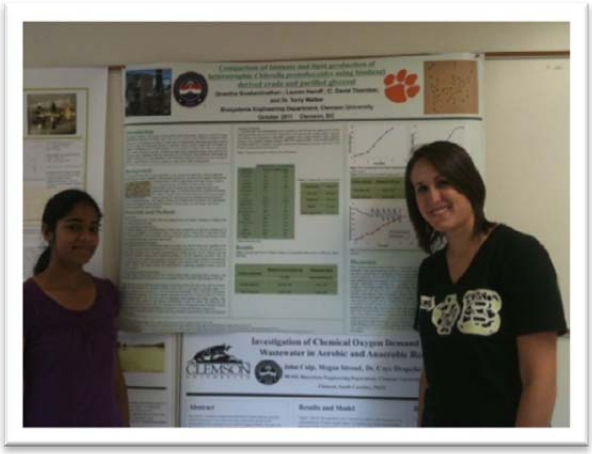
EEES NEWS

Student News FALL, 2011

Kelly Grogan, EE&S PhD candidate and one of the recipients of the 2012 Roy G. Post Scholarship is invited to attend the Waste Management Conference (WM 2012) in Phoenix, Arizona in February, where he will accept the scholarship.



This October Biosystems Engineering graduate student **Shwetha Sivakaminathan** and honors undergraduate senior **Lauren Harroff** presented the results of their study on a Comparison of Biomass and Lipid Production of Heterotrophic Chlorella Protothecoides Using Biodiesel Derived Crude and Pure Glycerol at the University of Texas Workshop on Micro Alga Production in Austin, TX. The aim of this study was to observe the growth of a microalga Chlorella protothecoids in batch and fed-batch mode using crude glycerol from biodiesel production as substrate in order to scheme a cost efficient process for producing high quality biodiesel. Preliminary studies showed that under batch conditions, growth of C. protothecoides with crude glycerol was about 11.14 g/L while that with glucose was only 6.11 g/L. In batch mode the biomass and lipid concentration of C. protothecoides cultivated for six days in a crude glycerol medium were 11.14 g/L and 3.16 g/L. In the fed-batch mode the biomass and lipid concentration improved to 22.13 g/L and 6.21 g/L after 8 days of cultivation, respectively. The maximum lipid productivity of 0.74 g/L/day in the fed-batch mode was higher than that produced by batch cultivation. This work demonstrated that crude biodiesel glycerol can be utilized as a potential carbon substrate for microalgal cultivation, which will increase lipid production and hence biodiesel production.

Heather Sprague, Biosystems Engineering junior, won the McAlister Foundation Scholarship for 2012. Heather is from Spartanburg SC and is involved with many CU organizations including BE student club, WISE and CES ambassadors program.

Lauren Harroff, Biosystems Engineering senior from Concord, NC, has been selected as a finalist for a Fulbright Grant by the National Screening Committee of the Institute of International Education. Lauren has proposed to work with communities near Kampala, Uganda to investigate the educational and cultural impediments that Ugandans face in adopting anaerobic digestion technology for waste treatment and bioenergy generation. Lauren will be notified later in the spring with the final decision of her application.

The Clemson Student Chapter of the American Water Works Association (AWWA), which was begun in Spring 2011, continued full speed ahead in Fall 2011. Pictured here are the executive committee members: Jackie Lauer (President), Kathryn Fauerby (President-Elect), Zach Priester (Treasurer; recently replaced by Kevin McIntyre), and Jessica Bush (Secretary), with faculty advisor **Dr. David Ladner**. For Spring 2012 planned events include a Career Panel where industry representatives will visit Clemson and teach students about finding internships and full-time jobs in the water sector. Also, AWWA students will take part in the South Carolina Environmental Conference in Myrtle Beach. Look for stories about those events in the next newsletter!

April Gillens, EE&S PhD student, will present a paper entitled "Rapid Quantification of TBP and TBP Degradation Product Ratios by FTIR-ATR" at the Methods and Applications of Radioanalytical Chemistry (MARC) IX Conference in Kailua-Kona, Hawaii March 25-30. **April's** advisor is **Dr. Brian Powell.**

Recent Publications:

Bridhikitti, A., and **Overcamp, T. J**. "Estimation of SE Asian Rice Paddy Areas with Different Ecosystems from Moderate-Resolution Satellite Imageries," Agriculture, Ecosystems, and Environment, 146 (1): 113-120.

Elango, V., Kurtz, H. D., Jr., Anderson, C., and Freedman, D. L. "Use of γ-Hexachlorocyclohexane as a Terminal Electron Acceptor by an Anaerobic Enrichment Culture." Journal of Hazardous Materials, 197, 204-210 (2011).

Elango, V., Kurtz, H. D., Jr. and Freedman, D. L. "Aerobic Cometabolism of Trichloroethene and cis-Dichloroethene with Benzene and Chlorinated Benzenes as Growth Substrates." Chemosphere, 84, 247-253 (2011).

Announcements:

Vladimir Soto, (MS, EE&S) and his wife were blessed with twin sons, Gabriel and Rafael, on October 26, 2011.

Congratulations to Vladimir and his new family!

THE HOLIDAY PARTY

The Faculty, Staff and students had a wonderful time of fun, food and fellowship at the Holiday Party hosted by the EEES students! Thank you students for a great time!

During the holidays, the Staff did their annual food drive for the Clemson Helping Hands. Faculty, staff and students were extremely generous and the donation to the Helping Hands was much appreciated.

Also during the holidays, the Staff chose a child from the Cooper Library Angel Tree. They thoroughly enjoyed the shopping trip to supply Holiday joy for the child.

A heartfelt **THANK YOU** goes to Nutra Manufacturing in Greenville, South Carolina for their generous donation of two Agilent 1100 HPLC systems (right), three analytical balances, several stir plates, and an auto-titrator to EEES in December. These will complement the analytical capabilities at Rich Lab.

The biodiesel program at Clemson University has been named the Energy Project of the Year by the Association of South Carolina Energy Managers. Director of Utilities Tony Putnam received the award for the program which is collaboration between the Facilities and Maintenance Organization and the EEES Biosystems Engineering Program under the supervision of **Dr. Terry Walker**.

The biodiesel initiative was started with the goal to convert diesel-powered vehicles to use more biodiesel made from cooking oil collected from dining halls and local businesses. The vehicles and equipment in university Facilities landscaping and utility services use 20 percent biodiesel now. The plan is to increase that to 50 percent in most vehicles, and 100 percent in a few vehicles.

Biodiesel is an environmentally friendly alternative to diesel fuel. It is made from renewable sources such as vegetable oil, animal fats, cooking oil and even algae. At Clemson, the cooking oil is taken to the BioEnergy Lab in McAdams Hall, where students work with instructors and staff to convert the cooking oil into fuel. This work is done in a facility that is powered 100 percent by renewable energy.

"With innovative research on emerging alternative fuel sources and the continuing support of the Clemson facilities staff, our percentage of renewable fuel consumed will continue to increase, improving Clemson's environment and establishing Clemson University as a leader in renewable fuels research and implementation," said **David Thornton**, research associate for the biosystems engineering program.

Vehicles need no modifications to use the biodiesel fuel, which is distributed from a 1,000-gallon tank at the university lumber yard. The current program capacity saves $8,000 to $9,000 a year and keeps 70,000 pounds of carbon from reaching the atmosphere.

The biodiesel program is part of a larger sustainability initiative at Clemson.

Dr. Richard Warner led two exceptional fieldtrips during his final semester teaching Mineralogy. In early October the class of 15 collected a variety of minerals from rutile (TiO_2) to kyanite (Al_2SiO_5) at Graves Mountain in Georgia. The Geology Club borrowed many minerals collected at Graves Mountain for a display at the Clemson Geology Museum. The second fieldtrip, in early December, was a mineralogy and petrology tour of the Piedmont and Blue Ridge geologic provinces, where the class visited sites including the shores of Lake Hartwell, an overlook at Caesars Head State Park, and the overpass at Toxaway Falls. Along the way, there was plenty of time for hiking, mineral collecting, and most of all learning! The department will miss Dr. Warner and hopes to continue to cross paths in the field.

Dr. Kevin Finneran has been invited by the National Academy of Sciences (NAS) to speak at the German-American Frontiers of Science (GAFOS) symposium in Potsdam Germany in May, 2012. This is part of the Kavli Fellows program. It is co-sponsored by the Alexander von Humboldt Foundation (German NAS counterpart) and brings together young faculty who are leaders in their field to a broad ranging conference on current issues in science and engineering.

Congratulations to **Drs. Kevin Finneran and Mark Schlautman** who were approved to work on a $600K project funded by the Department of Defense Strategic Environmental Research and Development Program (SERDP). Clemson will use ~60% of the funds and Geosyntec and Army Corps Research Lab will share the other ~40%.

The project is titled "Combined Biological and Chemical Mechanisms for Degradation of Insensitive Munitions in the Presence of Alternate Explosives" and will focus on understanding how combined chemical and biological reactions influence degradation of insensitive munitions 2,4-dinitroanisole and 3-nitro- 1,2,4-triazole-5-one.

In November, the **Lee** Research Group attended the Society of Environmental Toxicology and Chemistry (SETAC) North American meeting in Boston. **Diana Delach** (PhD, Entox) gave three presentations. Her two platform presentations were titled "Chiral Signatures of Subsidiary PCBs in Spiders along an Exposure Gradient" and "Women in Environmental Chemistry: Past Accomplishments and Present Challenges," which was an invited talk. **Diana** also presented a poster "Characterization and Quantification of PCB Metabolites in Riparian Spiders." **Sandra Reller** (MS, EE&S) presented a poster "Dissolved PCB Concentrations Measured by Passive Samplers." **Diana and Viet Dang** (PhD, EE&S) were co-authors. **Jessica Dahle** (BS, Chemistry) presented her poster titled "Chiral Selection of PCBs in the Webs of Riparian Spiders" with **Diana and Viet** as co-authors.

Margaret Thompson, J.D., Lecturer, Environmental Science, Law, and Policy, attended a special evening event in April, 2011, at The University of Michigan Law School, honoring Joseph L. Sax. Often referenced as "The Father of Environmental Law," Joe Sax taught at Michigan from 1966 to 1986, before joining the faculty at the University of California (Boalt Hall) where he is now an emeritus professor.

An alumna of The University of Michigan Law School, J.D. 1984, I had enrolled in a Joe Sax course in the Fall of 1983, to expand my horizons, and then next thing I knew, I was in EPA Region II (New York Office) handling Superfund cleanups at notorious New Jersey sites, working for another Joe Sax alumnus. I have maintained my commitment to environmental science, law, and policy since then, and I was privileged to take part in what was a memorable occasion at Michigan Law.

I learned that with EN SP 400, I have developed a course that is patterned after Michigan's interdisciplinary approach to the subject and is, appropriately, included in the Environmental Engineering and Earth Sciences curriculum.

CONGRATULATIONS!!!

Associate Dean for Academic Programs and Initiatives

Dr. Nancy Love is a professor and chair of the Department of Civil and Environmental Engineering at the University Michigan. In September 2011, she became Associate Dean for Academic Programs and Initiatives in the Rackham Graduate School at the University of Michigan. Prior to 2008, Dr. Love was an Assistant, Associate and Full Professor of Civil and Environmental Engineering and an Adjunct Professor of Biological Sciences at Virginia Tech.

Her research focuses on environmental biotechnology and water quality with an emphasis on engineered treatment systems. Her specific interests focus on the fate of stressor chemicals in these systems, the use of technologies to sense and remove these chemicals, and on resource recovery from wastewater.

Dr. Love has B.S. and M.S. degrees in Civil Engineering from the University of Illinois, and a Ph.D. in Environmental Systems Engineering from Clemson University. After completing her M.S. degree, she worked as a process design engineer for approximately 3 years for CH2M Hill, Inc.

James F. Chamberlain (MS, 1994; PhD, December 2011) passed the exam for Board certification (BCEE) with the American Academy of Environmental Engineers. His specialty is "Environmental Sustainability".

Arika Bridhikitti (PhD, May 2011) currently holds research and teaching positions at Maharasakham University, Thailand. Arika has been invited as one of visiting scientists from many countries for the Young Scientist Support Program of APEC Climate Center (APCC), South Korea, for 2 months, starting from 1 January 2012. During the time in APCC, she will investigate the effects of El Nino/La Nina Southern Oscillation (ENSO), Indian Ocean Dipole temperature anomalies, aerosols, and land cover changes on Thailand climatology. Furthermore, she wishes to apply this understanding to forecast rainfall in Thailand.

RECENT GRADUATE NEWS

Katelyn Bryll (MS, December 2011)

Peng Luo, (PhD, December 2011) is working with Dr. DeVol as a Research Associate. The primary duties include setting up experimental instrumentation for radiation detection and measurements for EES 611 class, and doing modeling for gas-filled radiation sensor with Nano-tubes by using COMSOL.

Pooja Mistry (MS, December 2011) is applying for jobs at this time.

Sandra Reller (MS, December 2011)

Tara Matheny, (MS, December 2011) is working as a scientist in the Radiation Protection group at McGuire Nuclear Station- one of Duke Energy's nuclear power facilities that is located a little north of Charlotte.

CONGRATULATIONS TO THE EEES BABY BOOMERS!

Sule Kaplan gave birth to a little girl, Zeynep Sevval, on January 28th. **Sule** was a visiting scholar in **Dr. Tanju Karanfil's** research group for nearly five years. Congratulations Sule and Mustafa!

Rong (Gloria) Zhang (MS, EE&S), gave birth on October 13, 2011 to a son, Samuel Bo'en Zhu. Congratulations and best wishes to the new family!

William Noah Hicks, son of **Andrea Hicks** (MS, 2010), arrived a little early (6 weeks) but according to his mom, he is doing just fine. **Andrea** is pursuing her PhD at the University of Illinois.

Frank Rombardo (MS, EE&S) and his wife, Jenn, are proud to announce the arrival of their little boy, Frank P. Rombardo, III, born June 29, 2011.

Ying Hong (PhD, 2006) was employed with Black and Veatch in Orlando. She is a stay-at-home mom since the birth of her son, Alex.

Joon Lee (PhD, 2008) and his wife Clair Lee, are proud to welcome Suah Kate Lee born August 16, 2011.

*The next issue will be published in May 1 2012. Please send your submissions for your activities during spring and summer to Jan Young (ej@clemson.edu) by April 20th… and **PLEASE**, take **PICTURES!***

THANK YOU!