River Site which is an onsite radionuclide waste disposal facility.

**Dr. Brian Powell** has been appointed to a three year term on the Environmental Protection Agency Science Advisory Board, Radiation Advisory Committee. **Dr. Powell** will serve as a special government employee and provide independent advice on technical issues underlying the EPA's policies and decision making.

**Dr. Brian Powell** gave an invited talk titled "Mechanistically based uranium sorption models" in the symposium *Investigating the Future of Uranium in the Geosciences: an Examination of Environmental Studies and Applications* at the 2012 Geological Society of America Meeting in Charlotte, North Carolina in November 2012. Co-authors on the talk were EES PhD student **Shanna Estes** and Geology undergraduate **students Jonathon (Alex) Baldwin** and **Tyler Waterhouse**.



Congratulations to Dr. and Mrs. **Richard Warner** on becoming grandparents! The Warners were blessed with their first grandchild September 13, 2012.

**The following students graduated in December, 2012:**

**Clay Freeman, MS**  
**Satya Gubbala, MS**  
**Pooja Mahajan, MS**  
**April Hall, PhD**  
**Yang Cao, MS**  
**Maurice Fagan, MS**  
**Glen Skawski, MS**  
**Phenny Mwaanga, PhD (ENTOX) Advisor Beth Carraway**

**Clay Freeman** is currently working at Tri-County Technical College in Pendleton, South Carolina.

**April Hall** is currently working at Nutra Manufacturing in Greenville, South Carolina.

### **Congratulations, Students!!**

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**James Cooper** (EE&S MS 2010) received his Professional Engineer (P.E.) license. James is currently working with the Naval Sea Systems Command (NAVSEA) in Virginia.

**Ramona Darlington** (EES PhD 2008) is currently a Research Scientist at Battelle in Columbus, OH.

**Hari Peethambaram** (EE&S MS 2010) is currently running a large resource recovery facility in India.

**James Henderson** (EES PhD 2008) is currently a Project Director for the DuPont Corporate Remediation Group. His advisor was Dr. Ron Falta.

**The next issue will be published in May of 2013. Please send your submissions for your activities during the Spring Semester to Jan Young (ej@clermson.edu) by April 15, 2013. (Please do not forget to take pictures)!**

**THANK YOU!**