



Spring 2011

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# Inside E3S

Department of Environmental Engineering and Earth Sciences

## Environmental Chemistry at EEES



Environmental chemists working within the Environmental Engineering and Earth Sciences Department have unique opportunities to collaborate with engineers and geoscientists in teasing out an understanding of the behavior of chemicals in engineered and natural systems.

For example, **Dr. Elizabeth Carraway** uses chemistry to understand nature especially in terms of the oxidation and reduction reactions that affect both organic and inorganic species through interactions with photochemical energy. Dr. Carraway connects chemistry to engineering through her investigations with nanomaterials and to earth sciences through her work on biogeochemical cycles.

**Dr. Cindy Lee** makes similar connections through her studies of the polychlorinated biphenyls (PCBs) in the natural laboratory of Lake Hartwell and Twelve Mile Creek in the “backyard” of Rich Lab. Her research group is currently investigating the links between contaminated aquatic sediments and soil contamination through spiders, decaying leaves, and colloidal transport in groundwater.

**Dr. Mark Schlautman's** research interests also lie at interfaces between water and wastewater treatment and natural systems such as streams, lakes, groundwater and near surface geologic environments such as soils, sediments, and aquifers. His recent studies have included the input of calcium through rainfall, the use of commercial polyacrylamides for engineered treatments of soils and sediments, and the effects of kudzu on Piedmont soils.



**Dr. Alan Elzerman** brings policy considerations into environmental chemistry through his work on sustainability and environmental policy. His research has also investigated tracers of wastewater inputs into natural waters and fate of radionuclides in groundwater systems.

**Dr. John Coates** has brought his environmental analytical chemistry skills to the development of devices to monitor radionuclides in water supplies. Through the classes offered by the environmental chemistry faculty, all EEES students are exposed to the “central science”, which is critical to understanding how to predict behavior in ecosystems and the subsurface as well as design effective treatment and remediation technologies.

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## Faculty Profile



Dr. Alan Elzerman, Professor & Chair emeritus, joined the department, of Environmental Systems Engineering, in 1978 with the assignment of teaching the required environmental chemistry course. The department was widening its areas of interest. He developed additional courses and initiated the environmental chemistry focus area, which has graduated many MS and PhD students and now has several additional faculty. His first research areas were acid rain in South Carolina and PCBs in Lake Hartwell, an area still active today with Dr. Cindy Lee. Enjoying diverse subjects and encouraging his students and postdocs to pursue things of interest to them, many additional areas were pursued, including aerosol solubility, analytical techniques, groundwater contamination, radionuclides, fate of PAHs, lead in Clemson's drinking water, and Lake Keowee contamination. Dr. Elzerman was Department Chair from 1996 to 2008. During that time the name was changed to Environmental Engineering and Science, and then Environmental Engineering and Earth Sciences. In 2001 he became the Director of the School of the Environment. This added the Department of Geological Sciences, and included the Environmental Science and Policy Program, an undergraduate minor initiated by Dr. Elzerman. He served as the Clemson leader of the Sustainable Universities Initiative and is still very active in sustainability studies and teaching. He has also held many positions in the American Chemical Society.

## Chair's Corner

Dear EEES alumni and friends:

I am pleased to present to you the new issue of our alumni newsletter highlighting some of our activities and accomplishments during the past semester. Please note that we also publish an eNewsletter every semester on the "Newsletter Archives" section of our web page. Please visit us at the web to learn more about the events and activities in the Department.

The most important event in this semester was the 90<sup>th</sup> birthday of Dr. Gene Rich that we celebrated at the L.G. Rich Laboratory, named in honor of Dr. Rich. We were very pleased to see several of our alumni attending this event. We prepared an ePhotobook from the event that you can see from our web page. Dr. Rich was also awarded with the Order of the Palmetto, the highest honor given to a civilian in the State of South Carolina. Dr. Rich's career, love and contributions to the Environmental Engineering profession and to the Department have been a great inspiration to all of us.

We had another (19<sup>th</sup>!!) very successful David Snipes Hydrogeology Symposium with over 300 attendees and 28 exhibitors. This is now a well established go-to event for geologists and hydrogeologists. Its influence and attraction pass beyond the boundaries of the Southeastern United States.

Dr. Rich Warner retires this summer after 30+ years of dedicated and loyal service to our Geology program. We offer him our sincere appreciation, and we wish for him a joyful retirement.

On the cover, you will see our feature article about our Environmental Chemistry program. This has been a major program in the Department with historical recognition and legacy. As always, we are proud of the accomplishments of our students. Their hard and high quality work is recognized in different forms, at both national and departmental levels. At EEES, we have always maintained a unique professional and collaborative atmosphere among our faculty, students and staff, making EEES a special place to study and work. I am proud to see this legacy continuing and getting stronger.

We greatly appreciate your continuous support and generous donations to the Department. They provide important resources to the Department and especially students during these challenging economical times. THANK YOU! Please visit us if you happen to be around the Clemson area, and keep us informed about the events and accomplishments in your life.



**Tanju Karanfil, Ph.D., P.E., BCEE**  
**Professor and Chair**

## Student Awards

**Jia Hu's** doctoral dissertation "Exploring Formation and Distribution of Halonitromethanes in Drinking Waters" was selected as one of the best doctoral dissertations completed in 2010 by American Water Works Association. Jia will receive her award (and a \$3000 check) at a ceremony during the Annual Meeting of American Water Works Association in Washington, DC this summer. **Dr. Karanfil, Jia's** doctoral research advisor, will be recognized with a plaque at the ceremony.

**Viet Duc Dang** and **Ting Shao** were selected as the recipients of Graduate Student Awards from the Division of Environmental Chemistry of American Chemical Society. Each year the Division of Environmental Chemistry recognizes up to 25 graduate students nationwide. The award is based upon students' records in course work, evidence of research productivity, and on statements from graduate faculty advisers. Primary emphasis is given to the students' potential for future contributions as professionals in environmental chemistry.

**Jim Chamberlain** was awarded a Paul Harris Fellow by Rotary Club International for his work in El Salvador. For the past three years, Jim has taken Clemson engineering students down to survey, prepare, and design drinking water supply systems to rural developing communities. The work has resulted in three Rotary grants (totaling \$75,000) that are part of a collaborative effort bringing water to over 13,000 native residents.



## Department/Faculty News

### 2011 Hydrosymposium



The 19<sup>th</sup> Annual Clemson/David S. Snipes Hydrogeology Symposium was held on April 7 at the Madren Center at Clemson. This year's event attracted over 300 attendees with most from SC but others coming from NC, GA, TN, VA, MS, and FL.

There were fifty oral and poster presentations given over three consecutive sessions. The theme sessions covered innovative techniques for groundwater and soil remediation using oxidation technologies, CO<sub>2</sub> sequestration, constructed wetland treatment systems, well and stream monitoring networks, bioremediation, stream and watershed hydrology, and the Geology undergrad Creative Inquiry projects.

The field trips to the Chattooga River were led by Scott Brame. They consisted of a river level examination of the rocks and processes that have shaped the morphology of the Chattooga River.

### South Carolina Environmental Conference

EEES graduate students attended the South Carolina Environmental Conference, March 12-15, 2011 and made poster presentations.

**Meric Selbes** received the first place award and was selected to represent AWWA SC Section at the Fresh Ideas Poster Competition during the AWWA National Meeting in Washington, DC this summer. **Daniel Lewis** and **Xiaojie "Jane" Gan** received the second and third place awards, respectively.

**Tony Johnston** made a platform presentation entitled "Evaluating the Energy Use and Greenhouse Gas Emissions of Water Utilities".

**Christina Anderson** and **Andrea Hicks** received the A. Ray Abernathy Fellowship and L.G. Rich Awards, respectively, during the Water Environment Federation luncheon at the conference.



### Faculty News

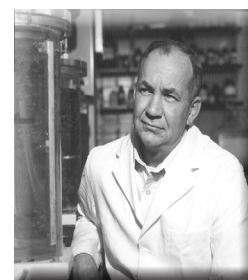
**Dr. Cindy Lee** presented the short course "Using Structure to Predict Behavior: Legacy and Emerging Contaminants" at the University of Costa Rica upon the invitation of the Centro de Investigacion en Contaminacion Ambiental from March 14 to 18, 2011.

**Dr. Brian Powell** was selected to receive the prestigious 2011 Outstanding Young Investigator Award for the Clemson University chapter of Sigma Xi. This is an important recognition of Dr. Powell's scholarly accomplishments and contributions to the Department and University.

### EEES Mourns the Loss of Professor John F. Andrews

**Professor John F. Andrews**, 80, passed away on April 10, 2011, in Fayetteville, AR.

**Professor Andrews** received his PhD from the University of California, Berkeley. Upon graduation in the early 1960s he taught environmental engineering at the University of Arkansas for a short period before accepting the second faculty position in Clemson University's newly established master's and doctoral environmental engineering program, later serving as Department Chair in the newly formed Environmental Systems Engineering.



**Professor Andrews'** lasting legacy at Clemson University was that he insisted on maintaining a high level of very high quality innovative research and publication which became institutionalized in Clemson's department, now called Environmental Engineering and Earth Sciences. As a result the department became highly ranked nationally and internationally.

### Congratulations Hydro!!

The **EEES Hydrogeology Program** is listed as a top 100 program by the National Ground Water Association (NGWA). More than 400 programs were considered. The list can be found at: <http://www.ngwa.org/students/hydrogeology-programs.aspx>

### Department Inaugurates AWWA/WEF Student Chapter



**Dr. Tanju Karanfil** introduces the new AWWA/WEF chapter to interested students at the kickoff meeting in March 2011.

This March the department inaugurated a joint student chapter of the American Water Works Association (AWWA) and the Water Environment Federation (WEF). These organizations give students opportunities for professional development in water and wastewater careers.

Morgan Young from the engineering firm Black and Veatch has been the main organizer from the industrial side, working with **Dr. Karanfil** to get the chapter up and running. **Dr. David Ladner** is now serving as the faculty advisor. Over sixty students came to the first

two meetings, getting the chapter off to an excellent start. If you want to get involved, email [ladner@clemson.edu](mailto:ladner@clemson.edu).



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Visit the ePhotobook at <http://www.youtube.com/watch?v=faHZkIOG0fE>

## Dr. Linvil G. Rich turns 90, receives Order of the Palmetto Award

### Happy Birthday Dr. Rich!



Dean Linvil "Gene" Rich's 90<sup>th</sup> birthday was celebrated in April by the Department of Environmental Engineering and Earth Sciences after a seminar by his son, Graham Rich of Arkansas Central Water, on the "Implementation of Total Water Management Strategies to Improve Water Quality and Achieve

Regulatory Compliance with EPA's Safe Drinking Water Act."

Gene received his undergraduate and graduate degrees at the Virginia Polytechnic Institute. In 1960, he was appointed head of the Department of Civil Engineering at Clemson. Shortly after he arrived, he was named the Dean of Engineering.

During his tenure as dean, Gene transformed the College of Engineering from an undergraduate teaching program at a former military school to an engineering college with graduate teaching and research.



Gene played early roles in many professional societies including the American Academy of Environmental Engineers (AAEE) and the Association of Environmental Engineering and Science Professors (AEESP). He has been a Board Certified Environmental Engineer for over a half century.

We are pleased to say that Gene is still serving as a role model for environmental engineering faculty. We benefit from his contributions and are happy to experience his humor and joy of life.

### Dr. Linvil G. Rich receives the Order of the Palmetto Award

**Dr. Gene Rich**, former dean of engineering who created one of the nation's first environmental engineering departments has received the highest civilian honor awarded by the state of South Carolina.



Gene received the Order of the Palmetto, which is awarded to persons who make contributions of statewide significance. Created in 1971 to recognize lifetime achievement and service, the Order of the Palmetto is bestowed by the governor. Presentation of the award was made by state Sen. Kevin Bryant Friday, April 15.

Born in Pana, Ill., in 1921, Rich served in Europe in World War II in Gen. Patton's Third Army. After the war, he earned undergraduate and master's degrees in engineering and a doctorate in biochemistry from Virginia Polytechnic Institute and State University.

"There's no place like Clemson. I came down here in 1960 from Chicago. 'I was in a state of shock,' he chuckled. "They've been wonderful years. Clemson is a great place to make a career and raise a family."

Rich retired from Clemson in 1986. The L.G. Rich Environmental Research Laboratory was dedicated Sept. 20, 1991, and a Linvil G. Rich Fellowship Fund has been established at Clemson by the South Carolina Water Environment Association and the South Carolina Section of the American Water Works Association.