



Biological Systems Engineering

Newsletter

Spring 2015

Congratulations - BSE Class of 2015!



BSE Annual Spring Banquet and Senior Design Showcase

On Friday, May 1st, BSE students, faculty, staff, and guests enjoyed the opportunity to socialize while recognizing BSE students for their accomplishments. The event began with a showcase of the 2014-2015 Senior Design projects. The seniors presented their projects via posters. After brief descriptions by each design team, the audience had the chance to visit with each team to discuss their projects in more detail. Later in the evening, three teams were recognized for design excellence (*see p. 8 for more on the design projects and team awards*).

During the awards and recognition program, new members were inducted into Alpha Epsilon, the honor society for agricultural, biological, and food engineering: **Taylor Adams, Akinrotimi Akinola, Dylan Cooper, Nicole Fazekas, Heather Govenor, Frank Gillam, Yun Hu, Colette Julson, Sampath Karunarathne, Yoon Kyu Lee, Carolyn Mottley, Victoria Nystrom, Bianca Pinto, Eva Rabil, Kindell Schmitt, Felicia Scott, and Daniel Wolozny.**

The department awarded Outstanding Student Awards to one student from each under-

continued on page 3

In this issue...

Note from the Department Head.....2

Department News.....2-3

BSE Student News.....4-9

BSE Faculty and Staff News.....10-13

BSE Alumni News.....14-15

BSE Annual Spring Commencement Reception



More pictures of the commencement reception on the back cover and on Facebook:

<http://facebook.com/vtbse>



Department News



Dear BSE Alumni and Friends,

I hope 2015 is going well for you; it has been a great year for BSE. A few weeks ago, we graduated our largest senior class ever, with 48 graduates. You will find information about the great work they did on their senior design projects in this newsletter. The job market is good, with many of our seniors employed or committed to graduate or professional school before commencement. Examples are listed on page 9.

A priority for this year is to develop the department's Biodesign and Bioprocessing Research Center (BBRC), with a focus on the BSE Pilot Lab in HABB1 (Human and Agricultural Biosciences Building 1). **Justin Barone**, BSE Associate Professor, is leading the planning and development group. The BSE Advisory Board has provided advice on identifying the market for both applied/practical research and testing, and basic research. Justin and colleagues will be conducting a survey this summer of BSE alumni in the bio-based products industry to gain additional insight. If you are interested in providing input or advice, please contact me (mlwolfe@vt.edu, 540-231-6615) or Justin (jbarone@vt.edu, 540-231-0680). We would appreciate your input.

We have been working to increase the number of BSE graduate students and contribute to achievement of the university's goal of increasing graduate student enrollment. We were very successful in spring recruiting and have 22 new graduate students enrolling this fall (with a few starting in the summer). Congratulations and thank you to **Mike Zhang**, BSE Professor and Graduate Program Director, and all the faculty and current graduate students for their outstanding work in recruiting! We are looking forward to welcoming the new students.

We invite you to join us at a new event this year: BSE Open House on Saturday, October 24, in conjunction with Virginia Tech Homecoming. Details will be posted on the departmental website, Facebook, and LinkedIn, and sent via email to BSE alumni. We hope to see you then or any other time you are in Blacksburg!

Best wishes for a great summer! Go Hokies!

Mary Leigh Wolfe

Valued Contributors to BSE (1/1/15 - 5/31/15)

Thank you to all of our alumni, friends, and organizations who generously support the department through gifts and donations! Your contributions help the department enhance the educational experience of our students. You have given us the means to award scholarships to many students. We also use your contributions to help recruit outstanding graduate students and support student travel to conferences and to participate in special projects both domestically and internationally. Your contributions support departmental activities that enhance the educational and work experience of BSE students, staff, and faculty. Please contact the department (barbt@vt.edu, mlwolfe@vt.edu) if your name has been omitted from this list.

Ayers, Paul
Blackwell, Neal
Dyson, Charles
Finney, Essex
Ford, William
Hale, John
Higgins, Jeffrey

Lane, Robert
Morris, David
Perdue, William
Resop, Jonathan
Tweedy, Kevin
Whitener, Adele
Yagow, Eugene

BSE Advisory Board

In each newsletter, we highlight the background of one of the BSE Advisory Board members. Janette Wolf, one of our new members for 2015-2016, is featured in this issue.



Janette (Peters) Wolf earned her B.S. degree in Biological Systems Engineering with a focus on land and water resources engineering

from Virginia Tech in 2006 and her M.E. degree in Environmental Engineering from Vanderbilt University in 2009. She has approximately nine years of professional experience with Civil and Environmental Consultants, Inc (CEC) in Nashville, Tennessee where her primary focus areas have included stormwater management, stormwater sampling, erosion and sediment control, stormwater pollution prevention plan design, and development and water quality permit compliance. She has also had the opportunity to work extensively on research and development of proprietary best management practices where comparative assessments were performed between the proprietary product and conventional products, both on a small and large scale basis.

Wolf is a licensed professional engineer and is a Certified Professional in Erosion and Sediment Control (CPESC) and a Certified Professional in Stormwater Quality (CPSWQ). She is also a member of the National and Tennessee Society of Professional Engineers.

Janette lives in Nashville, Tennessee with her husband Brian and their two cats. She enjoys running, hiking and gardening and also enjoys watching football and hockey. Janette is looking forward to serving on the BSE Advisory Board!

Vist us at:
<http://www.bse.vt.edu/>

BSE is on Facebook!

Virginia Tech Biological Systems
Engineering
<http://facebook.com/vtbse>

VT BSE Alumni
<http://tinyurl.com/bsealumni>

BSE Advisory Board Members 2015-2016

Clifton Bell, P.E.

Brown and Caldwell
Virginia Beach, VA

Matthew Dickson

MedImmune, Inc.
Gaithersburg, MD

J. Michael Flagg, P.E.

Hanover County Public Works
Hanover, VA

Dale Lehman, P.E. (Chair)

AECOM
Germantown, MD

Xun Liu

National Institutes of Health
Bethesda, MD

Kumar Mallikarjunan (Faculty)

Biological Systems Engineering
Virginia Tech

Kelly Ramsey, P.E. (NRCS Liaison)

USDA - Natural Resources
Conservation Service
Richmond, VA

Andy Southerly

Cargill Meat Solutions
Wichita, KS

Kevin Tweedy, P.E.

Ecosystem Planning and
Restoration, LLC
Cary, NC

Janette Wolf, P.E.

Civil & Environmental Consultants,
Inc.
Franklin, TN

Mary Leigh Wolfe (Department Head)

Biological Systems Engineering
Virginia Tech

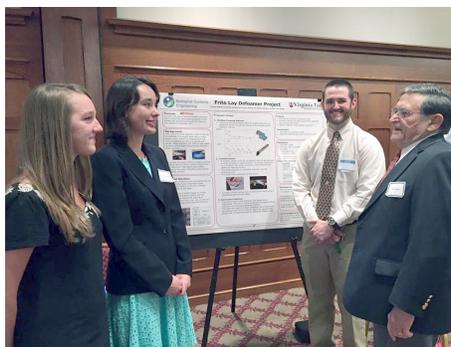
continued from page 1

graduate class and graduate degree. This year's award recipients were **Connor Brogan**, Outstanding Sophomore; **Lauren Cashman**, Outstanding Junior; **Jacob Cantor**, Outstanding Senior; **Felicia Scott**, Outstanding M.S. Student; and **Yun Hu**, Outstanding Ph.D. Student. Each Outstanding Student and senior design awardee received a plaque and a cash award from a fund endowed by **Drs. Saied and Patty Mostaghimi**.

BSE scholarships for the 2015-2016 academic year were announced (*see p. 6-7 for scholarship recipients*). A total of over \$115,000 was awarded, with individual scholarships ranging from \$100 to \$8,500, to 55 students. Thank you to all donors to the 13 scholarship endowments that make these awards possible.

Student organization officers for 2014-2015 and 2015-2016 were introduced and thanked for their service to BSE students and the department through their leadership of the ASA-BE Student Branch, Alpha Epsilon Chapter, and BSE Graduate Student Organization (GSO).

Congratulations to all BSE students for your wonderful accomplishments!



Frito Lay Defoamer Project group with Professor Emeritus Gene Haugh



Smiling BSE faces waiting for their dinner!



Alpha Epsilon initiates



Dr. Mary Leigh Wolfe (l), Dr. Saied Mostaghimi (r), and Dr Cully Hession (back r) with Senior Design winners



Harry and Karen Pryde with recipients of Julia Pryde Memorial Fund travel grants



A selection of some of the brightest and "BSE" BSE scholarship winners

BSE Student News

ASABE Student Branch News

This semester our ASABE student branch has been very busy! Our chapter hosted two fantastic guest speakers: Sam Reilly from Saha Global and Dr. Larry Gaultney from DuPont; members furthered their professional development by participating in our Resume/Cover Letter Workshop; and we participated in a tree tube clean-up of Stroubles Creek. The chapter ended the semester on a particularly high note, hosting a guest lecture from Dr. Terry Howell, Jr., President of ASABE.



(l-r) Emily Hilburger, Bianca Pinto, Tad Kolterman, Jordan Wetzig, Kyle Jacobs, Valeria Llanos, Victoria Nystrom, Sara Gokturk; (back) Dylan Cooper, Brendan Tobin

In March, students traveled by van with **Dr. Warren Ruder**, BSE assistant professor and faculty advisor to the ASABE student branch, to the ASABE Southeastern Regional Rally in Gainesville, FL. This year ten schools attended the rally, which was hosted by the University of Florida. On Saturday, students toured the University of Florida's labs, pet alligators, and competed in a design competition to create a tower that holds a bucket of water. Students visited Kennedy Space Center and saw the Atlantis space shuttle on Sunday. At the annual business meeting, VT-BSE rising senior **Sara Gokturk** was elected President of the Southeastern Region, and fellow rising senior **Hanna Montoro** was elected Treasurer of the Southeastern Region.

New officers for the VT chapter of ASABE were elected on April 7th: President – **Sara Gokturk**, Vice President – **Brendan Tobin**, Treasurer – **Bianca Pinto**, and Secretary – **Kyle Jacobs**. These officers will no doubt be very busy during the upcoming academic year, since Virginia Tech will be hosting the 2016 ASABE Southeastern Regional Rally!

Sara Gokturk, ASABE Presiden 2014-2016

Alpha Epsilon (BSE Honor Society)

The Eta Chapter of Alpha Epsilon had another successful semester! We continued a series of educational, service, and professional development projects, including a departmental food and clothing drive in December 2014 to benefit the Montgomery County Emergency Assistance Program (MCEAP), Pizza Friday, hot cocoa socials, our ongoing veggie share program with the Glade Road Growing farm, maintenance of the Julia Pryde memorial garden, the Big Event, workshops on free citation managers and prelim exams, and an academic advising panel to help students gain more information on pursuing an academic career.



Over this academic year, the Eta Chapter's primary focus has been educational and service activities on promoting environmental sustainability. We participated in the Kid's Tech University program at Virginia Tech, during which we used a river simulation model to demonstrate the importance of employing proper land management to counter heavy rainfall.

Our activity was popular among the kids and promoted teamwork in problem solving. We also participated in a stream restoration effort by planting over 100 trees along both sides of Stroubles Creek, an impaired stream near the Blacksburg campus. This work aims to improve water quality and promote a healthy ecosystem of Stroubles Creek.

In April, we welcomed sixteen new members to Alpha Epsilon, and are looking forward to yet another productive year.

Jiun Yen, AE President 2014-2015

Fall 2014 Dean's List

Congratulations to the BSE undergraduate students who made the Dean's List in the fall 2014 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 2014)

John Brabender
Connor Brogan
Marisa Cole
Benjamin Croom
Sydni Koch
Haley Kujawa
Sean Mackey
Ryan Marano
Gina Muan
Thomas Murray
Matthew Pickering
Cara Sarver
Suraye Solis
Daniel Wilkin
Urban Withers

BSE Juniors (in fall 2014)

Taylor Adams

continued on page 5

New Graduate Students - Spring 2015

Graduate Student (Advisor)

M.S. Students

Teneil Sivells (Hession)

B.S. Biological Systems Engineering, North Carolina Agricultural and Technical State University, 2014

Ph.D. Students

Nasrin Alamdari (Sample)

M.Sc. Civil and Environmental Engineering, Tennessee Technological University, 2014

M.Sc. Civil Engineering, Sharif University of Technology, 2011

B.Sc. Civil Engineering, Tabriz University, 2009

Bill Carswell (Senger)

B.S. Biological Systems Engineering, Virginia Tech, 2013

Weihua Guo (Feng)

B.E. Chemical Engineering, Tianjin University, 2014

B.S. Chemistry, Nankai University, 2014

BSE 2015-2016 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 2015-2016 academic year are as follows:

Gordon E. Barlow

Sasha Howes

J. Lawrence & Lucille G. Calhoun

Heather Bomberger

Connor Brogan

Sasha Howes

Dina Huynh

Joshua James

Joshua Kennedy

David Meier

Joel Neifert

Jenna O'Brien

Elaina Passero

Bianca Pinto

Kindell Schmitt

Jessica Slagle

Joseph Stevens

Peter H. Fitzgerald

Heather Bomberger

Connor Brogan

John B. Greiner

Kevin Dennis

Serena Emanuel

Patrick Gallagher

Emmett George

Alexandra Groen

Sydni Koch

Gina Muan

Sara Peterson

Alison Waldman

Jim & Elizabeth Lillard

Carolyn Mottley

Kindell Schmitt

Urban Withers

John Philip Mason

Elaina Passero

Jessica Slagle

B. L. Parsons

Connor Brogan

Christopher Gilson

Earl T. Swink, Jr.

Connor Brogan

Dina Huynh

Congratulations to four BSE graduate students who completed their degrees!

M.S. Degrees Completed Fall 2014

Joshua Moehrle (Advisor: **Thompson**), *Non-thesis*. Joshua is employed as a water resources engineer at Wilson T. Ballard Company, Owings Mills, MD.

Lory Willard (Advisors: **Thompson/Krometis**), *Does it pay to be mature? Assessing the Performance of a Mature Bioretention Cell Seven Years Post-construction*. Lory works as a water resources engineer at Coastal Resources, Annapolis, MD.

Ph.D. Degrees Completed Fall 2014

Ben Freedman (Advisor: **Senger**), *Degenerate Oligonucleotide Primed Amplification of Genomic DNA for Combinatorial Screening Libraries and Strain Enrichment*. Ben accepted a position with Illumina in San Diego as a process engineer.

Theresah Zu (Advisor: **Senger**), *Phenotypic and Metabolic Profiling of Biological Samples in Near Real-time using Raman Spectroscopy*. Theresah is now working at the US Army Research Laboratory in Adelphi, MD. She officially naturalized to become a US citizen in March 15. She and her family (husband Prince and daughter Nadine) welcomed a new baby boy, Nehemiah, on Mother's Day 2015.



VT Soil and Water Conservation Society

The Virginia Tech student chapter of the Soil and Water Conservation Society, led by BSE senior **Valeria Llanos** and faculty advisor **Erin Ling**, raised over \$150 through a fundraiser that partnered with local Blacksburg restaurant Gillie's. The students promoted dining at Gillie's on the evening of April 15, and 10% of Gillie's profits for that evening went to VT-SWCS, which advocates the protection, enhancement, and wise use of soil, water, and related natural resources.



continued from page 6

David Meier

Joel Neifert

George C. Vaughan

Carolyn Carrithers

Marisa Cole

Diego De La Torre Campos

Micah Dezort

Taylor Duncan

Nicole Fazekas

Alexandra Gibson

Michael Grinter

Jean Javier

Colette Julson

Tad Kolterman

Haley Kujawa

Andrea Kuliasha

Taylor Lohneis

Ryan Marano

Carolyn Mottley

Shaina Pigliacampi

Bianca Pinto

Lea Sarment

Daniel Smith

Morgan Steel

Urban Withers

Austin Wozniak

International Scholarships

Every year, international scholarships provide BSE students with opportunities to study global issues and network with other researchers and students from around the globe. Here are some of their adventures in their own words:

Chelsea Corkins: "As an awardee of the Julia K. Pryde Scholarship, I worked as an intern at the International Water Management Institute (IWMI) in Addis Ababa, Ethiopia. During this time, I conducted research with Dr. Tracy Baker – a renowned expert in hydrological modeling – on two projects emphasizing cross disciplinary integration. These projects included 3D Mapping in Rural Ethiopia using natural resource importance and Small-Scale Irrigation Modeling with an integrated decision support system. During these projects, I was exposed directly to rural fieldwork which included interaction with families of various ages, incomes, and educations. This part of my experience bettered me professionally and personally as I was required to describe my work to multiple levels of constituents. Working with students from other disciplines reminded me of the importance of interdisciplinary research with an integration of social aspects."



In addition to technical projects at IWMI, I was also fortunate enough to experience traditional Ethiopian dance, music, and tej – honey wine – throughout Addis. During my final week in Ethiopia, I ventured to Bahir Dar, Gondor, and the Simien Mountains where I trekked with baboons, relaxed lakeside, and toured ancient castles. Spending part of my time fully immersed in the country opened my eyes to natural and cultural beauties that few American students ever experience."

Sasha Howes: "With the help of the Pratt Scholarship, I spent this past year abroad, learning new cultures, languages, and making international friends. My academic year was spent in Madrid, Spain, studying engineering in Spanish at Universidad Politécnica de Madrid and making connections all across Europe. While in Madrid, I spent time in the Spanish classrooms, taking Unit Operations, Heat Transfer, and Microbiology in Castilian, challenging myself to understand not only the mathematics, but the language as well. During study breaks, my European friends and I visited the plethora of parks, cafes, and museums that Madrid had to offer. We discussed the politics of Europe, the differences in traditions for weddings, Christmas and summer holidays, and the amusing aspects of Spanish life. During free weekends, I traveled through Spain, taking notice of the differences in language and culinary delights. In May, I visited Germany for a student agricultural conference, meeting German university students and learning "How Green is German Agriculture?". The visit included trips to a hop plantation, organic test farms, a tractor museum, and a beer festival to experience the all famous German bier and lederhosen."



Valeria Llanos: "Thanks to the Pratt Scholarship, this summer I had the opportunity to experience an unforgettable internship in Vitoria, Brazil. I worked for Avantec Engenharia Limitada, a company that offers a wide variety of engineering services, such as industrial and residential construction, execution of projects, consultancy and supervision of constructions and projects. The project that I worked on during this internship was designing an approximately 31 kilometers long accessible highway for the state of

continued on page 9

BSE Comprehensive Design

Fifty BSE seniors finished their BSE Comprehensive Design in May. Of these, 48 students graduated in May, with the remaining graduating in December 2015. This past year there were 15 design projects that addressed biomolecular, biomedical, food processing, and water resources design needs. Most projects were mentored by practicing engineers in addition to a faculty advisor. The design teams presented their final design via websites, oral presentations, and a poster session on May 1st. Three teams were selected for the inaugural Senior Design Excellence Awards: **Kathryn Brown, Nick Offerjost, Michael Scimeca, and Sarah Steinke** for their project “Dialysis Sensors”; **Katie Atkinson, Dan Flannery, and Jordan Wetzig** for their project “Nursery Research Facility Design”; and **Dylan Cooper, Jenna Sharkey, and Aidan Suiter** for their project “Cross Country Course Detention Pond Retrofit”.

Design project titles, student teams, mentors, and websites are listed in table below.

BSE Comprehensive Design Projects 2014-15			
Title	Authors	Advisor Professional Mentor(s)/ Client	Team Website
Ghana Peanut Processing Facility	Moureen Barua, Jenna Kolakowski, Zach Reif, Matthew Rock	Mallikarjunan/Celiker (BSE) <i>Darko (Ghana)</i>	http://kulikuliproject.weebly.com/
Green Space Trail Redesign	Chris Balian, Jacob Cantor, Lindsay Carr (Fernandi, Intern)	Thompson/Wolfe (BSE) <i>Keesee (Draper Aden Assoc.)/ Village at Tom's Creek</i>	http://greenspacedesign.weebly.com/
Production of A Raman Sensor to Track Patient Progress During Hemodialysis	Kathryn Brown, Nick Offerjost, Michael Scimeca, Sarah Steinke	Senger (BSE) <i>Robertson (BME/BioMed Innovations LLC); Senger (Dialysis Sensors LLC)</i>	http://dialysensors.weebly.com/
Agricultural Nursery Plots to Study Water Quality Impacts	Katie Atkinson, Dan Flannery, Jordan Wetzig	Sample (BSE) <i>Owen (VT-Hampton Roads AREC)</i>	http://nurseryresearch.weebly.com/
BioBattery PowerBank	Ryan Frizzell, Carl Jackson, Shafie Rashid	P. Zhang (BSE) <i>Z. Zhu (CFB, Inc.)</i>	https://sites.google.com/a/vt.edu/bio-battery-sd-2014-2015/
Protein Ultrafiltration Process for Biopharmaceutical Manufacturing	Charles Roco, David Roth, Nolan Shen, Brianna Jahn (Intern)	M. Zhang (BSE) <i>Dickson (MedImmune)</i>	https://sites.google.com/a/vt.edu/medesignbse/title
Pepsi Clean-in-Place	McKenna Millington, MJ Rice, Nancy Stevenson	Mallikarjunan (BSE) <i>Walker (Nestlé)</i>	http://mj1824.wix.com/seniordesignpepsicp
VT Cross Country Course Detention Pond Retrofit	Dylan Cooper, Jenna Sharkey, Aidan Suiter	Scott (BSE) <i>Dietz/Grimes (VT-Site & Infrastructure Development)</i>	http://xcdetention-vtseniordesign14-15.weebly.com/
Vocal Fold Prosthesis Design Using Shape Memory Alloy Actuators	Shanel M. Tsuda, Eda Turgut, Patrick Weldon	Leonessa/Burks (ME) <i>Leonessa (VT-Center for Dynamic Systems Modeling and Controls)</i>	http://vocal2k14.weebly.com/
Sustainable Recirculating Aquaponic System for Rwanda	Chelsea Kellinger, Scott-Eugene Saverot, David Strickland	Ruder (BSE) <i>Lane (BSE/VT-Seafood AREC)</i>	http://sdaquaculture.weebly.com/
Frito Lay Defoamer Project	Andrea Beahm, CJ Caudill, Cassandra Conway	Mallikarjunan (BSE) <i>Moffitt (Frito Lay)</i>	https://sites.google.com/a/vt.edu/frito-lay-senior-design-project-2014-2015/
Residential Green Building Plumbing Design: Limiting Pathogen Growth	Daniel Logsdon, Anish Luthra, Austin Moon	Krometis (BSE) <i>Edwards/Rhoads (CEE)</i>	http://plumbingmicrobiome.weebly.com/
Catawba Sustainability Center Biofilter	Bushra Alam, Valeria Llanos, Victoria Nystrom	Easton/Bock (BSE) <i>Nease (VT-Catawba Sustainability Center)</i>	http://vtbiofilterseniordesign201415.weebly.com/

continued on page 9

BSE Comprehensive Design Projects 2014-15			
Title	Authors	Advisor Professional Mentor(s)/ Client	Team Website
Barnacle Bioadhesives	Michele Anderson, Blake Dosunmu, Haley Fuller, Hailey Koch, Kevin Parsons	Barone (BSE) Barone (Protein Q)	https://sites.google.com/a/vt.edu/barnacle-bioadhesives/our-company
Liquid Manure Management System for a Compost Packed Bed Dairy Barn	Emily Hilburger, Yoon Kyu Lee, Joe Roeske, Brett Walles	Ogejo (BSE) Knowlton (DS/VT-Legacy Dairy)	http://emilyh5.wix.com/legacydairy

continued from page 7

New Addition - Congratulations!



Welcome to Eleanor (Ella) Ann Scott, daughter of BSE graduate student **Felicia Scott** and her husband Jason. Ella was born on May 23rd, and was 8 lbs 8.6 oz and 20 in. Felicia and Ella are doing well.

Espiritu Santo. To accomplish this project, I worked with the environmental plant of the company. This consisted of a team of five environmental and sanitary engineers and technologists in environmental sanitation.

Having an international/abroad internship offered me the chance to gain work experience in Brazil, where the language, culture, lifestyle, and working style is different from the United States. Personally, I have built more confidence and independence by living in a new country. Besides having the opportunity to visit one of the five largest countries in the world, I have made new and lifelong friends at work, as well as with my host family. Experiencing a different culture has expanded my vision and my knowledge. I found that there is so much to learn and gain from other countries, cultures, and customs. It helped me grow and see life from a different perspective.”



Student Placement

Our 2015 graduating seniors are putting their BSE knowledge to work and inventing the future in numerous positions throughout the country! Examples include:

Position	Company	Location
Project Engineer	The Conservation Fund	Shepherdstown, WV
Field Engineer	Allan Myers	Chantilly, VA
Application Engineer	AKG of America	Mebane, NC
Scientist I	USGS Center for Integrated Data Analytics	Madison, WI
Scientist	National Institutes of Health	Gaithersburg, MD
Submarine Nuclear Officer	US Navy	TBD
Environmental Engineer	CDM Smith	Fairfax, VA
Operations Management	Nestle	Eau Claire, WI
Junior Engineer	RK&K	Richmond, VA

And some of our graduates are choosing to continue their academic studies in various graduate and professional programs:

Program	University	Location
Doctor of Osteopathy	Virginia College of Osteopathic Medicine	Blacksburg, VA
Doctor of Dental Surgery	Virginia Commonwealth University	Richmond, VA
Biomedical Engineering	Tulane University	New Orleans, LA
Biomedical Engineering	Virginia Commonwealth University	Richmond, VA
Biomedical Engineering	University of Virginia	Charlottesville, VA
Biomedical Engineering	VT-Wake Forest School of Biomedicine	Winston-Salem, NC
Civil & Environmental Engineering	Villanova University	Philadelphia, PA
Bioengineering	University of Washington	Seattle, WA
Civil & Environmental Engineering	Virginia Tech	Blacksburg, VA
Biological Systems Engineering	Virginia Tech	Blacksburg, VA

BSE Faculty and Staff News

Wolfe ASABE President 2015-2016

At the end of the Annual International Meeting of the American Society of Agricultural and Biological Engineers (ASABE) in New Orleans July 26-29, **Mary Leigh Wolfe**, BSE Professor and Department Head, will assume the office of ASABE President. She was elected to the President-elect office in spring 2014 and has served in that role since July 2014. "It is an honor and a privilege to serve ASABE and the agricultural and biological engineering (ABE) profession in this way," said Wolfe. She has gotten a good preview of the year to come, as the presidents' council (past president, president, president-elect) work closely together, and she has had the opportunity to observe and work this year with Terry Howell, Jr. (ASABE President 2014-2015). She is particularly looking forward to meeting more ABEs and representing ASABE and promoting the ABE profession in the US and around the world. Wolfe said, "The work that ABEs do is essential in addressing global challenges related to food, energy, and water in the U.S. and around the world."



ASABE Global Engagement Task Force members traveled to Africa in May 2015 to plan for The Global Food Security Conference that will be sponsored by ASABE in South Africa in October 2016. Dr. Linus Opara hosted the group, which met with Shadrack Moeophuli, President and CEO of the South African Agricultural Research Council (ARC), and others to invite ARC to participate in planning and sponsoring the food security conference. More information about ASABE's Global Initiative can be found on the ASABE website at <http://www.asabe.org/media/195967/globalinitiative.pdf>.

(l-r) Ajit Srivastava (Michigan State U), Bridget Murovhi (ARC), Dorota Haman (U of Florida), Lalit Verma (ASABE Past-President, U of Arkansas), Linus Opara (Stellenbosch U), Shadrack Moeophuli (ARC), Mark Zielke (ASABE), Mary Leigh Wolfe (ASABE President-elect, Virginia Tech), Jasper Rees (ARC)

Mike Zhang receives Dean's Award for Research Excellence



BSE professor **Mike Zhang** was one of five recipients of the College of Engineering (COE) Dean's Award for Research Excellence at the eighteenth annual Virginia Tech COE Faculty Reception in April. Zhang's research concentrates on bioprocessing of proteins and other biomolecules. His current research efforts focus on building delivery mechanisms for vaccines against infections and drug addiction, and on refining the use

of nanoparticles to deliver cancer treatments. Recently, he received \$2.14 million from the National Institutes of Health to develop a vaccine that could help persons addicted to nicotine quit smoking and/or using other tobacco products. Zhang's research group of students in the Protein Engineering and Separation Laboratory integrates molecular biology, biochemistry, bioprocessing engineering, and immunology to gain knowledge and develop skills in protein expression and purification.

BSE faculty and students lead the American Ecological Engineering Society

The American Ecological Engineering Society (AEES) is an international organization that promotes the integration of ecological design principles in engineering education and practice for the common benefit of society and nature. Two members of the BSE department served as national officers during 2014-2015. **Tess Wynn Thompson**, BSE associate professor, served as the president. During her tenure, Dr. Thompson initiated a strategic planning process to redefine and grow the organization. **Stephanie Houston**, a Ph.D. candidate in BSE, served as the national student representative, organized the student poster competition at the annual conference, and was instrumental in the planning process.



BSE students (l-r) Dylan Cooper, Tyler Weiglein, Teneil Sivells, Stephanie Houston, Nick Cook, and Kinsey Hoffman won second place in the student design competition at the American Ecological Engineering Society 2015 conference.

The 2015 AEES conference "Designing 21st Century Grasslands: Fire, Water, Conservation, and Carbon" was held at Oklahoma State University in Stillwater Oklahoma, June 3-5. Tyler Weiglein placed 2nd in the student poster competition, where he presented his research on the effects of precipitation regime and landscape position on soil greenhouse gas emissions. Additionally, a team of BSE graduate students won 2nd place in the student design competition, where the challenge was to develop a stormwater control system in a section of Stillwater to reduce flooding in a residential area. The students focused on

continued on page 11

continued from page 10

rainwater harvesting methods to decrease runoff and to promote water reuse, including cisterns and rain barrels. Using the EPA Stormwater Calculator, the students estimated the amount of runoff reduction due to their design and the cost of implementation. Congratulations Hokies!

Ling and Benham receive VCE Program Excellence Award

BSE Extension Associate **Erin Ling** and Professor **Brian Benham**, along with county extension agents Karen Poff, Mark Sutphin, and Corey Childs, were recipients of a 2014 Virginia Cooperative Extension Program Excellence Award for achieving excellence in “Program Evaluation” with their project “Northern Shenandoah Valley Water Testing Program Yields Positive Results”. As part of the broader Virginia Household Water Quality Program, this outreach effort provided over 350 homeowners in Clarke, Frederick, Shenandoah, Warren, and Page counties with access to low-cost water quality testing and education on the maintenance of their private drinking water supplies (i.e. wells).



Focus on Faculty Research: Durelle Scott's Research Group

BSE associate professor **Durelle Scott's** research group focuses on coupling biogeochemical and hydrological processes that alter water quality and quantity through river systems. They currently work in a range of stream and floodplain systems, from Stroubles Creek that flows through Blacksburg to the nation's largest riverine swamp (Atchafalaya). Scott's research team includes: BSE Ph.D. students **Nathan Jones** and **Tyler Keyes**, BSE M.S. students **Dylan Cooper** and **Breanne Ensor**, **Tyler Weiglein** (CEE BS '15), and BSE B.S. students **Connor Brogan**, **Colette Julson**, and **Emma Withers**.

Floodplains are an important component of the landscape adjacent to streams and rivers. When rivers flood, sediment and nutrients are transported onto the floodplain, providing an opportunity for sediment and nutrient removal in addition to flood peak attenuation. The group has recently quantified the efficiency of nutrient removal within the Stroubles Creek floodplain. Through a series of five artificial floods on the floodplain over the course of a year, they found that the floodplain was a nitrogen sink but a source for phosphorus. The floodplain sediments have a large store of legacy nutrients from former agricultural practices. Their results suggest that the practice of reconnecting a stream with its adjacent floodplain with an agricultural history may not result in better water quality downstream, at least in the short term and when phosphorus is limiting biological growth.



Floodplain monitoring at the STREAM Lab on Stroubles Creek

Their work in larger floodplains that are characterized by greater hydrologic connectivity between the river and floodplain illustrate the benefits of nutrient removal. They've shown that transporting nutrient rich water from the Mississippi River into the Atchafalaya Swamp removes up to 20% of the annual nitrogen load entering the swamp. Thus, these riverine swamps that are common in the coastal plain are an effective best management practice (“BMP”) for removing excess nitrogen, which is commonly the limiting nutrient in coastal estuaries.

Ongoing research is exploring how climate variability alters the nutrient sink/source potential of floodplains throughout our nation's stream network. The group is also currently exploring how greenhouse gas fluxes from floodplains vary seasonally and in response to altered stream flow/precipitation magnitude and frequency. Collectively, the group seeks research findings to provide BMPs to improve water quality, while maintaining other floodplain ecosystem services and not enhancing greenhouse gas production.

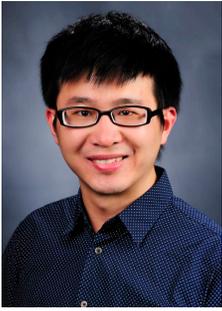
Krometis awarded Teacher of the Week and Favorite Faculty Award

BSE assistant professor **Leigh-Anne Krometis** was named “Teacher of the Week” by the Center for Instructional Development and Education Research (CIDER) at Virginia Tech for the week of November 17, 2014. She was honored with this award for her effort to “model science and engineering as a conversation through frequent opportunities to interact with real-world problems”. With her fellow teachers of the week for the past academic year, Leigh-Anne was presented with her award at a banquet at the Inn at Virginia Tech in April.

Just the week before, Leigh-Anne was also honored with a “Favorite Faculty Award” by the Division of Student Affairs. She was nominated as a “Favorite Faculty” by students in the East Ambler-Johnston Honors Residential College where she is a senior fellow for her devotion to mentoring a hall of interdisciplinary female undergraduates known as the “Lady Lair” through the organization of book clubs, documentary nights, and guest lectures.



Welcome New Postdoctoral Associates



Jiayuan Sheng joined the BSE Department in October 2014 after receiving his Ph.D. in Bioengineering from Zhejiang University. Sheng works as a postdoctoral associate under the guidance of **Xueyang Feng**, BSE assistant professor, to engineer yeast to produce therapeutic proteins and drugs. He will reprogram the yeast genetic code and introduce a series of unnatural amino acids into protein therapeutics, such as HBV vaccines, to develop novel pharmaceutical products with improved functionality. Sheng will also be working to develop novel synthetic biology tools to efficiently edit microbial genomes.



Hande Kaya-Celiker started as a postdoctoral associate in October 2014 as well, under the supervision of **Kumar Mallikarjunan**, BSE professor. She works on the Peanut Mycotoxin Innovation Lab's (PMIL) project at Virginia Tech. She will be taking the lead on setting up the Mycotoxin Testing Lab at Virginia Tech and coordinating the comparative study of aflatoxin evaluation across all the PMIL labs in sub-Saharan Africa and Latin America. As part of the study she will compare various methods of aflatoxin evaluation, work to create a database of available labs to conduct mycotoxin evaluation, and establish standard safe operating procedures in the participating labs. Aflatoxin is a secondary metabolite of *Aspergillus* (mold) commonly present in cereals (corn) and nuts/legumes (peanuts, almonds, and pistachios) and is the major reason for several diseases in the developing world such as liver cancer, stunted growth, and compromised immune system. Kaya-Celiker received her Ph.D. from Virginia Tech - BSE.

Engineers, scientists to examine antibiotic resistance in food chain from farm to fork

BLACKSBURG, Va., May 20, 2015 – Growing evidence suggests that agricultural practices, especially widespread antibiotic use, could be contributing to the increasing antibiotic resistance problem in humans. In order to learn how to effectively control this spread of antibiotic resistance from livestock manure, the U.S. Department of Agriculture (USDA) has awarded a \$2.25 million grant to a Virginia Tech team of engineers and scientists to examine the food chain from farm to fork. Two faculty from BSE are part of that team: **W. Cully Hession** and **Leigh-Anne Krometis**. The team's plan includes tracking the fate of antibiotics, antibiotic resistant bacteria, and antibiotic resistance genes, as they are potentially carried over from manure to fresh produce.

To read the complete article:

<http://www.vtnews.vt.edu/articles/2015/05/052015-engineering-prudenfoodsafety.html>

Researcher develops vaccines to help people and animals breathe easier

Growing up, **Mike Zhang** watched his aunt battle a dependence on cigarettes until she died from lung cancer. "It was hard to see her struggle with addiction," said Mike Zhang, BSE Professor.

Today, Zhang is developing a vaccine that could help smokers conquer their nicotine addictions. That ultimately could make many smoking-related diseases relics of the 21st century.

To read the complete article:

<http://www.vt.edu/spotlight/innovation/2015-01-12-nicotine/vaccine.html>

BSE Welcomes New Staff



Dumitru Branisteanu joined BSE in December 2014 as our Field Research Technician. Before joining us in BSE, Branisteanu worked for 17 years with Exelis, Inc. in engineering research and development. He developed, assembled, and tested new night vision devices. His work there was recognized by several awards: 2013 Gold Team Award – Exelis Inc., License Gold Ring of Quality – MTF/SNR Improvements, and You Make a Difference Award – Night Vision in 2006 and 2012. Branisteanu's educational background includes an A.A.S. in Computer Electronics Engineering Technology from Skyline College and a diploma in Electrical/Electronics and a certificate in HVAC/R from Virginia Western Community College. He is a Master Plumber in Virginia, grew up on a farm, and has experience as a welder assembler, mechanical/hydraulic technician, and industrial electrician. Branisteanu's expertise and wide-ranging experience, from farm machinery to precision electronics, are great assets to the BSE department.



Liza Spradlin joined the department in January 2015 as the BSE Academic Programs Coordinator. From October 2003 through 2014, Spradlin worked at American National University in Salem, VA, in several positions, including Student Services Representative/Financial Planner, Admissions Representative, and Director of Academic Processing and Records Department. Her experience and expertise with all aspects of the student experience at a university, including recruiting, admissions, enrollment, financial aid, student records, class scheduling, and graduation, will serve BSE well. Spradlin's outstanding work at American National University was recognized by several awards: Staff Member of the Year in 2007 and 2013 (voted by the student body) and Student Services Department Award 2013. Spradlin's educational background includes an A.S. in Paralegal Studies from National College and a B.S. in Business Administration from American National University.

Visiting Scholars



Xiaqing Yang is a professor in the department of Food Science and Engineering in Inner Mongolia Agricultural University, China. Her research interests include mechanical and rheological properties of agricultural materials, mechanical damage of agricultural materials during storage and transportation, food processing engineering, and virtual prototyping technology in food processing. Yang received China Science Council's Scholarship to spend one year of training and research under the guidance of **Kumar Mallikarjunan**, BSE Professor. She is focusing on characterizing food materials during the cooking process and development of procedures to extract phytochemicals from agricultural byproducts.

Hanan Abdallah Moustafa, from the Biotechnology Department at the Alexandria University in Egypt, joined the Carbohydrates and Biofuels Lab under the direction of BSE professor **Percival Zhang** this semester. Her goal within this lab is to construct cell-free artificial enzymatic pathways that can convert xylan to high-yield hydrogen without ATP. This work will require mining mega-genomic databases in order to identify key enzymes that can mediate artificial metabolic pathways. This research will enable the production of low-cost green hydrogen from biomass, which will fuel a future of high energy efficiency and zero carbon dioxide emissions.

Niveda Sundararaman, a visiting student from Shanmugha Arts, Science, Technology & Research Academy, India, joined the BSE Department in January, 2015. Niveda is working under the guidance of BSE assistant professor **Xueyang Feng** to develop a novel computational approach for mining microbial genomes. Niveda's work can improve our understanding on the genotype-phenotype correlation and identify new genetic targets to improve microbial fermentation performance.

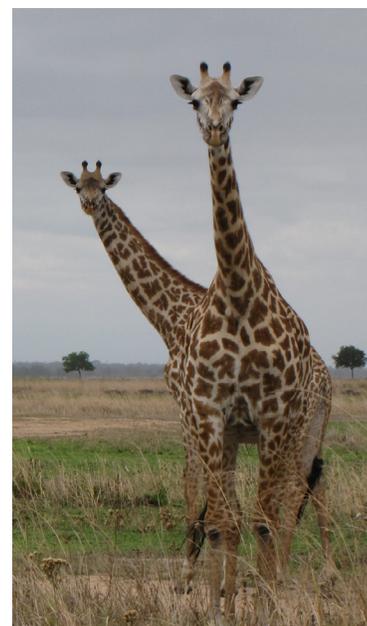
Watershed Research in Tanzania

Winfred Mbungu, a Ph.D. student advised by BSE associate professor **Conrad Heatwole**, has been conducting field research for his dissertation this past year back at his home university in Tanzania. Winfred is on the faculty of the Sokoine University of Agriculture (SUA) in Morogoro, and has a 4-year study leave to get his Ph.D. at Virginia Tech. His field data collection examines the influence of climate, landscape, and land use factors (agricultural practices) on the quantity and quality of flow in headwater streams. A rainfall simulator is being used to determine runoff and erosion parameters for watershed models.

As an extension of Winfred's project, Heatwole successfully obtained funding from USAID to partner with Dr. Henry Mahoo of the Agricultural Engineering and Land Planning Department of SUA, to strengthen the collaboration between SUA and the regional water management authority (Basin Office) for improved watershed management. The 2-year \$250k project aims to a) expand and strengthen stream and weather monitoring programs; b) build and use two rainfall simulators for research and outreach related to effects of land use practices on runoff and erosion; c) adapt watershed modeling tools for application in the Wami/Ruvu River Basin, a primary water source for the capital city of Dar es Salaam; d) develop current and historical land cover maps for the watershed; e) conduct model application studies in collaboration with SUA and Basin Office staff; and f) provide training workshops that support the above programs. When he completes his Ph.D. next May, Winfred will return to SUA and will participate in this project along with other faculty in their department.

(l): A stream monitoring site in the Uluguru Mountains; L-R: Winfred Mbungu, Dr. Conrad Heatwole, Dr. Henry Mahoo

(r): Giraffes in nearby Mikumi National Park



Engineering a New Archive

When **W. Cully Hession** (Agricultural Engineering '84, M.S. '88), BSE professor, chanced upon thousands of photographs and documents deep within Seitz Hall—some dating back to 1915—he knew he'd found the mother lode of Virginia Tech's agricultural engineering history.

The materials—since compiled in a digital collection titled "Project No. 10," the name of the entity that originally funded Tech's agricultural engineering department, today's Department of Biological Systems Engineering—have already proven valuable to researchers and historians alike, Hession said.

To read the complete article:

<http://www.vtmag.vt.edu/winter15/engineering-archive.html>

BSE Alumni News

Alumni Updates

1980s

Chuck Hatcher (BS '81) was recently promoted to Regional Linings Manager at Stonhard, Inc. with responsibilities for Stonhard Corrosion Resistant Linings sales and installation in states along the Mid-Atlantic. Despite his added responsibilities, Chuck still finds time to kick back and listen to music with his son, Ryan.



Jeff Gentry (BS '84) recently completed a stream exclusion program at his family's Hillview Farm in Albemarle County, VA that was featured by the Chesapeake Bay Foundation. More about the project and its environmental and herd health benefits can be found here: <http://www.gettingmoreontheground.com/files/2014/12/Gentry-December-2014-Albemarle-Co-CD5.pdf>. Jeff's son Jason Gentry, who is carrying on the family tradition as he completes his junior year in Biological Systems Engineering, commented on the project: "It was neat to see the stuff we have learned in class actually be applied to a real world scenario!"

Eldridge (Trey) Collins, III (BS '86) was recently named the Global Program Manager for Dell Inc.'s International Organization for Standardization (ISO) certifica-

tions. He resides in the Austin, Texas area with his wife and two sons.

2000's

Adrian Harpold (BS '03, MS '05) married Allison Peterson on June 20, 2013 in Page, AZ and the couple spent their honeymoon climbing in the North Cascades. Adrian finished his Ph.D. at Cornell University in 2010 and recently accepted a faculty position at the University of Nevada, Reno. He will be teaching in the undergraduate Ecohydrology program within the Department of Natural Resources and Environmental Science. His research focuses on watershed hydrology in snow-dominated regions. Adrian is developing opportunities for graduate students in the Sierra Nevada and Great Basin mountains. BSE alumni are highly encouraged to apply!



Joe Madren (BS '04) completed a tour in Afghanistan with the US Marine Corps in 2012. He currently works as a future operations and pilot training officer/weapons and tactics instructor at Camp Pendleton in Oceanside, CA. Joe and wife Rebekah are kept busy by two beautiful daughters: Ella (2 years) and Natalie (2 months).

Angela Gardner (BS '04) married Brady Allen in October 2014. She recently completed her MS degree in Biological and Agricultural Engineering at NC State University in Raleigh, NC and is working as a Water Resources Engineer at Wildands, Engineering, Inc.



Stephen Park (BS '06) has been busy since leaving Blacksburg! Immediately following graduation, he worked for Novozymes Biologicals, Inc., in Salem, VA with fellow BSE '08 graduates **Derek Grysko** and **Stephen Nimitz**. A year later, Stephen began a Ph.D. program at the Ohio State University, and defended his dissertation, titled "Numerical and Procedural Methods to Improve the Performance of an Open Channel Raceway for Nannochloropsis salina cultivation" in August 2014. Along the way, in 2012, he married high school classmate Youji Kim, and the couple celebrated the birth of a daughter in 2013. Stephen and his family have just moved to Carbondale, IL, as he begins a postdoctoral research position in the Civil Engineering Department at Southern Illinois University.



Visit BSE for tours and more during the
College of Engineering Homecoming

October 24, 2015

VT vs. Duke

For more information re COE Alumni Tailgates:
<https://www.eng.vt.edu/alumni/tailgates>

continued on page 15

continued from page 14

Christine (Bechtel) Gingras (BS' 06) has also been busy post graduation! She finished her MS at the University of Vermont in 2012, and currently works for the Vermont Agency of Agriculture as a registered professional Agricultural Engineer to improve state water quality. Christine married fellow Hokie alum Tyler Gingras (CE '05), and the couple welcomed daughter Adalyn Korra Gingras to their family in February 2014.

Marc Henderson (MS '06) is currently working as a Water Resources Engineer at Meliora Environmental Design in Phoenixville, PA.

Neil Templeton (BS '09) completed his Ph.D. in Chemical and Biomolecular Engineering at Vanderbilt University in 2014, and accepted a position as a Senior Scientist in Bioprocess Development with Merck & Co. in Kenilworth, NJ.



Neil and fellow VT alum Scott Mostoller (Mining Engineering '09) on a recent ski trip

2010's

Joshua Flickinger (BS' 10) finished his tour as a Peace Corps volunteer in the Philippines in September 2014. He spent two years working in coastal resource management restoring reefs and mangroves.

(Olivia) Waverly Parks (BS '11, MS'12) has begun work as an assistant engineer at Penfield and Smith Engineers in Santa Barbara, CA.

Jamey Smith (BS '12) has been serving in Honduras for the past 2 years with Great Commission Ministries as a Water and Sanitation Engineer. He is currently working on a project to provide clean water and sanitation in a community of 1,000 people that was devastated by flooding in 2010. He is currently developing constructed wetlands in order to treat the wastewater in the community as there currently exists no form of treatment. Jamey worked on



a similar project in the Dominican Republic for his senior design project. To find out more about what Jamey is doing, visit: www.totalwater.org.

Parker Lee (BS '13) has begun a doctoral program at Case Western Reserve University. His dissertation research is in the field of polymeric systems for delivery of protein therapeutics, focusing on HIV and cancer.

We enjoy receiving
your news & pictures!

Please take a few
moments, and
fill out our
alumni update form:

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

Outstanding BSE Alumni

Two BSE alumni received alumnus 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 Mark and Brad!



Mark Bennett (BS '85, MS '97) was awarded the CALs Outstanding BSE Alumnus Award. This award recognizes alumni who have graduated more than 10 years ago. Bennett is the director of the United States Geological Survey (USGS) Water Science Centers in both Virginia and West Virginia. He helps to facilitate collaborative research between the USGS office, Biological Systems Engineering, and other departments at Virginia Tech. Bennett served on the BSE Advisory Board for six years, including one year as chair. He recently presented a seminar on campus which was hosted by the VA Water Resources Research Center.



Brad Matanin (BS '05, MS '07) was awarded the CALs Outstanding Recent BSE Alumnus award. This award recognizes alumni who have graduated in the last 10 years. Matanin is a manager of Global Biologics Supply for AstraZeneca. He is an internal consultant responsible for managing projects and analytics across the global biologics operations. He performs industry research, benchmarking, analytical modeling, and project management on major strategy initiatives. He has remained connected to the department by presenting his perspectives on industry through seminars to graduate students and mentoring senior student design teams.

Pictured at left: Dr. Mary Leigh Wolfe and Dean Alan Grant with Mark Bennett (top) and Brad Matanin (bottom)

Biological Systems Engineering Department (MC0303)
Seitz Hall, RM 200, Virginia Tech
155 Ag Quad Lane
Blacksburg, VA 24061

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Blacksburg, VA 24060

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BSE Newsletter Staff

Editor-in-chief

Leigh-Anne Krometis
Email: krometis@vt.edu

Managing Editor

Design & Layout Editor

Distribution

Barbara Wills

Assistant Editor

Karen Kline

Current Issue Contributors

Priscilla Baker
Conrad Heatwole
W. Cully Hession
Stephanie Houston
Durelle Scott
Tess Thompson
Janette Wolf
Mary Leigh Wolfe



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