EEES NEWS

GEOL 370 Class Visits Colorado Plateau

Scott Brame of the Department of Environmental Engineering and Earth Sciences and **Dr. Richard Warner**, Emeritus Professor of Geology, took 15 Clemson University students in GEOL 370 (Western US Field Study) to Utah during the 2012 Minimester A. The goal of the class was to experience the spectacular geology of the Colorado Plateau by hiking and camping in Utah's national parks and monuments. On May 10 the class flew to Salt Lake City then drove to Dead Horse Point State Park. The following day they visited Canyonlands National Park's Island in the Sky District and in the afternoon headed to Arches National Park, where they camped two nights. Highlighting their stay at Arches were an evening hike to view Delicate Arch at sunset and an afternoon hike in Fiery Furnace, a maze of sandstone fins. Over the course of the following week the class visited Canyonland's Needles District, Natural Bridges National Monument, Capitol Reef National Park, Grand Staircase-Escalante National Monument, and Bryce Canyon and Zion National Parks. Students saw the Waterpocket Fold (a monocline) at Capitol Reef, hiked two narrow slot canyons (Peek-a-boo and Spooky) in Grand Staircase-Escalante, saw myriads of "hoodoos" (erosion-carved spires and pinnacles) in Bryce Canyon, climbed over 1,500 feet to the top of Angel's Landing (the last bit holding onto chains bolted into the rock) in Zion, and, on the last day, waded through the cold waters of the Virgin River in the Zion Narrows. On May 19 the class returned to Clemson University, after having spent nine memorable days exploring central and southern Utah.

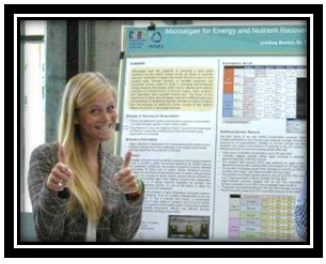
Congratulations students!

Jeff Schwindaman (M.S. – Hydrogeology) has been awarded a DOD SMART scholarship (https://smart.asee.org/) for the coming academic year. The Science, Mathematics And Research for Transformation (SMART) Scholarship for Service Program has been established by the Department of Defense (DoD) to support undergraduate and graduate students pursuing degrees in Science, Technology, Engineering and Mathematics (STEM) disciplines. The program aims to increase the number of civilian scientists and engineers working at DoD laboratories.

Recent Biosystems Engineering graduate **Lauren Harroff** has received a Fulbright grant to conduct research in Uganda. A member of Clemson's National Scholar Program, Harroff earned many accolades for her research, which is centered around the adaptation and application of sustainable biofuels, particularly in international settings. She volunteered with the Pendleton Place Children's Center, participated in peer mentoring with the Calhoun Honors College and worked with Engineers Without Borders. The Fulbright Program is the flagship international educational exchange program sponsored by the U.S. government and was created to increase mutual understanding between the people of the United States and those in other countries.

While participating in an internship at Lawrence Livermore National Laboratory, **April Gillens** (Ph.D. – EE&S) was selected to attend lunch with Dr. Sigfried Hecker, the former director of Los Alamos National Laboratory and a former negotiator for the US with North Korea. Dr. Hecker is interested in ongoing work in the area of nuclear forensics that April is involved with. This work is supported by the Department of Homeland Security through research projects in our Nuclear Environmental Engineering and Science Focus area.

Lindsey Burton (Senior – B.E.) was selected as one of twenty students across the nation to participate in the C2B2 Colorado Center for Biorefining and Biofuels undergraduate research experience this past summer. The program is a joint collaboration between the National Renewable Energy Laboratory and the state of Colorado. Lindsey worked with Dr. Tzahi Cath at Colorado School of Mines on the treatment of wastewater using conventional biological processes and novel wastewater treatment processes utilizing algae. The algae were then cultured on the wastewater to remove toxic ammonia as well as grow for potential



lipid extraction for the production of biofuels.

Victor Y. Liao, senior Biosystems Engineering major, has been selected as one of the nation's top rising young leaders in the clean energy sector by the national organization Focus the Nation. He is among 20 students from across the country selected for their dedication, passion and unique contribution to increasing clean energy in America.

The young leaders, five each in the categories of Technician, Innovator, Politico and Storyteller, will meet for a week in August on Oregon's Mount Hood at the ReCharge! Retreat to viscerally experience an area of the country where energy is accelerating toward renewables.

Participants in ReCharge! Retreat will hike Elliot Glacier, which has experienced 60 percent snowpack loss since 1982; tour the Boardman Coal Plant, scheduled to close by 2020; experience The Dalles Dam, located on the Columbia River and producing hydropower since 1957; and visit Biglow Canyon Wind Farm, which powers 125,000 homes in Oregon. Focus the Nation created ReCharge! in collaboration with The Center for Whole Communities to address the need for rising leaders to approach energy challenges with innovative ideas and fortitude throughout their careers. ReCharge! is made possible through sponsorship by KEEN Footwear, Portland General Electric, LiFT Label, the Clif Bar Family Foundation, the Nathan Cummings Foundation and the Rockefeller Brothers Fund.

Xiaoling Liu, Ph.D. student in Environmental Engineering & Science won third place in the Student Research Contest sponsored by Gheosyntec Consultants. The papers were judged on: Writing and clarity of presentation, novelty of the research and likely contribution to the firm's groundwater practice.

Meg Smith (Ph.D. – EE&S) gave a platform presentation entitled "Composite nanoparticles as regenerable coatings on reverse osmosis membranes," at the 22nd North American Membrane Society (NAMS) Annual Meeting in New Orleans, LA, in June.

David Hahn, one of our M.Sc. Hydrogeology students, was awarded with the National Association of Geoscience Teachers (NAGT) Outstanding Teacher Assistant Award for his outstanding contributions to many of our Geology and Physical Sciences courses. This is a great recognition for David's strong commitment to high quality teaching and continuous hard work.

Recent Biosystems Engineering Masters Graduate **Shwetha Sivakaminathan** has just begun her professional career with BioProcess Algae. BioProcess Algae is a company specializing in culturing and producing algae for various applications ranging from animal feed, proteins and fuel. The BioProcess Algae project, co-located at the Green Plains Renewable Energy plant in Shenandoah, Iowa, is now installing a 5-acre demonstration of its modular technology – which is expected to be the final step before active commercialization at Shenandoah and other sites. This algae plant utilizes excess CO2 emissions and process heat from the Shenandoah ethanol plant to produce microalgae. Along with its unique growth media recipe and biofilm technology, the company projects great prospects for the future. Shwetha's work is in process development, fermentation, heterotrophic and mixotrophic cultivations in pilot and commercial scales. Shwetha made contact with BioProcess Algae after presenting a poster of her heterotrophic algae research at the National Biodiesel Conference well in February 2012.

Peng and Jaclyn on the campus of Southern Methodist University

Peng Xie (M.S. – EE&S), **Jaclyn Ellerie** (MS graduate – EE&S**)**, and **Dr. David Ladner** attended the American Water Works Association (AWWA) Annual Conference and Exhibition in Dallas, TX, in June. Peng gave a platform presentation entitled, "Sinusoidal- and Helical- Flow Spacers for Fouling Mitigation and Energy Reduction in RO Desalination." Jaclyn gave a platform presentation entitled, "Adsorptive Carbon Coatings for Ultrafiltration Membranes." Peng also gave a presentation entitled, "Status of Drinking Water in China," during a special session on global water issues. Dr. Ladner moderated a Universities Forum session during the conference.

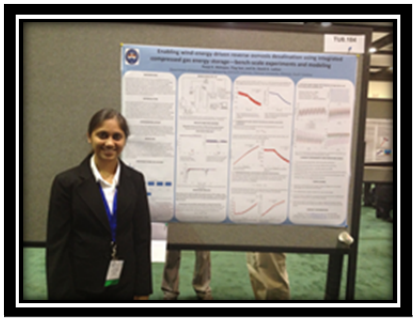
Dr. Karanfil's research group attended the American Water Works Association (AWWA) Annual Conference and Exhibition in Dallas, TX, in June. **Jane Gan**, EE&S M.Sc. student, made two oral p resentations from her M.Sc. thesis entitled "The Control of N-DBP and C-DBP Precursors with MIEX" and "The Treatment of an Effluent Impacted Stream Water with MIEX." **Onur Apul**, EE&S Ph.D. student, presented his work from his Ph.D. research at the University Forum session. The title of his talk was "Predictive Model Development for Adsorption of Organic Contaminants by Carbon Nanotubes." He also presented at the Session, "International Young Professionals Address the Status of Drinking Water in Their Home Country" the title of this talk was "Water Perspective of Turkey." **Habibullah Uzun** presented work from his Ph.D. at the Fresh Ideas Session. The title of his presentation was "NDMA Formation from Source Waters to Distribution Systems."

This summer Biosystems Engineering Research Associate **David Thornton**, and recent BE graduate **Jared McKnight**, led a group of Creative Inquiry students to collect wild yeast samples from the Clemson Musser Fruit Farm. Following a mix of historical and microbiological methods, the group has captured and refined about a dozen yeast cultures containing saccharomyces and brettanomyces yeast, and a host of other beneficial bacteria. Using differential media and adjustments to pH, temperature, and alcohol content, the strains are being selectively refined to distinguish the best uses of the various yeasts. Uses include production of beer, wine, spirits and fuel. The research will continue this semester in The Science of Beer – Introduction to Zymology. This C.I. course partners varying engineering majors pursuing scholarly research in brewery optimization and waste reduction, analytical methods for the testing of beer, and the production of unique regionally specific beers for the Upstate SC through domestication of wild yeast and sustainable production of regional grains and hops. You can follow more at clemsonbiofuels.wordpress.com. Stay tuned for a host of workshops regarding "nano"brewery construction and design for home or commercial brewing, beer analytics, and microbiology techniques for capturing your own yeasts!

Pad Thai at San Diego farmers market

Muriel Steele (M.S. – EE&S) and **Dan Carey** (Ph.D. – EE&S) attended the 2nd International Conference on Algal Biomass, Biofuels & Bioproducts in San Diego, CA, in June. Muriel presented a poster entitled, "Mixotrophic Growth of Chlorella protothecoides for Wastewater Treatment, Effects of Retention Time on Membrane Harvesting, Treatment, and Productivity." Dan presented a poster entitled, "Algal dewatering by microfiltration: membrane flux improvement with NaCl addition in a stirred filtration unit." The students were too busy learning about algae to take pictures of themselves, but their appetites were whetted enough to photograph some Farmers-Market Thai food they enjoyed.

Pooja Mahajan, Masters Student in Environmental Engineering and Earth Science, attended the Cleantech Conference and Showcase 2012 in Santa Clara, CA, in June. She presented a poster entitled "Enabling wind-energy driven reverse osmosis desalination using integrated compressed gas energy storage—bench-scale experiments and modeling."



Pooja Mahajan at Cleantech conference

Dr. David Ladner's research group hosted four undergraduate and high school students in June and July as part of summer research programs. Two students, Colin Richards (from the University of Arizona) and Deidre Baker (from Lehigh University) came as part of the Research Experience for Undergraduates (REU) in Advanced Functional Membranes. Another student, Graham von Oehsen (South Carolina Governor's School for Science & Mathematics), came as part of Clemson's Summer Program for Research Interns (SPRI). The fourth student, Cassidy Laird, is a new freshman in Engineering and participated in the Experiences in Undergraduate Research, Exploration and Knowledge Advancement (EUREKA!) program. **Muriel Steele** was the research mentor for Cassidy and Graham. **Meg Smith** was the research mentor for Colin and Deidre.

Cassidy & Muriel in Algae Room

Dan Carey (M.S. '12 – EE&S) in collaboration with Catherine Mobley (Department of Sociology and Anthropology) and Dr. Ladner spearheaded a pilot project called "QR Codes as a Sustainability Research Tool." You may have seen little QR code stickers placed on water fountains and in bathrooms in Rich Lab and in various buildings on campus. A user can scan the QR codes with their smartphone to visit a Water-Energy Nexus website created by the research team. The website gives the user water and energy data specifically for the water fixture scanned. Users can also learn about Clemson's overall water data, take a water-energy quiz, and complete a survey about sustainability. So if you see a QR code, please scan it and participate. Or visit the site http://www.clemson.edu/ces/wenexus

QR code on drinking water fountain

Meric Selbes, EE&S Ph.D. student, and **Dr. Tanju Karanfil** attended Gordon Conference on Disinfection By-Products held at Mount Holyoke College in Massachusetts. Meric presented his Ph. D. work at the poster session. The title of presentation was "Importance of Tertiary Amine Structure on NDMA Formation and Effect of Background Matrix and Chloramine Species." Dr. Karanfil served as the Discussion Leader of the session entitled "Methods to Identify DBPs."

EE&S 2012 FACULTY, STAFF & GRADUATE STUDENTS

The Environmental Engineering & Earth Sciences undergraduate department has moved on campus. Undergraduate services and faculty offices for Environmental Engineering, Biosystems Engineering and Geology are all now located in Brackett Hall. If you are on campus, stop by 340 or 441 Brackett Hall to say hello to Cindy and Jessica!

Jessica Economy has joined the EEES department as the new Student Services Coordinator for the Environmental and Biosystems Engineering Undergraduate majors. She graduated from Clemson in 2010 with a BS in Ceramic and Materials Engineering and in 2012 with a M.Ed. in Counselor Education: Student Affairs. Many of you may recognize Jessica from her work with the College of Engineering and Science Recruiting and Advising Offices over the past 3 years. Welcome Jessica!!

Bobby Clark has a new addition to him family, Amos, born July 11th. Amos was welcomed home by big sister Hanna and big brother Sam

The Welcome Back Picnic was great fun for Graduate Students, Staff and Faculty!!

We would like to extend a special **WELCOME** to the new graduate students:

Semra Bakkaloglu, Jill Brandy, Chris Carlson, Kayla Collins, Stephanie Ely, Alex Hanna, Alex Haluska, Marjorie Hekman, Joel Hirsh, Derrell Hood, Ben Huffer, Alexandra Jarvis, Tao Jiang, Ayushya Khanna, Mengfei Li, Amy Meldrum, Ellie Miller, Alex Ramos, Ben Rhiner, Ani Sawant, Tuanhong Song, Colby Thrash, Kata Tisza, Ying Tu, Wenwen Wang, Mary Ann Williford, Mike Witmer

We are also looking forward to our first annual undergraduate fall picnic, this Thursday (Sept 13th) in the Carillon Gardens on campus! This picnic will provide the opportunity for Biosystems Engineering, Environmental Engineering and Geology undergraduate students to network with one another.

In August, **Dr. Annick Anctil** joined the EEES department. Dr. Anctil received a Ph.D. in Sustainability from the Rochester Institute of Technology in 2011 where she also received her M.S in Materials Engineering (2007) after a B.S. in Materials Engineering from Ecole Polytechnique de Montreal (2005). Prior to joining Clemson, she worked as a Research Associate at the National Photovoltaic Environmental Research Center at Brookhaven National Laboratory where she worked on the environmental impact of large-scale photovoltaic power plants and resource availability of critical metals for solar technologies. Dr. Anctil's major research interest is in sustainable energy, in particular photovoltaics, where she uses life cycle assessment to identify the main issues of current technologies and propose alternative solutions. A primary focus of her work is in the environmental impact of nanomaterials and fine chemicals for energy applications, in particular as it relates to reducing the impact of industrial production.

Dr. Kevin Finneran, Associate Professor, was named a Kavli Fellow of the National Academy of Sciences (NAS) in May 2012. The Kavli program recognizes young scientists who are leaders in their field, and brings them together in the Frontiers of Science program, which is a collaborative symposium between the NAS and the leading scientific academy of a foreign country. Professor Finneran was invited to speak and become a Kavli Fellow at the German-American Frontiers of Science conference (GAFOS), held May 10-14, 2012 in Potsdam Germany. The Alexander Von Humboldt Foundation is the participating organization in Germany. Kavli Fellows are encouraged to establish overseas research collaborations with counterparts from their respective Frontiers of Science symposia, and the hosting organizations provide funding to initiate these visiting professorships. His presentation "Bioremediation: basic science meeting applied goals" can be viewed at http://vimeo.com/44772026. Information on the Kavli Frontiers of Science Program can be found here: http://www.kavlifoundation.org/kavli-frontiers-science.

Drs. Ladner and **Karanfil** of EEES and Mefford of MSE were awarded a 3 year $325K project from National Science Foundation CBET entitled "Coupling Small-particle Adsorbents with Membranes for Trace-containment Removal in Water Treatment" They will work developing a hybrid adsorbent-membrane system that will allow multiple treatment objectives in a single process (i.e., the control of both small molecular weight contaminants and microbial contaminants). Moving into the future, sustainable water treatment will require low-footprint and low-energy processes, which are the dual objectives here.

Dr. Cindy Lee has been appointed the Interim Associate Dean for Research and Graduate Studies. This position reports to the dean of Engineering and Science and includes oversight of the college's research centers, alliances and institutes. The associate dean for research and graduate studies assists in the coordination of research activities for the college by identifying and cultivating possible research opportunities. In this role, Dr. Lee also approves the GS-2 forms for the college, along with coordinating the Graduate Teaching Assistant Certification Seminar and the Testing Program. The associate dean also oversees the master's degree programs offered externally.

Drs. Brian Powell of EEES and Scott Husson of ChE will work on recently funded a 3 year $750K project from the National Nuclear Security Administration. The project title is "Alternative Sample Loading Preparation for Thermal Ionization Mass Spectrometry". They will examine different methods of preparing and loading samples for more sensitive TIMS measurements to determine isotope ratios of uranium and plutonium within interdicted or environmental samples.

Dr. Cindy Lee gave two presentations at the American Chemical Society meeting in Philadelphia in August. The first "Integrating Field, Lab, and Modeling to Assess the Distribution of PCBs in a Stream Ecosystem" included co-authors **Viet D. Dang**, Diana L. Delach, and **David C. Hahn**. The second paper, "Role of Inorganic Colloids in the Transport of PCBs from Groundwater to Surface Water" was co-authored by **David C. Hahn** and **Viet D. Dang**.

Dr. Brian Powell also attended the American Chemical Society conference in Philadelpha and gave a talk titled "Development of mechanistic thermodynamic models of actinide sorption to metal oxides" with co-authors **Shanna Estes, Sarah Herr, Yu Xie**, and Yuji Arai. The talk was in a symposium honoring former adjunct faculty member Sue B. Clark for winning the Francis P. Garvan-John M. Olin Medal from the American Chemical Society.

Dr. Tim DeVol, Professor in EEES and Scott Husson of Chemical and Biomolecular Engineering received a $1.05 M grant (over three years) entitled "Ultra-Trace-level Quantification of α- and β-emitting Radionuclides with Extractive Scintillating Resin" from Defense Threat Reduction Agency. Under this grant, the research team proposed research to understand the fundamental science associated with a new class of extractive scintillating resins for radionuclide detection. Scientific advancements from completion of the proposed work will lead toward an on-line monitoring system for α- and β-radioactivity in water, air and sewage sludge which is needed by state, federal and international law enforcement authorities.

Condolences to the Family of **Dr. James Orr "Jimmy" Bryant**, 71, of 213 Village Walk Lane and died Saturday, August 18, 2012 at AnMed Health in Anderson.

Born in Pickens County, he was a son of the late James O. "Jake" and Doris Sears Bryant. Dr. Bryant graduated from Clemson University with a Bachelors Degree in Chemical Engineering, earned a Master's Degree in Chemical Engineering from Rice University and a PhD in Environmental Engineering from Clemson. His career in environmental engineering led him to live in many locations across the country and the world and he retired from Auburn University. He was a US Army Veteran of the Vietnam Era and was affiliated with the Church of Christ

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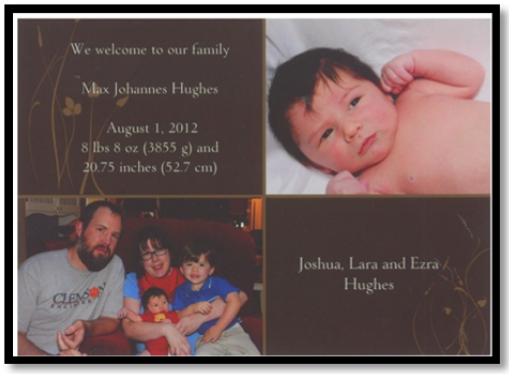
Dr. Andrew Sowder (PhD '98) was a co-organizer for the Gavan-Olin Medal Symposium in honor of Sue B. Clark, former adjunct faculty member of the department and currently Regents Professor of Chemistry at Washington State University. She was honored with the award by the American Chemical Society for her distinguished work in radiochemistry. Kelly Groghan (PhD '12) and Brian Powell (PhD '04 and current EEES faculty member) presented during the award symposium.



Lara Hughes(MS EE&S '02, PhD '06) welcomed Max Johannes Hughes on August 1st.

NEW JOBS FOR RECENT GRADUATES

Jaclyn Ellerie has taken a job at Environmental Standards in Kingston, TN

Kristen Jurinko accepted a position as a hydrogeologist at Golder Associates, Inc.

After completing a Post-Doc with Dr. Tim DeVol, **Peng Luo** has returned to China and is now at The Institute of Modern Physics as a research scientist

Yogendra "Yoge" Kanitkar is looking at several Ph.D. positions in Europe, starting January or May 2013.

U.S.M.A. West Point

Kristina Robertson Private Contractor for the Chattahoochee-Oconee National Forest office in Gainesville, GA

Megan Smith is starting her Ph.D. in this Department

Vladimir Soto joined the US Military Academy at West Point as an instructor.

Sally Gould is a project geologist with HRP Associates, Inc in Greenville, SC.

David Hahn is working as a Staff Geologist for Langan Engineering and Environmental Services in Philadelphia, PA

Peter Van Heest is working as a hydrogeologist with BLE in Greenville, SC.

After completing research with Dr. Cindy Lee, **Diana Delach** (Ph.D. ENTOX) took a post-doctoral position at Clarkson University, and **David Christopher** (MS Civil) is going to India to serve a four-month intership with Engineering Missions International doing design work for orphanages

Xiaojie "Jane" Gan joined URS-BP Barber in Columbia South Carolina as a process engineer.

After completing post-docs with Dr. Karanfil, **Dr. Qiliang Wang** moved to a new post-doc position at Rice University and **Dr. Nuray Ates** returned Turkey to continue her Assistant Professor position in Environmental Engineering at Erciyes University.

The next issue will be published in February, 2013. Please send your submissions for your activities during the Fall Semester to Jan Young (ej@clemson.edu) by January 15, 2013.

(Please do not forget to take pictures!!)

THANK YOU!