



# Biological Systems Engineering

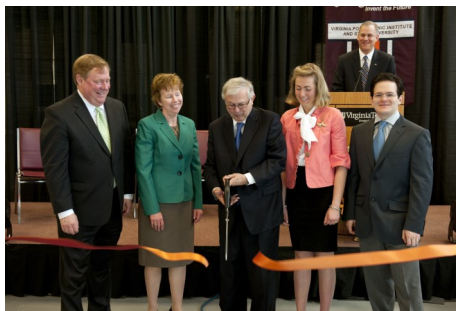
**Newsletter**

**Spring 2014**

## Congratulations—BSE Class of 2014!



## Human and Agricultural Biosciences Building 1



(L-R) Joe Marcy (FST Dept. Head), Mary Leigh Wolfe (BSE Dept. Head), President Charles Steger, Alexandra Walsh (FST PhD student), and Daniel Wolozny (BSE PhD student) participate in the official ribbon cutting ceremony at HABB1.

In December 2013, the BSE and Food Science and Technology (FST) Departments began the process of moving into the new Human and Agricultural Biosciences Building 1 (HABB1). The official Grand Opening took place on March 21, 2014. Events included a ribbon cutting; remarks by Dean Grant, Daniel Wolozny (BSE PhD student), Alexandra Walsh (FST PhD student), and President Steger; tours by faculty and graduate students; and a reception. HABB1 is the first of four new buildings planned for the Human and Agricultural Biosciences Precinct. The building was designed to incor-

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“Although I’ve been doing research for four years now, coming to work in a brand new building was a first for me. The lab space is well-lit, we have three brand new autoclaves, building-wide deionized water, even a graduate student lounge a few paces away for our convenience: a dream come true! The building even comes with an atrium to remind us that the outside world does exist!”

**Daniel Wolozny—BSE PhD Student**

**VirginiaTech**  
Invent the Future

# Department News



Dear BSE alumni and friends,

We completed the academic year on a high note, with commencement festivities on May 16-17. Congratulations to all of our graduates on their undergraduate and graduate degrees. We wish them the best in their new endeavors. The graduates are headed to a variety of opportunities; we look forward to hearing how their careers develop. We know that they will have great success!

This spring 2014 semester has been a busy and exciting one. Many of our research laboratories began moving into the new Human and Agricultural Biosciences Building 1 (HABB1) in December; the move continued into the spring. The Grand Opening was held on March 21. University President Steger led the celebration, providing remarks and cutting the ribbon. Faculty, staff, and graduate students are well settled into the space now, and research is going strong. One space in the building that we are particularly excited about is the BSE Pilot Lab. This 3,227 square foot, two-story high space provides the BSE department with a great opportunity to work with industry and government partners to expand our work to pilot-scale processes. We are currently developing a strategic plan for maximizing the beneficial use of the Pilot Lab. You can take a "tour" of HABB1 on page 10.

I am very pleased to let you know that we have hired several new faculty and staff members this spring. Cora Chen is our new bioprocess laboratory manager; she provides technical support to the bioprocess emphasis area of the department in the acquisition, operation, and general repairs and maintenance of laboratory equipment and manages the unit operations laboratory. Priscilla Baker is our new Undergraduate Student Services Coordinator. This is a new, half-time position that is needed to better serve our increasing undergraduate student enrollment, which we expect will exceed

*(Continued on page 3)*

## Valued Contributors to BSE (12/16/13 - 5/31/14)

The BSE faculty, staff and students would like to thank our alumni, friends, and organizations who have generously supported the department through their gifts and donations. Please contact the department if your name has been omitted as we want to make sure that we have recognized all our donors ([barbt@vt.edu](mailto:barbt@vt.edu), [mlwolfe@vt.edu](mailto:mlwolfe@vt.edu)). Your contributions are used to provide student scholarships, purchase teaching laboratory equipment, aid in recruitment of outstanding graduate students, enable students to participate in special projects both domestically and internationally, and allow students to attend professional conferences. Activities that we would like to add or expand through the generous contributions of our alumni and friends include senior design project fabrication and a Distinguished Lecture Series.

Blackwell, Neal  
Brown, Patsy  
Collins, Eldridge  
Cundiff, John  
Dominion Foundation  
Finney, Essex  
Graham, Mark & Katy  
Hale, John  
Hatcher, Charles  
Higgins, Jeffrey  
Holmes, Brian  
Lane, Robert  
Mangili, Nicholas  
Moore, Jo Ann

Parsons, Carol  
Point Breeze Farm  
Purdue, William  
Rakes, Bruce  
Reid, Diane  
Resop, Jonathan & Shannon  
Rowland, Neville  
Smith, Easley  
Smith, John  
Stroup, Elizabeth  
Tweedy, Kevin  
Vaughan, David  
Virginia Water Well Association  
Yagow, Eugene

## BSE Advisory Board Members 2013-2014

### Amy Alber

Frito-Lay, Inc.  
Lynchburg, Virginia

### Clifton Bell, P.E. (Vice-Chair)

Brown and Caldwell  
Virginia Beach, Virginia

### Matthew Dickson (Chair)

MedImmune, Inc.  
Gaithersburg, Maryland

### J. Michael Flagg, P.E.

Hanover County Public Works  
Hanover, Virginia

### Dale Lehman, P.E.

URS Corporation  
Germantown, Maryland

### Kumar Mallikarjunan (Faculty)

Biological Systems Engineering  
Virginia Tech

### Angela Parrish, P.E.

USDA Forest Service  
Roanoke, Virginia

### Farzaneh Rezaei

Novozymes Biologicals, Inc.  
Salem, Virginia

### Kelly Ramsey, P.E. (NRCS Liaison)

USDA - Natural Resources  
Conservation Service  
Richmond, Virginia

### Andy Southerly

Cargill Meat Solutions  
Wichita, Kansas

### Kevin Tweedy, P.E.

Ecosystem Planning and Restoration,  
LLC  
Cary, North Carolina

### Mary Leigh Wolfe (Department Head)

Biological Systems Engineering  
Virginia Tech

*Visit our website:*

<http://www.bse.vt.edu/>

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150 by fall semester. Priscilla's primary responsibility is academic advising; she will also coordinate undergraduate student recruiting. We have also hired a new faculty member, Dr. Xueyang Feng, who will be joining the department in August. Dr. Feng is currently a post-doctoral associate at University of Illinois; his research focuses on yeast lipid metabolism for both biomedical and biochemical applications. We will profile Xueyang in the fall newsletter.

As we begin summer, we are looking forward to a busy season of research, outreach, and renovation. Our two National Science Foundation Research Experience for Undergraduates (NSF-REU) programs will each welcome their third summer cohort. Renovation of the second floor conference room in Seitz starts May 27. Over the summer, we will be converting the old food engineering lab in Seitz to a senior design workshop/laboratory. In the fall newsletter, we will feature the "new" spaces in Seitz.

Best wishes for a relaxing and fun-filled summer! Please visit us when you are in Blacksburg.

Sincerely,

*Mary Leigh Wolfe*

(Continued from page 1)

porate open workspaces and communal areas so that faculty and students can work collaboratively. Other features of the 93,860 square foot building include plenty of natural lighting, passive heat, and recycled building materials. LEED certification is expected to be received in July.

Specific facilities within HABB1 range from nanoscale research laboratories to pilot-scale research facilities that will enable large-scale systems to be built and operated to generate information or to provide training for larger facilities. There are separate pilot-scale facilities for food and non-food products. The BSE Pilot Lab will focus on bio-based products, such as bio-energy, biomaterials, and biochemicals. There is also a biosecurity level 2 food processing facility that allows scientists to conduct experiments using *E.coli*, *Salmonella*, and other pathogens that require a higher level of safety.▪



## BSE Advisory Board

In each newsletter, we highlight the background and activities of one of the BSE Advisory Board members. Clifton Bell is featured in this issue.

**Clifton Bell** received his BS in geology from William and Mary in 1990, and his MS in environmental engineering from Virginia Tech in 1995. He began his career in 1992 with the U.S. Geological Survey's Virginia Water Science Center, where he performed hydrologic and water quality studies around the Commonwealth. In 1997, Bell made the leap from federal government into environmental consulting by joining Malcolm Pirnie, Inc. (now ARCADIS) in Newport News, VA. In 2012, Bell joined Brown and Caldwell's Virginia Beach office, where he serves as Technical Leader for Water Quality in the mid-Atlantic region.



Bell's technical area of focus is water quality management. This broad area includes permitting, water quality modeling, water quality master planning, and water quality standards development. His clients have ranged from wastewater utilities and municipal departments to state and federal government. Many of his projects are driven by the total maximum daily load (TMDL) program, whereby regulatory agencies identify the maximum amount of a potential pollutant that can enter a water body without impairing its designated uses. Other projects are driven by clients' needs to obtain or comply with wastewater discharge or stormwater permits. Examples of projects Bell has led include:

- Developing TMDLs for metals in copper mining terrain in Arizona.
- Providing technical representation of municipal wastewater utilities in nutrient reduction efforts for the Chesapeake Bay and James River.
- Writing national guidance on the use of nutrient models for the Water Environment Research Foundation.
- Leading stormwater quality compliance efforts for the Virginia Port Authority.
- Creating watershed management plans to address bacterial impairments in South Carolina.
- Facilitating multi-stakeholder negotiations on clean-up plans for the Savannah Harbor in Georgia.
- Representing the wastewater sector in the statewide development of nutrient standards in North Carolina.

Bell is a certified professional geologist and licensed professional engineer in Virginia. In 2014-2015, he will serve as the chair of the BSE Advisory Board.

Clifton and his wife Laurie reside in Williamsburg, VA with their son and daughter. They enjoy hiking and biking both in Virginia and—when possible—the western U.S. They also enjoy Virginia Tech football and pull hard for the Hokies unless they are playing the Tribe.▪

# BSE Student News

## ASABE Student Branch News



The design competition at the 2014 Southeastern Regional Rally. (Dylan Cooper standing up and Emily Hilburger holding the bottom.)

The Southeastern Regional Rally was main focus for the ASABE Chapter at Virginia Tech this semester. This year's Rally was held at Auburn University in Alabama, which is the home college of the southeastern region president. Five ASABE members (**Sarah Nash, Dylan Cooper, Jordan Wetzig, Brendan Tobin, and Emily Hilburger**) made the eight hour drive to spend an awesome weekend getting to know Biological Systems Engineers from different schools and learning about Auburn University's program in particular. Many exciting ideas stemming from this trip are in the works for next year! And we are already planning for next year's Rally in Gainesville, FL, where we hope to represent our chapter with an even larger number of Hokies.

This spring ASABE also teamed up with Virginia Tech Site & Infrastructure Development to organize a stream clean-up. In just a few hours on a single weekday night, truck beds were filled with garbage bags full of litter found in the Duck Pond, the Grove Lane detention pond, and the BSE STREAM Lab. We hope to make this clean-up an annual event.

In April we participated in the Relay for Life on a joint team with the BioChem club.

ASABE members are in good hands next year with the newly elected officers: **Sara Gokturk** (President), **Dylan Cooper** (Vice President), **Jordan Wetzig** (Treasurer), and **Emily Hilburger** (Secretary).

**Sarah Nash**, ASABE Chapter President (2013-2014)

## GSO (Graduate Student Organization)

Winter and spring 2013/2014 was busy once again in the BSE department at Virginia Tech. The fall 2013 semester ended with another successful white elephant holiday party supported by the GSO. Winter 2014 brought on two feet of snow and multiple prospective graduate student recruits, many of whom are planning to join us in fall 2014! Winter also saw the first semester of BSE seminar in the new HABB1 building, with snacks provided by students (coffee by GSO). In more recent news, GSO held its spring elections in order to usher in a new group of highly motivated BSE'rs! Congratulations to the officers for the 2014-2015 year; **Chelsea Corkins** (President), **Hehuan Liao** (VP, L&W), **Frank Gillam** (VP, Bioprocessing), **Stephanie Houston** (Secretary), and **Felicia Chang** (Treasurer).

**Nick Cook**, GSO President (2013-2014)

## Fall 2013 Dean's List

Congratulations to the BSE undergraduate students who made the Dean's List in the fall 2013 semester. Undergraduate students must attempt at least 12 credit hours graded on the A-F option and earn a 3.4 grade point average (on a 4.0 scale) during the spring or fall semester to be awarded Virginia Tech Dean's List status.

### *BSE Sophomores (in fall 2013)*

**Brooke Baugher**  
**Christopher Gilson**  
**Alexandria Gruendl**  
**Kyle Jacobs**  
**Christopher Marple**  
**Christopher Rasnick**  
**Kindell Schmitt**  
**Katie Spruill**

### *BSE Juniors (in fall 2013)*

**Bushra Alam**  
**Christopher Balian**  
**Jacob Cantor**  
**Lindsay Carr**  
**Dylan Cooper**  
**Haley Fuller**  
**Yoon Kyu Lee**  
**Jennifer Lewis**  
**Daniel Logsdon**  
**Anish Luthra**  
**Austin Moon**  
**Maryjoe Rice**  
**Scott-Eugene Saverot**  
**Michael Scimeca**  
**Xunuo Shen**  
**Nancy Stevenson**  
**William Strickland**  
**Shanel Tsuda**  
**Eda Turgut**  
**Jordan Wetzig**

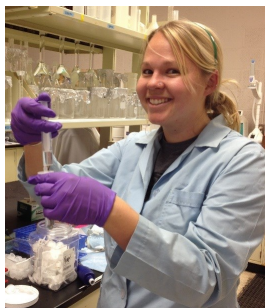
### *BSE Seniors (in fall 2013)*

**Mitchell Dillon**  
**Jaclyn Einstein**  
**Kelly Ferguson**  
**Benjamin Fox**  
**Angela Foy**  
**Theresa Garwood**  
**David Gong**  
**Joshua Gozum**  
**Kinsey Hoffman**  
**Meghan Laporta**

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## Pieper Receives Grants

Doctoral candidate **Kelsey Pieper** recently received two grants to support her research on lead release from on-site plumbing in homes reliant on private drinking water systems: a \$5000 grant from the Virginia Water Resources Research Center, and a \$700 grant from the Virginia Tech Graduate Student Association. These funds will sup-



port Kelsey's effort to conduct an in-depth sampling campaign to better understand lead concentrations observed

in homeowner collected grab samples processed by the Virginia Household Water Quality Program. Kelsey is advised by **Leigh-Anne Krometis** (BSE assistant professor).

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**Travis Moore**

**Sarah Nash**

**Victoria Nelson**

**Edgar Oliveros**

**Cassidy Owen**

**Brian Shenk**

**Lauren Smith**

**Michael Swartz**

**Aishwarya Venkat**

**Thinking about  
grad school...**

**Or know of someone  
who is?**

BSE is accepting applications

**Application due date:  
Spring 2015: October 1, 2014**

For more information, please  
visit: [www.bse.vt.edu/apply](http://www.bse.vt.edu/apply)



## Alpha Epsilon (BSE honor society)

The opening of the new HABBI building has proved an exciting time for faculty and graduate students alike; however, it does present a new challenge in getting graduate students (AE members) together, as members now occupy two separate buildings a large distance apart. Regular interaction and community within the department has been maintained through weekly seminar meetings during which a student or invited speaker presents their research work. One of our goals for the next academic year is to invest in a means of shared transportation (e.g. bicycles) that will shorten the commute between the two buildings.

With the onset of warmer weather, the Julia Pryde Memorial Garden was rejuvenated and is in full bloom. The original design for the garden (which has been maintained over the years) showcases a pathway made of rocks leading into a central seating area as would be the setting for a campfire.



A clothing drive organized late last semester carried forward into the spring semester with high participation from the BSE department as a whole and resulted in the donation of items valued at \$300 for the Montgomery County Emergency Assistance Program (MCEAP). The items included gently used shoes, outer cold weather clothing, and more. Our Glade Road Growing Farm Share began in June, which always marks the beginning of summer.

**Theresah Korbich Zu**, AE President (2013-2014)

## Julia K. Pryde Memorial Scholarsips



The Julia K. Pryde Memorial Scholarship provides funding to support BSE students in international efforts aimed at the preservation of global water resources and the provision of safe drinking water. This past year, two of our undergraduate students, **Jenna Sharkey** (pictured on left) and **MaryJo “Mj” Rice** (pictured below), volunteered with a non-profit organization called Community Water Solutions in Ghana. While Jenna and Mj worked in separate villages over their 3-week stays in-country, they had similarly eye-opening experiences. Jenna remarked, “It was the most incredible experience to see how simply these people lived but also how happy they were with so little. The Pryde Scholarship made it possible for this village to finally drink

clean water, and forever changed not only the lives of the villagers, but also my perspective of the world.” Mj adds: “I loved the program because it allowed close relations with the village community including the chief and elders, and especially the two women that we trained to run our water treatment business. I love knowing that every one of these amazing people will live a better life with access to safe drinking water!”

Pryde Scholarships also supported the graduate research of two current BSE doctoral students, **Lonesome Malambo** and **Winfred Mbungu**. This past November, Lonesome traveled to the AfricaGIS 2013 – Global Spatial Data Infrastructure (GSDI) 14 conference in



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## European International Exchange Program

**Sara Venneri**, a postgraduate student at University of Bari in Italy, is studying in the BSE department for spring and fall 2014 semesters. She received a scholarship through the Trans-Atlantic Biosystems Engineering Mobility and Curriculum Development (TABE.NET) project funded by the US-EU Atlantis Programme. She says the overall experience has been wonderful so far, although during her first several days in the country she acknowledges some culture shock! Sara states that the most challenging aspect of moving to a new country has been adjusting to the language, emphasizing that it does not matter how much you study a language before traveling—it is always different relying on it on a daily basis. However, she says the Tech community has been very friendly and welcoming, and living in the Graduate Life Center has given her the opportunity to interact with many other graduate students (including other international students). Sara says the most enjoyable part of studying abroad is being in a totally new place. Since this is her first time in the United States, she hopes to tour some of the major East Coast cities like New York, Boston, and Washington, DC. •



## Education Abroad in Australia

G'Day from Sydney! Every single day here is an incredible adventure, and it's only been 3 weeks! Classes are very different from in the States; there's a lot less class



time and homework, but the final exams weigh heavily on your grades. The teaching style is much more hands-on; I've found that I have labs and recitations in all of my classes. I'm even taking an Outdoor Education course where one of my assessments is a 3-day camping trip in the beautiful Blue Mountains! After classes end for the day, it's standard to go to the beach for a couple of hours to relax and soak up the beautiful sunsets. Sydney is the perfect combination of busy city life, relaxing beaches, historic architecture and endless natural beauty. It's a completely different world Down Under, and although I'm missing Virginia Tech, this is definitely somewhere I could get used to!

**Jenna Sharkey**, BSE Junior

## Senior Design Projects Complete!

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Winfred Mbungu at a sign indicating the Mgeta at Duthumi Hydrometric station in the Upper Ruvu watershed

Addis Ababa, Ethiopia to present a portion of his graduate work focused on fire mapping in Zambia. Lonesome reported that the conference was well worth the travel: "The various presentations on environmental and application of geospatial technologies strengthened my resolve to study ecosystem disturbances such as fire in my country and I am forever grateful to the Julia Pryde Scholarship for making this possible."

Winfred used his Pryde Scholarship to travel to Tanzania and visit the Upper Ruvu watershed, a headwater watershed which serves as a drinking water source for dar-Es-Salaam, that is the focus of his dissertation research. Over the course of his trip, Winfred was able to gain a deeper understanding of the watershed and the various services it provides: "I collected different hydrological, meteorological and other field data important for my study. The visit was a good opportunity for me to meet stakeholders, see the different activities and extent of land degradation in the watershed."•

Another successful group of seniors has completed BSE 4125/4126 Comprehensive Design Project, a two-course sequence that serves as the capstone experience for our undergraduate students. Working in teams, students complete the entire process of preparing a comprehensive design to solve engineering problems for companies, town governments, and university centers and departments related to issues such as food processing, sustainably produced products, ecological design, and hydrology. Teams work with faculty advisors and professional mentors and clients throughout the process. A special thanks to all who worked with our seniors!

**Now it's time to develop design projects for next year's seniors and we would appreciate suggestions and proposals for topics and professional mentors for projects. Please contact Cully Hession ([chession@vt.edu](mailto:chession@vt.edu)) with any suggestions. We need your ideas now to develop achievable project proposals by early August!**

Please visit our web page to read more: <http://www.bse.vt.edu/undergraduate/comprehensive-design/index.html>



## Education Abroad in Spain

Four BSE students are currently studying abroad at Universidad Politécnica de Madrid (UPM) through the Trans-Atlantic Biosystems Engineering Mobility and Curriculum Development (TABE.NET) project. **Sasha Howes** and **Tad Kolterman** arrived in August 2013 and are spending the 2013-14 academic year at UPM. **Haley Fuller** and **Brett Walles** are there for the 2014 spring semester. All four report that while learning Spanish can be a challenge, the experience has been thoroughly enjoyable and will undoubtedly be one of their most memorable undergraduate experiences. Some comments from each of our intrepid world travelers:

"This experience has helped me appreciate the support (and homework) the professors at Virginia Tech are constantly providing their students. It has been fascinating to see the way engineering is taught here in Spain, and I have also thoroughly enjoyed my experiences with getting to study in such an international city." – **Haley Fuller**

"Living here has been very difficult but also incredible. I have made friends all over Europe and have traveled to Morocco, Serbia, Switzerland, France and am going to Germany in May in addition to traveling to six cities in Spain. Spain is an incredible country, with huge diversity that I never knew about before arriving here. I love living here and am glad to be a Hokie representing VT and the USA!" – **Sasha Howes**

"Between my travels, both in and out of Spain, and the students from all over Europe with whom I regularly interact, I have gained greater perspective on where I fit in the world at large as well as a newfound desire to explore. It wasn't always smooth sailing, but I will always appreciate the opportunity to study abroad." – **Tad Kolterman**

"I enjoy exploring Madrid and outlying cities like Toledo, Segovia and Manzanares el Real on the weekends. I really enjoy the Spanish culture and their laid back approach to many things. The city and scenery here are beautiful, and I'm enjoying the early spring compared to Blacksburg. I encourage future students to join this program for a wonderful study abroad experience." – **Brett Walles**



(L-R) Brett Walles, Tad Kolterman, Sasha Howes, Haley Fuller

## Annual BSE Spring Banquet

The annual BSE Spring Banquet, held May 2<sup>nd</sup> at the Owens Banquet Hall on campus, served to recognize student awards and scholarships and showcase this year's final Senior Design Project poster presentations. Six current students were recognized for their commitment to academic merit. Students are nominated based on their academic excellence and are invited to submit materials describing their achievements in academics, service to the department and university, and extracurricular endeavors. Awardees are presented carved wooden plaques and a cash award funded by **Dr. Saied Mostaghimi**, former head of the BSE department, and his wife Patty.

- **Devin Ridgely** (*Outstanding Ph.D. Student*) – Devin completed his doctorate degree in the Barone Research Group this spring. While working on his graduate work he published six articles in a number of high-impact biological journals.
- **Stephanie Houston** (*Outstanding Graduate Teaching Assistant, not pictured*) – Stephanie is a member of the VT-CALS Graduate Teaching Scholar Program, in which she is focusing her teaching experience on a TA position for BSE 2105: Introduction to Biological Systems Engineering.
- **David McCann** (*Outstanding M.S. Student*) – After receiving the award for Outstanding Senior in 2013, David continued his studies at Virginia Tech by

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## Congratulations to Five BSE Graduate Students Who Completed Their Degrees in Fall 2013

### MS Degrees

**Elizabeth Collins** (Advisor: **J. Ogejo**), *Improving the Environmental and Economic Sustainability of Dairy Farming Using Value-Added Products Derived from the Anaerobic Digestion of Manure*. Liz is seeking employment in the DC Metro area.

**Nicholas Smith** (Advisor: **Z. Easton**), *Nitrate and Phosphate Removal and Nitrous Oxide Production in Lab-scale Denitrifying Bioreactors*. Nick is a full-time instructor at Richard Bland College of William & Mary, where he teaches math, biology, and a beta engineering class.

**Jiun Yen** (Advisor: **R. Senger**), *Systems Metabolic Engineering of Arabidopsis for Increased Cellulose Production*. Jiun is working on a PhD under the guidance of Dr. Senger, and is continuing his research in computational biology for metabolic engineering of plants and microbes for the production of cellulose and other valuable bio-synthetic products.

### PhD Degrees

**Jia Liu** (Advisor: **D. Sample**), *Development of a Design-Based Computational Model of Bioretention Systems*. Jia is pursuing employment in consulting or government in the urban stormwater area. His ideal job would allow him to utilize his skills in modeling bioretention and rainwater harvesting systems, and develop field and design skills. With that in mind, he took and passed the FE exam.

**Chih-Yu Wang** (Advisor: **D. Sample**), *Floating Wetlands for Urban Stormwater Treatment*. Chih-Yu is a postdoc in the Department of Bio-Environmental Systems Engineering at National Taiwan University. He recently married Chia-yu (Evelyn) Chang in a traditional Chinese ceremony.



## BSE Students Receive Scholarships

Each year the BSE department offers a number of scholarships to undergraduate students made possible through the continuing generosity of our alumni and friends. Scholarship awardees for the 2014-2015 academic year are as follows:

*J. Lawrence & Lucille G. Calhoun*

**Connor Brogan**  
**Dylan Cooper**  
**Dan Flannery**  
**Sasha Howes**  
**Danielle Jones**  
**Tad Kolterman**  
**Valeria Llanos**  
**Anish Luthra**  
**Marco Perez-MacCollum**  
**Mj Rice**  
**Michael Scimeca**  
**Morgan Steel**  
**Joseph Stevens**  
**Nancy Stevenson**  
**Aidan Suiter**  
**Jenna Sumey**  
**Jordan Wetzig**

*Peter H. Fitzgerald*  
**Sasha Howes**  
**Joseph Stevens**

*John Philip Mason*  
**Dan Flannery**

*B.L. Parsons*  
**Jacob Cantor**  
**Dylan Cooper**

*Jim & Elizabeth Lillard*  
**Jacob Cantor**

*Earl T. Swink, Jr.*  
**Connor Brogan**  
**Marco Perez-MacCollum**

*Gordon E. Barlow*  
**Lindsay Carr**  
**Austin Moon**  
**Gina Muan**

*George C. Vaughan*  
**Haley Gardner**

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**Christopher Gilson**  
**Valeria Llanos**  
**Anish Luthra**  
**Zoya Mahajan**  
**Mj Rice**  
**Keeana Ross**  
**Kindell Schmitt**  
**Casey Schradling**  
**Michael Scimeca**  
**Nancy Stevenson**  
**William (David) Strickland**  
**Aidan Suiter**  
**Urban Withers**

*John B. Greiner*  
**Patrick Gallagher**  
**Danielle Jones**  
**Haley Kujawa**  
**Andrew Marino**  
**Carloyn Mottley**  
**Jacob Patish**  
**Dalia Rakha**  
**Scott-Eugene Saverot**  
**Jenna Sharkey**  
**Morgan Steel**  
**Jordan Wetzig**  
**Julie Wright**

## New BSE Graduate Students (Spring 2014)

### Graduate Student (Advisor)

#### MS Students

**Hesam Babahosseini** (M. Zhang)  
 PhD Mechanical Engineering, Virginia Tech, in progress  
 MS Mechanical Engineering, Sharif University of Technology, 2010  
 BS Mechanical Engineering, Imam Khomeini International University, 2007

**Andrew Campbell** (Sridhar)  
 BS Civil Engineering, Boise State University, 2012

**Josh Moehrle** (Thompson)  
 BS Mechanical Engineering, Virginia Tech, 2013

#### PhD Students

**Heather Govenor** (Krometis/Hession)  
 MS Entomology, Michigan State University, 1998  
 BS Biology, Penn State University, 1995

**John Ignosh** (Ogejo)  
 MS Forestry, University of Minnesota, 2005  
 BS Forestry, The Ohio State University, 1999

**Andrew Sommerlot** (Easton)  
 MS Biosystems Engineering, Michigan State University, 2012  
 BS Biosystems Engineering, Michigan State University, 2010

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pursuing a master's degree.. He successfully defended his thesis in April. His research explored floodplain connectivity on a basin scale.

- **Michael Swartz** (*Outstanding Senior*) – Michael has been on the Dean's List six semesters, serves on the departmental curriculum committee and as an Undergraduate Ambassador, and conducts research with **Dr. Ryan Senger**. Mike also helped lead the FIJI Run Across Virginia effort for his fraternity, Phi Gamma Delta, which raised \$50,000 for The V Foundation for Cancer Research.
- **MaryJo Rice** (*Outstanding Junior, not pictured*) – MaryJo studied abroad in Switzerland as Presidential Global Scholar, and has completed coursework in Fiji and Australia. She was a recipient of a Pryde Scholarship last year which she used to travel to Africa. She is currently an undergraduate research assistant working with **Dr. Warren Ruder**.
- **Christopher Gilson** (*Outstanding Sophomore*) – Chris is involved in Virginia Tech Student Government, serves as Assistant Director of the Virginia Tech Freshman Leadership Experience, and conducts undergraduate research in the department with **Dr. Leigh-Anne Krometis**.



(L-R) Dr. Saied Mostaghimi, Christopher Gilson, Michael Swartz, David McCann, Devin Ridgley, Dr. Mary Leigh Wolfe

Senior Design final project posters were judged by a faculty panel on design content and clarity of presentation. Three projects received awards: *Best Engineering Design Content Award*: Foxridge Stormwater Retrofit Team (**Jason Arze, Mitchell Dillon, Kinsey Hoffman**); *Best Visual Content Award*: Stream Exclusion and Conservation Plan for the Virginia Tech Animal Science Farm Team (**Lia Doumar, Jennifer Lewis, Alexandros Mikroulis**); and *Best in Show Award*: Using Synthetic Biology to Detect Iron in Household Water Team (**Sakura Clifford, Jaclyn Einstein, Michael Swartz**).

Finally, \$145,000 in scholarships were awarded to 38 undergraduates to support their education during the 2014-15 academic year. Scholarship amounts ranged from \$400 to \$13,400, based on scholarship-specific combinations of academic achievement, leadership, financial need, and/or interest area.▪

# BSE Faculty and Staff News

1



BSE assistant professor **Durelle Scott** (left) conducts research which involves improving the nation's water quality through studying how natural systems behave in the face of change and applying those lessons to real-world ecological challenges.

Sample analysis for the Virginia Cooperative Extension Virginia Household Water Quality Program is performed in the *Water Quality Lab* by **Kelly Peeler**, BSE WQL manager, and **Asa Spiller**, BSE lab assistant. HABB1's spacious labs allow for expanding this program.

2



3



The *Bioseparation Lab*, led by **Mike Zhang**, BSE professor, focuses on developing delivery systems for vaccines against nicotine addiction, cancer treatment, and protein-based vaccines. HABB1 labs have plenty of natural light and energy efficient work space.

4



HABB1 office space for students promote quiet times for planning research activities. Here **Clara Darko**, BSE PhD student, is going over a review article for her research on developing the process for dehydrated African indigenous leafy vegetables.

Welcome!  
HABB1 tour  
starts here...

Come back  
again!



7



HABB1 has a state of the art room for meetings and seminars. The seminar room walls have specialized acoustic foam for a better listening experience, motorized window controls, and a variety of lighting arrangements for engaging seminar presentations.

FST professor **Susan Duncan** studies panelists' facial expressions in her state-of-the-art *Sensory Lab* to measure emotional experiences with food. Food companies can use such a facility to tailor their products to optimize consumer organoleptic experience.

6



5



One function of the *Metabolic Engineering / Renewable Materials Laboratory* led by **Justin Barone**, BSE associate professor, is making biodegradable plastics from agricultural waste products such as chicken feathers and plant matter like corn and soybeans.

## Scientist Makes Fibers in a Bottle

BLACKSBURG, Va., March 19, 2014 – **Justin Barone**, BSE associate professor, may just be a modern day alchemist.



But instead of turning ordinary metals into gold, he makes synthetic fibers that reproduce according to a genetic code embedded in their DNA.

Barone's research seeks to make the fibers replicate and assemble of their own volition depending on the genetic code that is used to create them. His research could potentially be used to create muscle fibers and entire limbs in the future.

Knowing the genetic recipe of a fiber allows Barone to control the shape of the fiber and how much the proteins should interact with each other. By programming the proteins to interact with each other more, it's possible to make a fiber tougher and stronger. If proteins are programmed to interact less, they are more pliable.

To read the complete article:

<http://www.vtnews.vt.edu/articles/2014/03/031914-cals-habbibarone.html>

## Biological Systems Engineering Scientist Develops Critical Vaccines for Human, Pig Diseases

BLACKSBURG, Va., March 21, 2014 – Pig herds infected with porcine reproductive and respiratory syndrome can be financially devastating to farmers. The syndrome causes reproductive failure in sows and respiratory disfunction in young pigs.

**Mike Zhang**, BSE professor, is researching how to develop a vaccine to combat this porcine pandemic which costs farmers as much as \$560 million per year. The disease is one of the most economically devastating illnesses to the swine industry.



He also works on developing vaccines for humans to breathe easier, but in a vastly different endeavor that seeks to eliminate addiction to nicotine in tobacco products. Zhang uses a nanocarrier system that can effectively present the nicotine haptens to the immune system. Haptens are small molecules that elicit an immune response when attached to a larger carrier such as a protein.

To read the complete article:

<http://www.vtnews.vt.edu/articles/2014/03/032114-cals-habbizhang.html>

## Easton and Krometis Receive COE Dean's Award for Outstanding Assistant Professor

**Zachary Easton** and **Leigh-Anne Krometis**, both BSE assistant professors, were two of five College of Engineering (COE) faculty members to be presented with the 2014 Dean's Award for Outstanding New Assistant Professor at the seventeenth annual Virginia Tech COE Faculty Reception in May.



(l-r) Zachary Easton, Mary Leigh Wolfe, Leigh-Anne Krometis

Easton joined Virginia Tech in 2011 as a tenure-track assistant professor at the Eastern Shore Agricultural Research and Extension Center in Painter, VA with a tenure home in the BSE Department. He joined the BSE Department on campus in 2013. The primary focus of his research is to improve the understanding of hydrologic and terrestrial processes that control water and biogeochemical fluxes with the ultimate goal of developing policies and management practices that protect water, soil, and other natural resources. Dr. Easton's extension and outreach program focuses on providing educational resources on watershed modeling and watershed management practices for a variety of audiences. Easton has a keen interest in international activities. He is chair of the BSE International Student Opportunities committee, which is charged with developing international internship and research experience opportunities for BSE students.

Krometis joined the BSE department as a research assistant professor in 2009 and moved into a tenure-track assistant professor position in 2011. Krometis is a dedicated and outstanding teacher. She has taught at the freshman, junior, and graduate levels, receiving excellent student evaluations. In fall 2014 she will be teaching BSE 2004: Introduction to BSE. As the first course students take in our program, it is critical to have a strong teacher such as Krometis, who relates well to the students and is capable of introducing the full breadth of the discipline. Krometis' research program focuses on environmental health, particularly fate and transport of water contaminants of potential health concern. She is faculty advisor for Alpha Epsilon and an Honors Residential College Faculty Fellow. •

## Welcome Venkat Sridhar—New BSE Assistant Professor!

The BSE Department is excited to welcome Dr. **Venkataramana “Sri” Sridhar** as an assistant professor in earth systems modeling. Prior to joining Virginia Tech, Sridhar was an associate professor in the Civil Engineering Department at Boise State University. Arriving with his family this January during a record-breaking snow season in Blacksburg, we all think he may have brought Idaho’s winter with him!



Sridhar’s research interests include understanding the relationship between large scale hydrological processes and climate change in managed and natural ecosystems, water and energy fluxes, land and atmosphere interactions, and global water cycle assessment using next generation remote sensing and GIS tools and datasets. His work is currently funded by the National Oceanic and Atmospheric Administration’s Regional Integrated Sciences & Assessments (RISA) program, and the National

Science Foundation’s Experimental Program to Stimulate Competitive Research (EPSCoR). Sridhar is aided in these research efforts by a current MS student, **Andrew Campbell**, and is seeking further students interested in investigating connections between climate, land use, and hydrology (<http://www.bse.vt.edu/people/tenure-track/files/sri-graduate-opps.pdf>).

In addition to his enthusiasm for research, Sridhar brings substantial expertise in classroom pedagogy. While an assistant professor at Boise State, Sridhar secured a fellowship to participate in American Society of Civil Engineers—Excellence in Civil Engineering Education (ExCEED) Teaching Workshops at the University of Arizona and the University of Arkansas. He has developed and taught a wide variety of classes, from GIS Application to Terrestrial Hydrometeorology. This June, he will be traveling to the Indian Institute of Technology in Kharagpur to teach a two-week course on Geospatial Technologies in Hydrological Modeling, which he is hopeful will lead to further international opportunities for collaboration in both teaching and research.

Joining him in Blacksburg are Sridhar’s wife Gayathri Sridhar, son Vishvesha (11), and daughter Sriya (7). The family enjoys music and biking, and are excited to join the Hokie community. •

## BSE Welcomes New Bioprocess Lab Manager

**Cora Chen** accepted the position of BSE Bioprocess Laboratory Manager this spring 2014. Among her many responsibilities, Chen serves as the health and safety officer of the new HABB1 laboratories, repairs damaged instrumentation, and ensures all equipment in the unit operations teaching laboratory is in good working order. Chen has an MS degree in Mechanical Engineering from Iowa State University, where she focused on instrumentation and robotics, and she has a BS degree in Precision Instrument Engineering from Tianjin University (China), where she focused on optical instrument engineering. Previous to her current position, Chen served as a part-time Instrumentation Engineer in the BSE Department from 2012 to 2013. While in this role, she minimized the funds BSE spent on contract repair fees by performing many repairs herself, demonstrating her tremendous value to our department. In the past, she also served as a lab specialist in the Mechanical Engineering Department at Virginia Tech, electro-mechanical engineer at GE Energy (Salem, VA), mechanical design engineer at Electro-Tech (Blacksburg, VA), and process engineer at AVX Corporation (Raleigh, NC). BSE is truly fortunate to have hired such an outstanding candidate for this position. •



## New Visiting Scholars

**Huiying Luo** is an associate professor in the Feed Research Institute of Chinese Academy of Agriculture Sciences (CAAS), and is a current visiting scholar with **Mike Zhang**, BSE professor. Luo received a



BS in Biotechnology from HeBei University and an MS and PhD in Biochemistry and Molecular Biology from CAAS. Her research over the next year at Virginia Tech will be focused on elucidating the molecular mechanisms of extremophilic enzymes in tolerating heat, pH, and proteinase hydrolysis. She will work with Dr. David Bevan (Biochemistry) for the molecular modeling part of work. Her other research interests include: isolation and identification of extremophiles, gene mining for novel extremophilic enzymes, high-yield expression of various enzymes, and molecular design and improvement of enzymes. She has published more than 90 papers.

**Wei Zhang**, a professor in the Biotechnology Research Institute of the Chinese Academy of Agriculture Sciences, joined the BSE Department as a visiting scholar in January 2014. She received her BS degree



in Microbiology from HeBei University, her M.S. degree in Microbiology from Shan Dong University, and her PhD degree in Biochemistry and Molecular Biology from the Chinese Academy of Agriculture Sciences. Zhang’s research interests are focused on cloning new enzyme genes, and improving their expression efficiency in a heterologous expression system. While at Virginia Tech, Zhang is working with **Percival Zhang**, BSE associate professor, in the Biofuels Laboratory on research related to the production of synthetic starch from nonfood biomass in cell-free biosystems. •

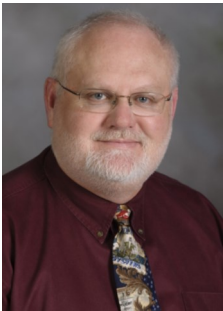
## Engineering Fees Used to Enhance BSE 3524: Unit Operations



The junior-level course BSE 3524: Unit Operations is key to the department's undergraduate curriculum. In this course, students use the knowledge gained from courses in thermodynamics and transport phenomena to design unit operation technologies for processing biological materials. The laboratory exercises and equipment for the Unit Operations laboratory were recently updated to provide students with knowledge related to the rapidly growing new field of biomolecular engineering. Two new three-week laboratory exercises were developed for the class. The objective of the first new lab is to produce recombinant enzymes in flasks, purify the protein using adsorption on cellulose and anion-exchange resin, and then compare the stability of the immobilized and free enzymes. In the second new lab, students produce recombinant proteins in a large-scale bioreactor and use fast protein liquid chromatography (FPLC) to purify the proteins produced. To complete these new laboratory exercises, new equipment was purchased using funds generated by the engineering fees paid by the students, including a refrigerated centrifuge, a temperature controlled shaker, a sonicator, and a UV-Vis Spectrophotometer. The

development of these new exercises and the updated equipment ensures our undergraduates have hands-on experience using equipment commonly found in bioprocessing industries to prepare them for their future careers. •

## Benham Receives Alumni Award for Excellence in Extension



**Brian Benham**, BSE associate professor and Extension specialist, has received the university's 2014 Alumni Award for Excellence in Extension. A member of the Virginia Tech community since 2001,

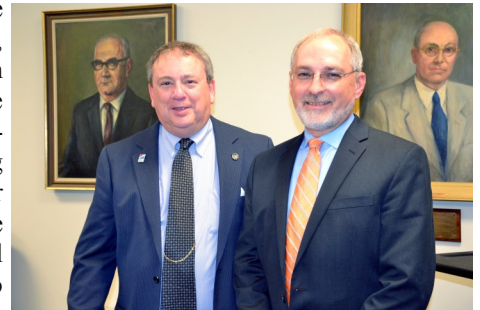
Benham currently serves as the director of the Center for Watershed Studies and oversees the Virginia Household Water Quality Program and Virginia Master Well Owner Network. The shared objective of these programs is to improve the water quality and health of the 1.7 million Virginians who rely on private water supplies for household water.

Sponsored by the Virginia Tech Alumni Association, the Alumni Award for Excellence in Extension is presented annually to two Virginia Cooperative Extension faculty members who have made outstanding contributions to the land-grant mission of the university. One award goes to an Extension specialist and the other is given to an Extension agent. Each award winner receives \$2,000.

<http://www.vtnews.vt.edu/articles/2014/04/042114-facstaffaward-benham.html>

## Grisso Named Outstanding Alumnus—Auburn University

**Robert "Bobby" Grisso**, P.E., Associate Director, Virginia Cooperative Extension, and BSE Professor, has been named an Outstanding Engineering Alumnus by the Auburn University College of Engineering. Established in 1966, the Outstanding Engineering Alumni Award is an honor bestowed by the College to recognize graduates who have reached exceptional levels of professional achievement. Grisso received his award, along with nine other recipients, at a ceremony in April at the Auburn University Hotel.



(l-r) Bobby Grisso and Steven Taylor, Dept. Head, Biosystems Engineering at Auburn University

Grisso is a 1985 PhD Auburn graduate from the Biosystems Engineering Department. His dissertation was entitled "Compaction of agricultural soil by continuous deviatoric stress." Grisso and his wife Teresa attended the recognition and enjoyed visiting the campus after almost 30 years. •

## New Position Filled — Undergraduate Student Services Coordinator



The BSE department is pleased to welcome **Priscilla Baker** as our new Undergraduate Student Services Coordinator. Baker is our undergraduate academic advisor and will also coordinate our undergraduate student recruiting efforts. Baker has a BA degree in English literature from Penn State and an MA in teaching (English and communications) from University of Pittsburgh. She has extensive teaching experience that literally spans the globe: grades 3-8 in Kenya, high school and community college in

Michigan, and tutoring in Maryland. Most recently, she was a freelance writer and editor and a substitute teacher in Montgomery County. Prior to joining BSE, Baker was an advising assistant in the Department of Hospitality and Tourism Management at Virginia Tech. Since joining BSE, Baker has created a welcoming undergraduate advising suite in 307 Seitz where she is already serving a steady flow of students. •

# BSE Alumni News

## Alumni Updates

### 2000's

**Kathy DeBusk Gee (BS '07, MS '08)** married Kyle Gee on April 19<sup>th</sup> in Blackstone, VA. You can read more about Kathy's success as an assistant professor at Longwood University on page 15.



**David Morgan (BS '09)** is an analyst at JPI, an information technology and program management consulting firm. While JPI's home office is in Blacksburg, VA, David works in the Washington, DC metro area.

### 2010's

**Cami (Johnson) Charonko (MS '10)** and her husband John (BS ESM '02, MS ESM '05, PhD BMES '09) are living in Los Alamos, NM with their daughter, Kristen Charonko (born 8/26/13, 9lbs 3.6oz, 20.5 inches). Kristen is already a big Hokie fan!



**J.D. McCoy (BS '10)** just completed his masters of health administration from Virginia Commonwealth University. J.D. is now a clinical operations administrator at Children's Specialty Group in Virginia Beach, VA.

**Yanwen Shen (MS '10)** completed her PhD at Iowa State University in 2013, and is currently a postdoctoral research associate in the Energy Systems Division of Argonne National Laboratory

**Karen Hall (BS '11, MS '12)** is a water resources engineer at Stantec in Richmond, VA.

**Jay Johnstone (BS '11)** is now a water resource engineer at Stantec. Jay married his beautiful wife, Diana, last summer. Diana earned her BS in biological sciences at Virginia Tech in 2011 and is now attending pharmacy school at Virginia Commonwealth University in Richmond. Jay and Diana also bought a house last summer and have settled into Williamsburg living, along with their new dog Chase.



**Katie Ridgeway (BS '12)** is an environmental engineer at Northrup Grumman in the Salt Lake City, Utah area. Katie is working on an Air Program Information Management System to track Air Force emissions to be reported to the EPA.

After earning her BS in BSE, Katie spent a year and a half teaching, traveling, and volunteering. She first worked in the Manassas City Public School system, where she taught at an engineering camp and was the STEM coordinator for the extended school year. That August, she left to participate in Worldwide Opportunities on Organic Farms (WWOOF). She spent a couple months with a family in Offwiller, France, helping them add an addition to their house using ecological methods. Katie then moved to Nottingham, England, where she worked on a farm in the city that supported people with mental disabilities. When she returned to the states, Katie substitute taught in Virginia and Utah before securing her current position.



(Continued on page 15)

**We enjoy hearing your news!**  
Please take a few moments, and check out our  
new alumni update form:

<http://www.bse.vt.edu/alumni/index.html>

(Continued from page 14)

**Tammy Smith (MS '13)** is employed as a staff engineer with KMEA, a small consulting firm, in Gainesville, FL.

**Nicole Szanyi (BS '13)** is an inside sales account manager for CDW, a leading IT provider in the United States and Canada, where she works to develop relationships and provide complete IT solutions for small businesses.

**Sarah Jennings (BS '13)** is an environmental engineer at GAI Consultants, Inc in Richmond, VA.

To find last issue's  
Flashback winners,  
please check out:

[http://www.bse.vt.edu/  
alumni/index.html](http://www.bse.vt.edu/alumni/index.html)

## Newsletter Flashback! Do you recognize yourself in this picture?



**Cully Hession**, BSE professor, has been working with Virginia Tech's Digital Imaging and Archiving (DIA) Group to scan and archive more than 1000 historical photographs (1923-1966) and annual reports dating back to 1923. Above is one picture from this collection. If one of these smiling faces is you, please send an email to Barbara Wills (barbt@vt.edu) identify which person you are, send a current picture, and we will send you a BSE hat! ■

## Outstanding BSE Alumni

Two BSE alumni received alumni awards from the College of Agriculture and Life Sciences (CALS) for their professional achievement, leadership, and service to their home department, the college, and the fields of agriculture and the life sciences. Awards were presented at the CALS annual banquet held in March. Congratulations Andy and Kathy!

**Andy Southerly (BS '83)** was awarded the CALS Outstanding Alumnus Award. This award recognizes alumni who have graduated more than 10 years ago. Southerly began his career with Cargill, Inc.'s Poultry Products Division as an engineering trainee. After 30 years at Cargill, he is currently VP - Supply Chain Management for the Cargill Value Added Meats business unit. Southerly also received an MBA from University of Arkansas.



When asked how he thought BSE prepared him for his current position, Southerly replied, "It gives you that solid foundation to build on. When you go into the workplace, and you have an engineering degree from a well-known school like Virginia Tech, you've got credibility. Folks know you're capable. With that comes a little bit of accountability. So you need to deliver and live up to that expectation that folks have of you. Take that personal responsibility seriously, so that they know that they made the right decision when they hired you."

**Kathy De Busk (BS '07, MS '08)** was awarded the CALS Outstanding Recent Alumna Award. This award recognizes alumni who have graduated in the last 10 years. De Busk is an assistant professor of environmental science at Longwood University. Environmental science is a new major at Longwood, and DeBusk will be helping develop the curriculum for this new program

One of DeBusk's favorite memories of BSE is the departmental graduation ceremony where "all of the professors were there and were very congratulatory and supportive of us. They were just as proud as our parents were because they helped us from day one; they helped us to succeed." ■



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