

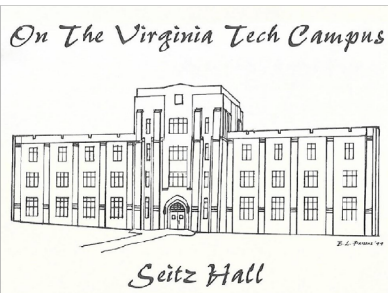
Biological Systems Engineering *Newsletter*

FALL 2018

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**VT BSE is celebrating
100 years in 2019!
Stay tuned and join us
for all the festivities!**



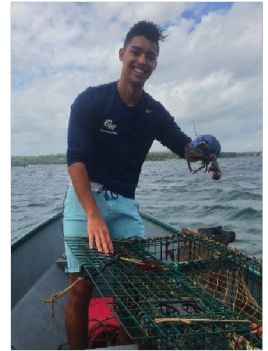
Hand-drawn sketch of BSE's campus home by Bernie (BL) Parsons, a 1944 departmental graduate, and later a long-time faculty member



BSE Undergrads Summer Internships & Experiences

Long summer days always prove the perfect time for our undergraduates to expand their college careers through internships and summer research programs. These experiences provide our students with hands-on opportunities to apply their classroom learning to real-world problems, establish professional networks and mentorships, and identify specific future career paths.

Summer internships can be especially valuable for juniors and seniors considering post-graduation plans. Senior **Antonio de Cecco** spent his summer working for the National Oceanic and Atmospheric Administration in their National Marine Fisheries Service in Gloucester, MA contributing to various aquaculture projects and outreach to local students and Native American tribes. Meanwhile, back in Virginia, senior **Emma Aguero** also enjoyed connecting with the environment as a Nutrient Management Intern in the Soil and Water Conservation Division of the VA Department of Conservation and Recreation where she helped manage fertilizer usage in soils to improve local watershed quality. **Kyle Knupp** (senior) worked for the Town of Blacksburg as the Engineering Intern in the Public Works department, monitoring the sanitary sewer system and designing a calibration device for pressure transducers. This proved such a great "fit" that Kyle is continuing to work for the town part-time during his senior year. Seniors **Kate Johnson** and **Maia Huntington** both found internships in the health industry. Kate worked at Luna Innovations in Charlottesville, VA on drug delivery systems used to treat peripheral neuropathy and traumatic brain injury while Maia worked at Phillips-Medisize, LLC in Hudson, WI on medical device production.



Antonio de Cecco
catching a traditional
New England dinner



Emma Aguero doing field work



Kyle Knupp logging
monitoring data

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Robert "Bobby" Grisso
Professor and Interim Department Head

Greetings from Biological Systems Engineering at Virginia Tech. Our lead stories include new discoveries, summer experiences and adventures. We are pleased to introduce a new faculty member, Clay Wright, who joined us in August. I stepped in as interim head from my role as Associate Director of Virginia Cooperative Extension. I am pleased with the changes and outcomes the BSE faculty, staff and students have developed since I was active in BSE. Please enjoy reading about exciting research, teaching and extension activities.

Around Seitz and HABB1, we have had a fantastic year of discovery and outreach. What you will notice is the breadth and depth of their work. I believe that we are well versed to develop engineered solutions for a wide variety of problems.

I'd like to draw your attention to two new positions available in BSE. The first is a food engineering position that will have a research and teaching components and a strong engagement with industry. The other is department head for BSE. The committee is being developed and when the position is posted, we will be conducting an international search for a well-qualified candidate. Both positions will be accepting applications and I hope to hear from some of the best and brightest among you that have interest. Please pass the word and we strongly encourage women and underrepresented members of the engineering community to apply.

We are happy to have Brian Benham and Mike Zhang back from research leaves. We also congratulate Drs. Justin Barone and Venkat Sridhar on their promotions. We have many faculty and staff accomplishments to celebrate.

A special committee under the leadership of Drs. Mary Leigh Wolfe and Cully Hession is preparing for the 100th Year Celebration of our department. We are planning an event in spring 2020 and will be developing a challenge for our classes that will propel us into another 100 years of success. Please plan on joining the celebration.

If your travels bring you to VT, please visit Seitz Hall. We would love to visit with you and have the opportunity to take your picture with your class portrait.

Bobby Grisso

Mike Martin and Bobby Grisso point out the class photo of Mike's brother, Dan Martin, class of 1988



Continued from front page

Interning also allows students to gain intensive hands-on experience with various tools, programs, and engineering techniques. Junior **Alexa Reed** spent most of her summer perfecting her use of Inventor and AutoCAD working as an intern for Simplimatic Automation in Forest, VA, while senior **Elijah Rinaldi** ran DNA extractions and PCR analyses to screen tobacco plants for RJ Reynolds in Winston-Salem, NC. **Madison Slager-Laurent** (junior) spent a second year interning with the Medical Products Group at Canon Virginia, Inc. in Newport News, Virginia where she gained expertise working with particle counters, aseptic procedures, x-ray detectors, and of course, technical writing and presentations.



Madison Slager-Laurent gets ready for the clean room

Senior **Nick Bohmann** spent his summer at the German Cancer Research Center in Heidelberg, Germany using CRISPR, proteomic analysis and organoid culturing to study tumor initiation in mouse models. But you don't have to be an upperclassmen to have the skills nec-

essary to prove yourself useful to a company as a summer intern! Sophomore **Emma Givens** spent her summer interning with General Dynamics Electric Boat in New London, CT ensuring the safety of new submarine designs; she jokingly commented: "this internship required that I apply a shocking amount of what I learned in Physics and Math classes (all the stuff we thought we'd never need in real life)!" Fellow sophomore **Coral Hendrix** spent her summer in the soils lab working for a geotechnical and environmental engineering and testing consulting firm, GET Solutions, in Virginia Beach. Meanwhile, **Rachel Lake** (sophomore) contributed to a wide variety of projects working as an Environmental Intern at the Cabell-Huntington Health Department, ranging from septic tank monitoring, pool chemical safety, mosquito and tick analysis, dog bite monitoring, health inspections, and needle pickup.



Rachel Lake hunts for ticks

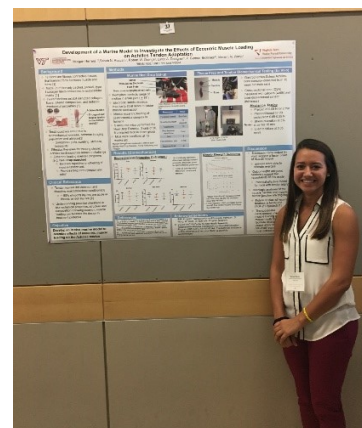
As in previous years, several of our undergraduates were selected to participate in competitive NSF-funded Research Experiences for Undergraduates (REU) programs throughout the country. **Layla Almualem**

(sophomore) spent her summer investigating the impacts of the *No-sema* spp. pathogen on bumblebee populations at the University of Kansas, providing her with invaluable experience in applied microbiology and ecology.



Layla Almualem at University of Kansas

Morgan Re (junior) spent her summer at the University of Texas at Austin conducting literature reviews and working in the lab to investigate best practices related to infrastructure design and natural hazards. Fellow junior **Morgan Herrera** participated in the Biomechanics and Biological Transport



Morgan Herrera presenting her summer research

REU program right here in Blacksburg, based in the Biomedical Engineering and Mechanics department. Over the summer Morgan worked to develop a mouse model for experiments targeting Achilles tendon injuries in athletes and the elderly.

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BSE Advisory Board

BSE's Advisory Board is a diverse group of professionals representing private industry, academia, and government agencies who provide feedback and oversight of BSE teaching and research programs. In this issue we feature one of our new members, **Steve Taylor**.



Steve Taylor received his B.S. and M.S. degrees in Agricultural Engineering from University of Florida in 1983 and 1985, respectively, and a PhD in Agricultural Engineering from Texas A&M in 1988. He began his career as an Assistant Professor in Auburn University's Department of Biosystems Engineering in 1989. After almost 30 years at Auburn, Steve has held positions as Head of the Department of Biosystems Engineering and Director of the Center for Bioenergy and Bioproducts. He is currently the Associate Dean for Research in Auburn University's Samuel Ginn College of Engineering since July 2016.

Dr. Taylor's research focuses on engineering for forest operations and improved utilization of forest biomass for energy feedstocks, as well as for structural products. He has received numerous honors and awards including the James R. and Karen A. Gilley Academic Leadership Award from ASABE in 2015. He was also elected an ASABE Fellow in 2013.

Steve and his wife Martha reside in Auburn, AL. He enjoys spending time outdoors, especially on his family forest land in Alabama and Kentucky, and taking care of his horses. He is looking forward to serving on the BSE Advisory Board!

Valued Contributors to BSE (6/1/18 - 12/31/18)

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 also support departmental activities that enhance the educational and work experience of BSE students, staff, and faculty. Please contact the department (lheanes@vt.edu or rgrisso@vt.edu) if your name has been omitted from this list.

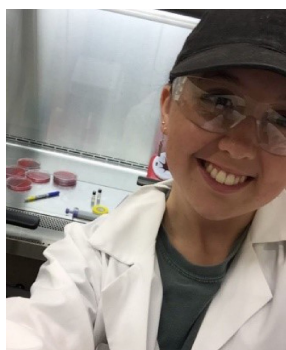
Tim and Amy Alderson
Eldridge S. Bell
Frederick Carbaug
Lindsay R. Carr
Andrew Clarkson
Keith B. Coffman
Eldridge and Belva Collins
George H. Comer
John Cundiff
David D. Daubert
Lia A. Doumar
Dominion Energy
Charles W. Dyson
EIP III Credit Co., LLC
John and Doris Elliott
Joseph M. Flag
Ray D. Frith

Joseph M. Gardner
Barbara L. Hale
Charles H. Hatcher
C. Gene Haugh
Valentina G. Heath
Jeffrey L. Higgins
Kinsey H. Hoffman
Brian J. Holmes
Jeffrey L. Johnson
Stacy L. Le
Charles M. Leach
Fred and Rebecca Massie
Dave and Jill Morris
Jacob Patish
William F. Patterson
William D. Perdue
John V. Perumpral

Robert Pitman
David and Monica Powers
George R. Prince
Dana S. Reeder
Neville A. Rowland
Brian and Suzanne Sapp
Easley Smith
John S. Smith
Jing Tang
Neil Templeton
Ralph A. Thompson
Gina L. Tonn
Tom Trykowski
Donald and Pamela Wells
Larry J. Wills
Gene Yagow
Your Cause, LLC

Continued from page 3

The research proved such a great fit that Morgan is continuing her work in Dr. Wang's Orthopedic Mechanobiology Lab this semester as an independent study. Many students found opportunities to invent the future and engage in varied research efforts right here at Virginia Tech with specific faculty mentors (for a look at one of our ongoing successful in-house research internships, see Dr. Scott's HARP program article on p. X). Research foci and day-to-day work were as varied as our students! Junior **Gabi Martinez** secured a project working with Dr. Robertson from BEAM and BSE Associate Professor **Ryan Senger** after sending out an email following an interesting lecture – leading to a summer in the lab doing Raman spectroscopy on urine samples to test for various forms of renal failure. Junior **Ben Agnor** also worked with Drs. Robertson and Senger on biomedical research this summer, working on the Healthy Humans and learning about advances in brain tumor diagnosis and treatment. **Rebecca Schmiele** (senior) gained experience she hopes will serve her in vet school by working on the development of non-invasive cancer cell treatments using nanocones under BEAM professor Dr. Vlaisavljevich.



Gabi Martinez in the lab

Of course research can mean long hours in the field, not just in the lab! Senior **Victoria Strand** spent a second summer working for Dr. Radtke in the Forestry department doing biomass research on a variety of tree species in Utah, Arizona, and California.



Victoria Strand sporting appropriate PPE!

Victoria appreciated the hard work, stating “it was interesting taking the raw data and understanding the work and challenges that goes into collecting data for research”. **Randolph Colby** (senior) spent time both in



Randolph Colby (front) & colleagues collecting water samples

the lab and on the river working for Dr. Xia in the School of Plant and Environmental Science examining the fate and transport of antibiotics, antibiotic resistant organisms, and emerging

chemical contaminants – and got to use a rainfall simulator similar to those he saw in his BSE classes!

Dan Irving (senior) collected data for BSE Assistant Professor Jon Czuba at 25 different river sites within the Dan and Roanoke river basins.



Dan Irving puts his surveying skills to work

Fellow senior **Ethan Smith** spent his summer examining the challenges of rural drinking water systems with BSE Associate Professor **Leigh-Anne Krometis**, collecting water from local springs and



Ethan Smith collects a spring sample in WV

analyzing patterns of drinking water contaminants. Seeing the application of his classes and working on a team inspired Ethan to continue his work as a BS/MS student following graduation this May.

Is your company looking for qualified Hokie engineering interns this summer? Contact us to post an ad on our jobs clearinghouse! (senger@vt.edu)

ASABE Student Branch News

The American Society of Agricultural and Biological Engineers (ASABE) welcomed back students from summer break by hosting an introductory meeting and a water balloon fight on the Duck Pond lawn. During the first professional meeting we heard from five BSE students: **Kate Johnson** (LUNA Health Sciences), **Antonio De Cecco** (NOAA), **Nick Bohmann** (Deutsches Krebsforschungszentrum), **Maia Huntington** (Phillips-Medisize, LLC) and **Dan Irving** (Study abroad in Dublin, Ireland) about their amazing summer internships and research positions. From these presentations, students learned so much about opportunities that BSE students have available to them and how to get involved in their own study abroad, internships, co-ops, and undergraduate research experiences.

To start off the busy October month, we heard from five speakers about their research within the department: **Taylor Lohnies** (graduate student for Dr. Zhang), **Daniel Smith** (PhD student for Dr. Thompson), **Hunter Flick** (graduate student for Dr. Senger), **Yihuai Hu** (graduate student for Dr. Ogejo) and **Dr. Jonathan Czuba**. Students learned about the research that they could potentially get involved with as an undergraduate student and what possibilities they have as graduate students. The day before Halloween we carved pumpkins to display in front of Seitz Hall to share the Halloween spirit with the rest of the department. The first week in November brought the annual department potluck, where students, faculty, and staff mingle and eat roasted pork by the bonfire. To round out the semester, we will be hosting a resume workshop with a representative from Career Services, and a Holiday potluck for all students before finals begin.

The ASABE Southeastern Regional Rally is at NC State in early April. We are looking forward to attending with even more VT students this year and are very busy fundraising in order to be able to cover the total cost. We also plan to hosting our annual “Raking Dead” fundraiser, where we raised about \$1,500 last year raking leaves around town dressed as zombies.

Overall, this year is off to a great start for ASABE and we look forward to what the spring semester brings!

Jessica Slagle, ASABE President 2018 - 2019



Spring 2018 Dean's List

Congratulations to the BSE undergraduate students who made the Dean's List in the spring 2018 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 semester to be awarded Virginia Tech Dean's List status.

BSE Sophomores (in spring 2018)

Kevin Johns
Bowen Xiang
Carol Yang
Shuyu Zhang

BSE Juniors (in spring 2018)

Ben Agnor
Georgie Alvis
Yuanzhi Bian
Hana Coogan
Dana Dabson
James Die
Anna Dykshorn
Jordan Hemmen
Kate Johnson
Matthew Lefkowitz
Gabrielle Martinez
Grant McMillan
Alexis Petrosky
Michael South
Tinh Vu

BSE Seniors (in spring 2018)

Hailey Alspaugh
Emilie Baker
Nikita Balani
Emily Berg
Lauren Bochicchio
Nicklas Bohmann
Madeline Carroll
Shiva Rama Challa
Julia Chand
Carrie Cheung
Kasey Chiuchiolo
John Colby
Garrett Craft
Shelbie Dashiell
Antonio De Cecco
Lindsay Dennis
Anna Dipietro
Alex Domiano
Taylor Duncan
Samuel Elizondo Villarreal
Serena Emanuel
Lucy Epshteyn
Sara Eubanks
Alyssa Ford

Emmett George
Jihyeon Gong
Austin Gouldin
Maria Graber
Alexandra Groen
Kellan Hagwood
Daniel Hildebrand
Michael Johnson
Leila Kamareddine
William Krisko
Andrea Kuliasha
Nikkole Lenardson
Taylor Lohneis
Kaila Martin
Laura McClenny
Colleen McDonald
Whitley Miller
Saede Moseley
Jenna O'Brien
Melissa Oberly
Seth Oliveira
Nathaniel Orazi
Megan Paul
Kaitlyn Paulchell
Andrew Penshorn
Christopher Perkins
Rebecca Pettit
Matthew Pickering
Dane Pizzo
Sara Prince
Teresa Reiber
Kelsey Reitz
Elijah Rinaldi
Naila Sayani
Sydney Scherer
Rebecca Schmiele
John Schubert
Benjamin Smith
Ethan Smith
Victoria Strand
Meaghan Sullivan
Rachel Taitano
Alexandra Thomasson
Aaron Tillar
Jackson Toth
Gavin Vess
Alison Waldman
Daniel Wilkin
Lauren Wills
U. Samuel Withers

BSE GLOBAL SCHOLARSHIPS

A variety of student international educational opportunities are supported by departmental scholarships, including the Julia K. Pryde Memorial Scholarship and COE Pratt Scholarships. So far, five awards have been made through these programs in 2018 - here are a few highlights from recent international educational experiences from BSE students:

Serena Emanuel - Senior Design Project Danli, Honduras

"This past Spring break, I had the incredible opportunity to travel with my Senior Design Client and External Advisor, Mr. David McCann, and his New Life Christian Fellowship (NLCF) mission team, to Danli, Honduras to implement water-related projects and perform survey of the community for which my Senior Design team was designing for. The week was magical-- full of memories, new relationships with the community members and trip members, as well as a growth in my personal and career-related knowledge. It was all made possible through the generous support from the Biological Systems Engineering Department Pratt Award and I cannot be more thankful for that." - Serena Emanuel



Alison Waldman - Service Project Work in South America

"I traveled to Ecuador in January of 2018 with Hillel at VT and to Peru in May and June of 2018 with VT Engage. While in Ecuador, I stayed in the mountainous indigenous Comunidad de Morochos. Here, I stayed with a host family and assisted in one of the community's reforestation projects and helped to plant over 1300 new indigenous saplings. While in Peru, I was a volunteer with ARCAmazon in the Madre de Dais region of the Amazon Rainforest and again stayed with an indigenous community as a volunteer. In the rainforest, I assisted the non-profit with maintenance of their camp and assisted individual researchers with their personal projects. When I stayed with the community of Markuray, outside of Cusco, I learned a lot about the traditional religious and cultural practices of the community. The main service project that my group and I completed here was installing a playground for the community's school." - Alison Waldman



Welcome new member of the BSE Family!

Current doctoral student **Qualla Ketchum** and husband Devin welcomed Yona Michael Ketchum on November 9th (9 lbs 5 oz, 22 inches). We couldn't ask for a cuter new member of the BSE family!

Qualla and Devin were recently featured in VT News:

<https://vtnews.vt.edu/articles/2018/11/111218-dsa-heritagemonthprofile.html>

New Graduate Students - Fall 2018

MS Students

Charles Aquilina (Hession) - BS, Environmental Science, Virginia Tech
Emily Berg (Senger) - BS, Biological Systems Engineering, Virginia Tech
Taylor Lohneis (Zhang) - BS, Biological Systems Engineering, Virginia Tech
U. Samuel Withers (Thompson) - BS, Biological Systems Engineering, Virginia Tech

PhD Students

Muneer Ahammad (Czuba) - MSE, Water Resources Engineering, Bangladesh University of Engineering & Technology
Alireza Moghaddasi (Shortridge) - MS, Civil Engineering, University of Science and Technology of Iran
Mina Shahed Behrouz (Sample) - MS, Water Resources Engineering, State University of New York
FNP Sumaiya (Czuba) - MS, Water Resources Engineering, Bangladesh University of Engineering & Technology

Graduate Student Organization (GSO)

The 2018-2019 BSE Graduate Student Organization (GSO) has kicked it into full drive this semester! Fearlessly led by President **Laura Hanzly**, GSO has hosted a number of events for graduate students & friends within recent weeks. For the Notre Dame vs Virginia Tech football game, GSO put on a tailgate with record attendance. There were over 45 folks from BSE and adjacent departments that decided to join the fun. GSO thanks **Dr. Bobby Grisso** for funding the event through the Social Committee. Additionally, GSO created a new position “volunteer liaison”, which is held by **Hannah Patton**. Hannah has put in many hours this semester to initiate volunteer opportunities for BSE graduate students. Additionally, GSO has created BSEBSE (BSE’s Being Sporty Engineers)! Every other Wednesday, staff, faculty, and grads are invited to be active with a walk or run after work. There has been an incredible turnout for these events and GSO thanks Hannah Patton for being the team leader on this. BSEBSE hosted the FREC grad students in a friendly kickball game on the drillfield and BSE won! The GSO board (President - Laura Hanzly; VPs - **Kyle Saylor** and **Samuel Withers**; Secretary - **Morgan McCarthy**; Treasurer - **Lauren Wind**; Volunteer Liaison - Hannah Patton) welcomes any comments or ideas to improve the graduate student community and atmosphere within BSE.

Alpha Epsilon (AE)

Currently, Alpha Epsilon (AE) has 14 members consisting of BSE graduate and undergraduate students. AE members pride themselves of being high achievers in the classroom and in the VT community. This semester AE had a welcome back pizza party and held a meeting discussing the future of the chapter. Under new leadership - President **Lauren Wind**, Vice President **Morgan McCarthy**, and Treasurer **Daniel Smith** - AE plans to become more visible within BSE and on the national level. Be on the lookout for more to come... we plan to team up with GSO for a volunteer event during the holiday season and host a Spring Research Symposium where both undergraduate and graduate students can participate to show off their presentation skills!

BSE Student Internship Partnership with China

This summer marked the third year of BSE's partnership with Huadong Engineering Corporation in China. Our exchange student, BSE senior **Isha Rege**, recounts her experiences and adventures:

"I spent this past summer doing an internship in Hangzhou, East China. It is one of the largest companies in China and carries out work in hydropower, renewable energy, environmental management and construction management. I was able to work in two of their departments that interested me the most: Water treatment and New Energy in my short span of two months at their headquarters.

In Water Treatment, I learned how to work with a 3-D modelling software called Microstation, and was able to assist on designing a treatment plant with two other colleagues. Within New Energy, I studied a few of their on-shore wind farm projects and got the opportunity to interact with a number of individuals working on similar projects overseas. I was able to apply concepts from my Intro to Environmental Engineering and Transport Processes classes in the work assigned to me.

I was extremely grateful to be able to choose what I would like to work on, and my colleagues and mentors were always happy to help and very approachable. They went out of their way to make me comfortable, and we would often plan weekend excursions within the city.

This was the first time that I ever visited China, and I loved travelling and exploring a completely new place on my own - even with no prior knowledge of Chinese. I travelled solo to Shanghai and Nanjing over two of the weekends, lived in youth hostels and made friends from all over the globe. Together, we would explore all that the city had to offer, including the local cuisines of course! China is one of the safest countries to travel for a tourist in my opinion, and it is definitely one of my most treasured experiences."



Continue to stay in touch with BSE through:



and/or joining our **LinkedIn**

And always feel free to send your alumni updates to Leigh-Anne Krometis at krometis@vt.edu.

Thinking about grad school...

Or know of someone who is?

BSE is accepting
applications

For more information, please visit
www.bse.vt.edu/graduate/apply.html

Degrees Earned

Congratulations to twelve BSE graduate students who completed their degrees in summer 2018:

PhD Degree

Akinrotimi Akinola (Advisor: T. Thompson), Temporal and thermal effects on fluvial erosion of cohesive stream-bank soils.

Nasrin Alamdari (Advisor: D. Sample), Modeling Climate Change Impacts on the Effectiveness of Stormwater Control Measures in Urban Watersheds.

Pedro Ivo Guimaraes Braga da Silva (Advisor: R. Senger), Discovery of a novel microalgal strain *Scenedesmus* sp. A6 and exploration of its potential as a microbial cell factory.

Stephanie Houston (Advisor: W. Hession), Developing a Stormwater Pond Filter to Capture Phosphorus and Other Pollutants.

Hyunwoo Kang (Advisor: V. Sridhar), Soil moisture-driven drought evaluation under present and future conditions.

Tyler Keys (Advisor: D. Scott), Monitoring and Managing River Corridors in the Midst of Growing Water Demand

MS Degree

Katherine Bland (Advisor: R. Senger), Lignocellulosic fermentation of *Saccharomyces cerevisiae* to produce medium chain fatty alcohols.

Connor Brogan (Advisor: D. Scott), The Role of Small Impoundments in Streamflow Alteration.

Madeline Caudill (Advisor: D. Scott), Composition and transport of carbon in a Virginia run-of-river (ROR) reservoir system across a storm event.

Morgan DiCarlo (Advisor: J. Shortridge), Statistically Evaluating Water Consumption Historically and Across Multiple Users in Virginia.

Daniel Robinson (Advisor: D. Sample), Assessing Green Infrastructure Needs in Hampton Roads, Virginia and Identifying the Role of Virginia Cooperative Extension.

Teneil Sivells (Advisor: W. Hession), MENG, Impacts of livestock exclusion on the water quality of small tributaries in southwestern Virginia.

BSE Undergraduate Contributes to Biomedical Design Group

From BSE student **Samantha Bond**: “Bioactivity is an interdisciplinary biomedical design team on campus. Our mission is to identify medical problems around the world and solve them with an engineering approach. The team is divided into two focuses: biomechanics and biochemistry. As part of the biomechanics team, I have been helping design a lifting device for emergency medical services (EMS). Our goal is to create a device that will lift patients and maneuver them to the ambulance to prevent emergency service technicians (EMTs) from straining their backs. Over the summer, a few members of our team and I presented our initial prototype to the Blacksburg Rescue squad. Using their feedback, we are now working to alter our design so it better fits the needs of our customer.”



Student Co-Ops: Reports from the “Real World”!

Co-ops provide Virginia Tech students with an extended internship of 6-12 months with a company in between semesters (or years) of their undergraduate degree (learn more at www.career.vt.edu). Several of our students take advantage of these opportunities every year. Here are some reflections on their adventures in the real world...

From junior **Katie Clatterbuck**: This past Spring and Summer I was on co-op working for Ulliman Schutte Construction, a general contractor that specializes in water treatment facilities. I worked with the project management team on the Patuxent Water Reclamation Facility Expansion Project which meant that I worked on the construction site as we nearly doubled the capacity of Anne Arundel County, MD’s wastewater treatment facility. I worked on things such as analyzing drawings, forming bills of materials, procuring cost quotes for supplies, doing cost analyses, ordering materials, and then monitoring field crews during installment. I also drafted construction documents such as submittals, RFI’s, purchase orders, and some project drawings and designs.

I really loved being able to co-op with Ulliman Schutte especially because I got to work with them for such a long time period. This gave me time to really feel comfortable and confident working there and also made me a much more valuable asset to the project management team. Being on a job site also meant that I got a lot of hands-on experience and wasn’t confined to an office all day which definitely taught me that that is something important to me in future job searches.

Since being back at VT I think I have developed a much better work ethic and schedule because I got so used to working full work weeks. I also have more practical knowledge to relate to a lot of the things that I am learning in my classes.



From senior **Sasha Thomasson**: For the past 5 months, I have been working as a Production Winemaking Intern in Livingston, California. In production winemaking, winemakers manage the process from grape to bottle. Some of my daily tasks include performing copper and acid trials, checking fermentation equipment, and pulling wine samples. In addition, I am working on a project to increase solids management capacity for smaller tonnage programs like Sauvignon Blanc and Rose. This project has provided the opportunity to employ the problem-solving skills learned throughout the BSE curriculum. Overall, Gallo is a wonderful company to work for! Everyone I work with is incredibly knowledgeable about what they do and are always more than happy to answer any questions I’ve had about both life in California and winemaking.



From senior **Sara Prince**: I am currently interning at E. & J. Gallo Winery out in Modesto, CA as a Winemaking intern. My role has been with the Table Wine team (think brands like Liberty Creek, Barefoot, and Dark Horse), working on getting wines

touched up and ready to be bottled at the Modesto headquarters. On a daily basis, I assist my team with monitoring wine quality by putting together wine blends, as well as tasting many different wines in their various stages. I am currently responsible for all of the Pinot Noir and Malbec blends that go through Modesto. Since mid-June that has amounted to over 1 million wine gallons. I have also been working on three different projects, which have allowed me to see many different aspects of the company and winemaking. Having a background in BSE allows me to see the bigger picture of the entire winemaking process, since I am familiar with the equipment used to get wine from tanks to filter to bottle. I have also had many chances to use both lab and problem-solving skills. I have very much enjoyed my time so far here with Gallo, everyone here is great and as a whole the company is awesome. And being a Winemaker is a lot of fun!



BSE Student Wins International Soil Judging Award in Brazil

The International Soil Judging Contest, the “Soilympics” as my team called it, was incredible. It took place in Seropédica, Brazil, which is an hour outside of Rio, during August 2018. The landscape is beautiful and consists of deep flat coastal deposits from which the tops of ancient mountains protrude.

There were 48 competitors from 10 countries in the contest. I placed 2nd and had teammates place 1st and 3rd. I loved my team. I think our success was partially due to how well we got along. The other part was due to our coach, Dr. Galbraith, who coaches soil judging at Virginia Tech and is incredibly knowledgeable.

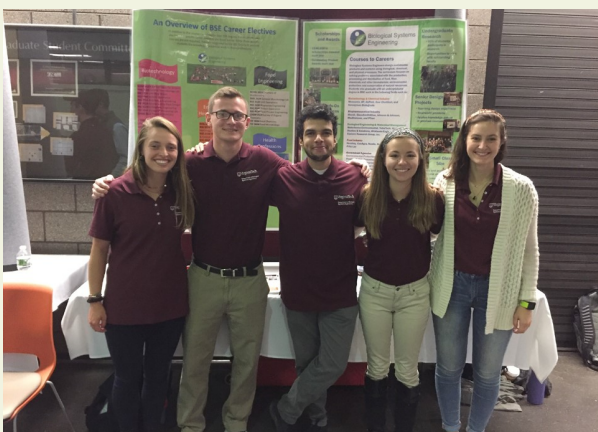
It was great meeting so many friends from other countries. Sometimes there was a language barrier, but a common love for soil was always enough to overcome it.

-Ben Smith, BSE Junior



BSE Ambassadors Recruit New Students

The 2018-2019 BSE Ambassadors have been busy this fall representing the department at various recruiting events. We have had four COE Open House events targeting prospective high school students and the COE Information Session for the General Engineering students here at Virginia Tech as they try to choose which departments they want to apply to when they officially declare their engineering majors. We have also helped students new to BSE acclimate to the program by volunteering at the BSE Welcome Back Ice Cream Social and serving as student mentors to our incoming sophomores and transfer students. The Ambassadors have given multiple individual tours to high school students and their families and are in the process of visiting classrooms and student clubs at local high schools in Blacksburg, Christiansburg, Salem, and Roanoke as well as their alma maters.



*October 13th Open House &
COE Showcase*

*Pictured left to right: Alyssa Ford, Ben Agnor,
Mohammed Bader, Hana Coogan, and Liz Pratt*

Graduate Student Research and Outreach in Guatemala



BSE associate professor Leigh-Anne Krometis and doctoral candidate Cristina Marcillo show off some water samples in San Rafael Las Flores, Guatemala

Supported by a VT Center for Peace Studies and Violence Prevention grant, doctoral student and Carver Fellow **Cristina Marcillo** spent nearly a month in Guatemala this summer working with local communities to ensure safe drinking water quality. In her words: “This July, I conducted a drinking water study of San Rafael Las Flores, Guatemala and co-lead a water monitoring workshop for citizen scientists. Most of this rural, mining-impacted area relies on sporadically treated spring water for all uses and little information is available regarding water quality. Sampling involved long days of hiking to water sources in forested mountainous areas with community guides. A subsequent water monitoring workshop equipped individuals from all over Guatemala to plan for

and implement their own campaigns with simple to use field equipment while laying the foundation for a national water monitoring network lead by citizen scientists. Being half Guatemalan, this project is extremely meaningful to me. It allows me to use my PhD training to help communities that are most in need of engineering expertise. Research will continue in December in conjunction with local scientist and community members.”

Summer REEU Program Researches Mountain Valley Pipeline

Summer 2018 marked the first year of the new USDA-funded “Confluence of Water and Society” Research and Extension Experience for Undergraduates (REEU), co-directed by BSE professor **Cully Hession**, BSE associate professor **Leigh-Anne Krometis**, School of Plant and Environmental Sciences assistant professor Brian Badgley, and extension coordinator Amber Vallotton (VT-Horticulture). For nine weeks BSE hosted eight undergraduate students from different colleges and universities across the country, majoring in a variety of disciplines ranging from Environmental Engineering to Economics. Interdisciplinary student teams focused on the environmental and social impacts of the local Mountain Valley Pipeline, relying on techniques as varied as benthic macroinvertebrate assessments, digital image evaluation, and content analysis of online comments on related news articles. In addition to their time in the field or lab, students participated in various meetings with local stakeholders at local regulatory offices, a natural gas processing site, and local public meetings. They also had opportunities to explore graduate programs, extension opportunities, and the broader region through trips to visit local farmers, a caving trip to witness karst geology firsthand, and professional development workshops. This represents just the first year of a three-year program, so interested undergraduates are encouraged to check out our website and apply for next year (<https://vtconfluence-reeu.weebly.com/>)!



WRIGHT JOINS BSE

Dr. Clay Wright joined BSE as an assistant professor in August 2018. His research aims to improve value and efficiency of agricultural products through increasing our understanding of how a plant's genes control its form and function. His work combines approaches from molecular genetics, synthetic and computational biology, bioinformatics, and protein engineering to develop tools to measure and re-engineer plant development and behavior. He received his Ph.D. from Johns Hopkins University and B.S. from North Carolina State University, both in Chemical and Biomolecular Engineering.



Dr. Wright spent the past four years at the University of Washington in Seattle, studying the master plant growth hormone, auxin, and how plants of the same species collected from all over the world respond differently to this hormone. A plant's response to auxin determines its root and shoot architecture. By understanding how mutations in auxin response genes change plant architecture, the Wright group aims to rationally engineer crop plant architecture.

At Virginia Tech, Dr. Wright's research will expand upon this study of plant hormones to defense hormones and hormone metabolism. He will also utilize protein engineering techniques to develop plant hormone and protein biosensors as well as to train plant immune systems to be resistant to pathogens.

In his spare time, Clay enjoys spending time with his partner Rachel and dog Sophie. Since moving to Blacksburg, they have been enjoying hiking in the Blue Ridge Mountains and preparing for the birth of their first child in January. Clay also enjoys mountain biking, cooking, and crafting fermentations of all kinds in his spare time.

Easton Appointed to Panel



Dr. Zach Easton was recently appointed to a National Academies of Science, Engineering, and Medicine panel to review the New York City Watershed Protection Plan. The New York City (NYC) water supply is the largest unfiltered water system in the world, delivering 1 billion gallons a day of water to over 9 million people in NYC and several upstate municipalities. The NYC water supply system is unique among unfiltered systems in that it does not own the majority of the water supply watershed, it is owned but private citizens. As a result, NYC has developed a unique relationship with upstate watershed land owners, providing funds to install and maintain best management practices and wastewater treatment plants in order to protect the source waters, while upstate residents agree to land management restrictions. The National Academies panel is tasked with a 24-month review process to advise NYC as it continues to implement the watershed protection plan, which has evolved to respond to

changing conditions, regulatory requirements, and emerging risks to the water supply. The panel will review and evaluate the NYC plan with the goal of determining whether the current suite of watershed protection programs is appropriate and adequate to comply with the Surface Water Treatment Rule into the future.

Promotions

Dr. Justin Barone was recently promoted to Professor. He received a PhD from Case Western Reserve University and worked at USDA prior to joining VT in 2007. Justin has researched, developed, patented, and commercialized low energy, low cost processes to convert agricultural proteins into useful biodegradable plastics. He has focused on using non-food proteins in low temperature processes with water and other benign solvents. He has started a company, Protein Q, Inc., to commercialize these discoveries. His research focuses on using agricultural resources to make useful biobased polymer materials at low processing energy. These materials are designed as direct replacements for many plastics. One of the spinoff ventures is Eastern Bioplastics, LLC (EBP), which produces feather keratin based plastics in a Mt. Crawford, VA factory. In the future, Justin desires to pursue new ways of making sustainable nanomaterials, help grow the Center for Soft Matter and Biological Physics and adapt fundamental polymer science to food structure and processing. He has taught several department courses including: Thermodynamics of Biological Systems, Transport Processes in Biological Systems, Biobased Industrial Polymers, Industrial Processing, and Food Engineering.



Dr. Venkataramana “Sri” Sridhar was promoted to associate professor with tenure this past summer. Sri has a PhD from Oklahoma State and held faculty positions at University of Nebraska and Boise State University before joining VT in 2013. Sri’s research focused on ways to optimize the allocation of water resources to meet competing demands (e.g., irrigation, hydropower, and water supply for industrial, municipal and domestic use, ecological flows, and navigation) especially under drought conditions. He has developed streamflow and watershed management scenarios with the ultimate goal of optimizing the allocation of water resources. He has co-lead the NASA-funded Mekong Basin project to study climate variability and water-energy-food nexus in an international collaboration covering Thailand, Laos, Cambodia and Vietnam. He is investigating the impacts of climate and sea level rise on reoccurring flooding in the Hampton Roads region of Virginia. His passion is to integrate social science perspectives with earth system modeling that will impact policy decisions and the welfare of society by correctly addressing relevant questions as well as build better models and datasets for effective policy decisions. At present, Sri teaches several department courses including Small Watershed Hydrology and GIS for Engineers.



* WIN A PRIZE IN THE TAGLINE/THEME AND LOGO CONTEST *

Participate in the BSE Department’s 100th Anniversary in 2020

We need a Tagline/Theme and Logo for the year-long observance.

A variety of activities, communications, and products will be part of our 100th Anniversary observance as we look to the past, present, and future of our department. Submit your ideas for a tagline/theme and/or logo to be included on virtually everything connected with the BSE Department’s 100th anniversary, including clothing and mementos.

PRIZES will be awarded for the selected Tagline/Theme and Logo entries. Prizes, each valued at approximately \$200, include scholarships for current students, free hotel stay for 100th anniversary on-campus celebration for alumni or friends, and anniversary clothing and mementos.

SUBMIT your ideas (and any questions) to Mary Leigh Wolfe (mlwolfe@vt.edu) by March 31, 2019.

EDUCATING STUDENTS THROUGH CREATIVE PARTNERSHIPS

BSE Associate Professor **Durelle “Scotty” Scott** has spent the past five years leading a creative collaboration with Robert Burgholzer (M.S. ‘05) from Virginia’s Department of Environmental Quality (VADEQ). Known as the Hydrologic Analysis and Research Program (HARP), the program employs 3-4 undergraduate students at a time (sophomores to seniors) to examine water resource issues across Virginia. Topics have ranged from running hydrologic models for the southern rivers of Virginia to exploring statistical metrics of widely available biological databases as tools for understanding the state’s aquatic resources. Beyond applying classroom knowledge, students gain a background in data science, visualization, and team dynamics.

Success from the program can be measured by the number of students involved, their immediate impact on the state, and each student’s next step in his or her career. To date, 13 students have been involved within the program. While most of these students were interested in water, bioprocessing students have also participated as valuable members of the team. To date, two students participated in the BSE five year BS/MS program, where their research built upon HARP projects. This not only provides an opportunity for each student, but also benefits VADEQ by providing value added products. For example, Connor Brogan (B.S. ‘17, M.S. ‘18) worked on improving cumulative understanding of impoundments through river systems, which is invaluable for holistic water resources management.

It’s extremely rewarding when student’s contributions and products are used beyond the immediate project. For example, some of the project analysts’ original visualizations (Lindsay Carr (B.S. ‘16), Kinsey Hoffman (B.S. ‘15, M.S. ‘16), Brian Parkhurst) on low streamflow across the state were part of the 2015 State Water Resources plan. The following year, a focus on the exploration of instream flow studies (Kinsey Hoffman, B.S. ‘15, M.S. ‘16; Joseph Kleiner, B.S. ‘17), led to a larger analysis on hydrologic and biological databases with Elaina Passero (B.S., ‘18) and USGS scientists.

Of course it is perhaps most rewarding for BSE to see HARP student analysts succeed beyond BSE. Multiple graduates have gone to graduate school and/or now work in consulting firms. Lindsay Carr (B.S. ‘16) found employment after graduation as a data scientist at the USGS. Joseph “Joey” Kleiner was hired directly out of his B.S. by VADEQ, and continues to work now as a mentor in HARP. Overall, the HARP program continues as a successful model for partnering with private/public agencies to educate our future engineers beyond the classroom. For more information on how the program works, get in touch with Scotty (dscott@vt.edu) who would love to continue to build upon this model to engage undergraduates, regulators, and consultants on meaningful applied hydrologic projects.



Current seniors Kelsey Rietz, Hailey Alsbaugh, and Daniel Hildebrand brainstorm over the summer working on HARP projects

Extension Associate Bob Lane Works to Ensure Safety of Local Seafood

“Recently I participated in a NOAA funded research study monitoring internal oyster temperatures as they traveled the food chain from harvest to chef. We wanted to know if oysters were being maintained at a safe temperature for raw consumption. I partnered with Dr. Dave Love of Johns Hopkins University Bloomberg School of Public Health, focusing on aquacultured oysters destined for the restaurant trade from the Chesapeake Bay Water Shed and Washington State. Placing small temperature monitoring data loggers into oysters at point of harvest and onto the oyster box or bag so temperatures encountered were collected and stored every ten minutes on their journey to raw bar chefs was primary. We also wanted to capture what was happening to change the temperature in the oyster along the food chain. The grant required Dr. Love, Lillian Kuehl (a graduate researcher), and myself to travel frequently to interesting places in the Chesapeake Bay Watershed and Washington State regions. Harvesting facilities, wet processing rooms, cold rooms, freezers, harvesting barges, large harvesting vessels, lunch rooms, muddy harvest flats, loading docks, offices, so chef kitchens, trailers, airport tarmac and hotel rooms were where worked. We met with oyster harvesters, processors, transporters, wholesale business, restaurant chefs and shipping companies at almost any hour of the day or night to arrange for the proper installation and safe return of the data loggers. The results of our 2 year study are currently being prepared of refereed journals publication, Sea Grant, industry and stakeholder meetings and extension publications.” - **Bob Lane**



Positioning temperature data logger in oyster without breaking oyster hinge

Shortridge Extension Activity

Dr. Julie Shortridge gave a presentation on irrigation at the Tidewater AREC's Peanut Field Day on August 15. This event attracted over 80 farmers and personnel from state agricultural agencies and extension offices. Dr. Shortridge talked about new collaborative projects with the Virginia Office of Water Supply aimed at helping farmers understand permitting and reporting requirements for irrigators, as well as new research on the financial costs and benefits of irrigation.



2000s



Kathy DeBush Gee (BS '07, MS'08), an assistant professor of environmental science at Longwood University, received the prestigious Junior Faculty Award this Fall for her contributions to student learning.

2010s



Dr. Theresah Zu (PhD '14) currently holds a civilian role as a general biologist with the U.S. Army Research Laboratory (ARL) in Adelphi, Maryland. Theresah served as president for the postdoctoral association during her first year at ARL and on several other committees. She has also published several papers detailing her research progress and given accompanying research presentations. While a graduate student in BSE, Thess together with husband Prince welcomed

their first child Nadine (now 6 yrs). Since leaving Blacksburg the family has been blessed with two additional children: Nehemiah (3 yrs) and Noah, born in Oct 2018. Thess says: "Ours has been a blessed journey and I still have fond memories of my tenure with BSE for which I remain a proud and committed giver."



Newest family member Noah

To: All graduates of the BSE department

From: BSE department alumni engagement committee

As we prepare to celebrate the 100th anniversary of our BSE department, one goal of our committee is to update our alumni contact information so all alumni can be well-informed about the activities of the 100th anniversary and stay in touch with the department and our growing alumni family as we move forward into the next 100 years. We would greatly appreciate it if you would provide your current contact information to the department via one of the following:

- 1) Complete survey at <https://tinyurl.com/VTBSE-alumni> or
- 2) Call Liza Spradlin, academic programs coordinator, at 540-231-6800 or email Liza at lizaas14@vt.edu

Thank you! We will be in touch.



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BSE Fall 2018 Welcome Back Ice Cream Social

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