

Biological Systems Engineering *Newsletter*

SPRING 2020

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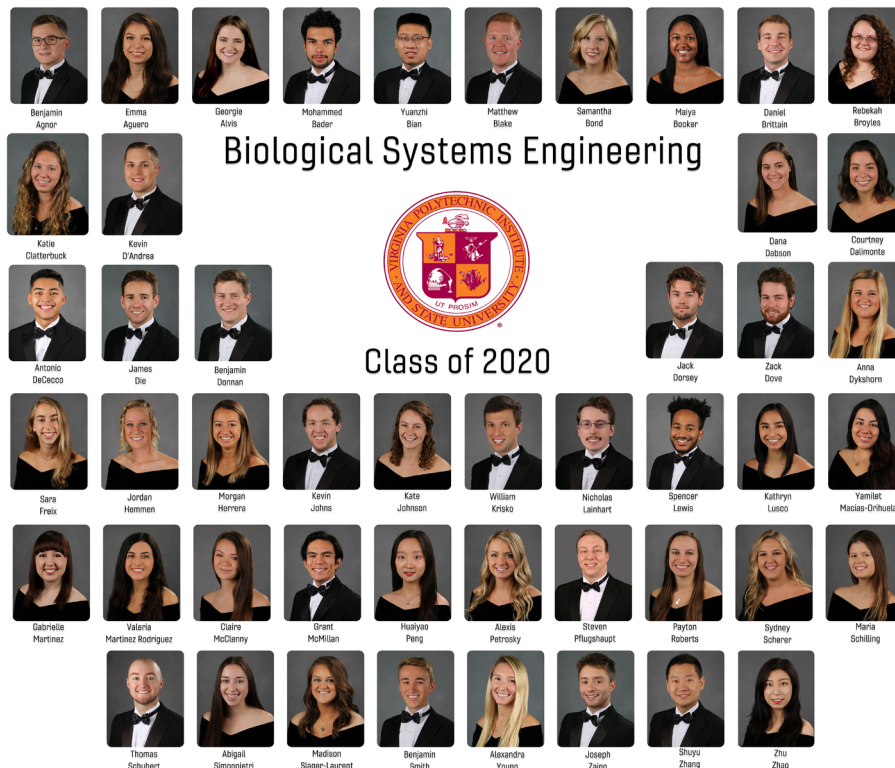
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Congratulations, BSE Class of 2020!



While we were not able to give our graduates the send-off that we, they, and their families and friends wanted, the University, College of Engineering and BSE Department did our best to collect and publish online content that highlights our graduates and their accomplishments. We invite you to visit Virginia Tech's Commencement web page (<https://commencement.vt.edu/>) and the College of Engineering web page (<https://eng.vt.edu/commencement.html>). Our own celebratory web page (https://www.bse.vt.edu/class_of_2020.html) includes detailed information about BSE graduates, including messages from graduating seniors, and the Senior Design Poster Gallery.

A Note from our Department Head



Dwayne R. Edwards
Professor and Department Head

Greetings from Blacksburg to all our friends of Biological Systems Engineering at Virginia Tech! At the risk of understating the situation, I'll share with you that we've had some very eventful times since our last newsletter. And while I'll have more to say on that, I want to lead by asking you to join with me in congratulating our 51 new BSE graduates. Over 45% graduated with honors, including nine who graduate Summa Cum Laude - by any standard, they're a simply amazing group. That's why, in addition to being relatively short, this newsletter will be somewhat different as we highlight our 2020 graduates and their accomplishments.

As for so many others, the past few months have been a time of adaptation within BSE. All instruction transitioned to online-only with only two weeks' notice, all staff functions transformed to almost exclusively a telework mode, and both field and laboratory research were significantly reduced. Almost everything we knew about life and work on campus changed, and it changed quickly. But BSE's response was overwhelmingly positive – the teaching mission was successful, extension activities continued consistent with new constraints and requirements, essential research continued with the minimum possible disruption, and administrative functions continued without missing a beat. Everyone recognized the common challenges and everyone worked together as a team to fulfill the Department's overarching mission. Significant uncertainty remains after three months into our response to the COVID-19 virus. We recognize that any resumption of "normal" remains over the horizon and might require sacrifice on everyone's part. But there are many positive indications. Consistent with Virginia Tech's phased approach, we are reopening laboratories for reduced-level operations, planning for the return of students to campus in Fall, and many other activities designed to restore us as closely to our pre-COVID-19 footing as possible.

Many of you will know that it was necessary for us to delay our celebration of the Department's 100th anniversary. However, as you will read further in the newsletter, we are proceeding with plans for a Centennial Celebration this Fall. I hope that you will be able to join us and to both reconnect with long-time friends and make new ones. In this spirit, I hope you will drop by Seitz Hall the next time you find yourself in the Blacksburg area, because all of us would enjoy visiting with you about the many wonderful things going on within BSE.

Finally, this is my first contribution to a BSE newsletter. I joined the Department at the beginning of the year after 25 years at the University of Kentucky. I couldn't be happier to be a part of the Hokie Nation, and there is no team I'd rather be a part of than the BSE Department at Virginia Tech. I look forward to meeting you.

Dwayne Edwards

BSE Centennial Celebration Weekend

October 16-18, 2020

Mark Your Calendars!!

Whether On-Campus or Remote --- Please plan to join in the celebration!!

When Charles Seitz began the work of establishing the Agricultural Engineering Department in 1920, he couldn't have known that it would exist a century later, still serving the citizens of the Commonwealth, in a building named after himself. But thanks to decades of hard work, adaptiveness, resiliency, vision and – above all – an unbroken tradition of devoted staff, students, alumni and faculty, the BSE Department is among a rare group of academic units privileged to celebrate our 100th birthday.

We have planned an on-campus celebration – check the schedule online <https://www.bse.vt.edu/100-anniversary.html>. The weekend will include a variety of opportunities to tour facilities, participate in social events, learn about current and planned activities in the department, and interact with alumni, current students, faculty, and staff.

While we hope that all who wish to will be able to be on-campus in October, we are making plans for some or all to participate remotely. So, whether we can hold the whole event on-campus or not (depending on university and government guidance), we are making arrangements to conduct the celebration using a combination of live, livestreamed, interactive, and recorded events throughout the weekend. Our goal is to maximize access to the celebration, while also maximizing interaction. We will continue to update the website as we finalize the arrangements.



Group of farmers and lecturers on 1948 Rural Affairs tour listening to discussion of use of TNT plow in experimental stubble mulch work.

Outstanding Student Awards

Each year, the BSE department selects an Outstanding Student from each undergraduate class and from each graduate degree level. Outstanding Students are nominated based on their academic achievement and are invited to submit materials describing their activities and achievements in academics, service to the department and university, service to the community, extracurricular participation, and leadership roles. The BSE Awards committee evaluates the material and selects the outstanding students to honor. It is a very difficult job for the Awards Committee to select just a few students because there are so many great students in BSE.

Each outstanding student award includes a plaque and a cash award made possible through the generosity of Dr. Saied Mostaghimi, a past department head, and his wife, Dr. Patty Mostaghimi. The Mostaghimis established an endowed fund in 2010 and specified that the proceeds of that fund be awarded to BSE Outstanding students each year.

https://www.bse.vt.edu/outstanding_student_awards.html

2020 Outstanding Senior: Kate Johnson



Kate has an outstanding academic record that has been recognized by inclusion on the Dean's List with Distinction each semester, as well as by other academic awards and honors. She also serves the university community in many ways. Kate's service in the BSE department includes mentoring BSE sophomores and representing the BSE program as a BSE Ambassador. As an ambassador, she participates in open houses and other student recruiting events. She and another ambassador redesigned the BSE department presentation for engineering freshmen and interested high schoolers. Kate is Treasurer of the American Society of Agricultural and Biological Engineers (ASABE) student branch for 2019-2020.

In spring 2019, she and five other students launched the Naughty Scotties Club at Virginia Tech to connect students to a range of student clubs on campus by collaborating with those clubs for a variety of fun events.

Kate is passionate about addressing the need for disease treatment and, thus, seeks to create novel, beneficial medical innovations. Through undergraduate research (three semesters) at Virginia Tech and summer internships at Luna Innovations, Inc. and Hemoshear Therapeutics, Kate has assisted in the development of vaccines, drugs, and drug delivery systems for porcine reproductive and respiratory syndrome, peripheral neuropathy, traumatic brain injury, and metabolic disorders. She developed skills in gel electrophoresis, dynamic light scattering, and chromatography.

As a student leader in Reformed University Fellowship at Virginia Tech, Kate leads a weekly bible study, mentors female students, assists in planning and conducting outreach, social, and service events, and directs music for weekly gatherings, including scheduling musicians, choosing songs, and leading rehearsals. Music plays a major role in Kate's service and activities. She is a volunteer music leader for a monthly worship service at Warmth Hearth Retirement Village in Blacksburg, and each spring beginning in 2017, she has been the music director for the Grace Covenant Presbyterian Church Women's Retreat. In October 2019, Kate was selected to play the role of "Catherine" in the musical Pippin with the Virginia Tech Department of Theatre and Cinema, which was to be performed in April 2020 but was cancelled due to the COVID-19 pandemic. In describing the end of her senior year, Kate wrote "although my senior year has concluded in unexpected ways, I am incredibly grateful for the experiences that I have had at Virginia Tech." Following graduation, Kate will begin her full-time position as a Research Assistant at Luna Innovations, Inc. in Charlottesville, VA.

2020 Outstanding Junior: Nicholas Nguyen



Nicholas' goal is to pursue a career as a physician where he can apply an interdisciplinary approach of medicine, engineering, and music. In addition to his major in BSE, he is pursuing minors in biomedical engineering and music. While maintaining an excellent academic record, which has been recognized by regular inclusion on the Dean's List and awarding of several scholarships, Nicholas has been active in undergraduate research, service, and extracurricular activities. Since August 2018, he has been an undergraduate researcher in the lab of Dr. Caroline Jones in the Department of Biological Sciences. He is working closely with a Ph.D. candidate to investigate what is happening on a single-cell level in the human body. With tasks that include designing and translating microfluidic devices on AutoCAD, Nicholas models

cell decision-making and interactions within the immune system. He presented his research in spring 2019 at the Mid-Atlantic Undergraduate Research Conference and at the Alpha Epsilon (honor society of BSE discipline) hosted Flash Talk event.

Nicholas' core values center around dedicating his life to service and taking care of those around him. As he seeks to fulfill his version of Ut Prosim while at Virginia Tech, he serves the BSE program as a BSE Ambassador and is a saxophone player in the Marching Virginians and Pep Band. In addition to performing at football and basketball games, he participates in the group's community service events, such as Hokies for the Hungry and raising funds for St. Jude's Children's Research Hospital through community performances and outreach. He also founded The Music Heals Initiative in Fairfax, VA, through which he recruits musicians and organizes musical events at hospitals and care facilities to raise awareness of the healing power of music.

Preparing himself for a career as a physician, Nicholas has pursued opportunities within the medical field. He gained significant experience during summer 2019 when he completed an observership at The Centers of Advanced Orthopaedics in Tysons Corner, VA, and Walter Reed Medical Center in Bethesda, MD. He was also a counselor for the Brain Injury Association of Virginia at Camp Bruce McCoy, where he worked as a caretaker for adults with brain injuries. He planned and led adaptive activities including aquatics, canoeing, and fishing. Nicholas said he "gained insight into how to balance humor and respect while communicating with injured or disabled individuals." He plans to apply to medical school and looks forward to representing not only Virginia Tech, but also the BSE discipline.

2020 Outstanding Sophomore: Anna Christovich



Anna began her studies at Virginia Tech in fall 2017. She has excelled in every aspect of her college experience. Her outstanding academic record has been recognized through being on the Dean's List each semester and membership two honor societies at Virginia Tech, Phi Kappa Phi and Gamma Beta Phi. Anna has co-oped two semesters (spring and fall 2019) with Dupont™ Tyvek® in Richmond, VA. She has been active in research, serving as an undergraduate researcher for one semester in Dr. Carlier's lab focusing on the synthesis of anti-malarial drugs.

She is currently a member of Dr. Luo's research group, working on several projects related to the multi-system autoimmune disease, Lupus. Anna is a member of the Society of Women Engineers and Newman Catholic Community at Virginia Tech. She was a member of the SERVE Living Learning Community at Virginia Tech during her freshman year. Anna's volunteer service includes Brandermill Woods Retirement Center, Campus Kitchen at Virginia Tech, and Feeding America - Commodity Supplemental Food Program and Powhatan Food Pantry.

2020 Outstanding Ph.D.: Lauren Wind



Lauren began her Ph.D. studies in May 2017, immediately after completing her M.S. degree in BSE. She is co-advised by Dr. Leigh-Anne Krometis and Dr. W. Cully Hession, who were also her co-advisors during her M.S. program. Lauren is a member of Tau Beta Pi, Sigma Xi, and Gamma Sigma Delta national honor societies in recognition of her outstanding academic achievements. She has been an Interface of Global Change Fellow at Virginia Tech since 2017, and was awarded a Global Change Center-IGEP Doctoral Fellowship for 2019-2020.

Lauren's research focuses on characterizing the Agricultural Antibiotic Resistome by evaluating the spread of antibiotic resistance from "Farm to Fork." She is analyzing the effects of common agricultural practices (antibiotic usage, manure management) and matrixes (soil, runoff, vegetables) on the potential occurrence of antibiotic resistant bacteria and genes that are critical to human and animal health. Lauren has demonstrated that resistance genes associated with antibiotics wholly absent from agricultural production can be elevated simply through field fertilization, and that soil metal content may be used to predict patterns of resistance. This work has required Lauren to develop an understanding of molecular biology and ecology as well as the ability to statistically analyze trillions of DNA base-pairs via high performance computing, or bioinformatics.

Lauren's publication and communication record is excellent. She is corresponding author on two refereed journal articles and a co-author on two additional refereed articles. Lauren has presented her work at multiple conferences with widely varying disciplinary foci, including invited presentations at the 2019 ASA-CSSA-SSSA International Annual Meeting and a United States Department of Agriculture (USDA) webinar and volunteered presentations at the 2018 American Public Health Association Annual Meeting; 2018 American Society for Microbiology Annual Meeting; and the International Symposium on the Environmental Dimension of Antibiotic Resistance in Hong Kong in 2019 and in Lansing, MI, in 2017; and 2016 and 2017 American Ecological Engineering Society Annual Meetings.

Lauren has strong teaching and mentoring skills. She has served as a graduate teaching assistant for four semesters, receiving high marks from both students and instructors. She actively mentors undergraduates in both of her research groups, and enjoys assisting other graduate students with their field and lab research projects when needed. In summers 2018 and 2019, Lauren served as a mentor for undergraduate fellows participating in the Confluence of Water and Society Research and Extension Experience for Undergraduates (REEU) at Virginia Tech funded by USDA.

Lauren is a leader in serving the BSE department. She is an active member of the local chapter of our discipline's honor society (Alpha Epsilon), serving as President in 2018-2019, and of the BSE Graduate Student Organization (GSO), serving on the board as well. Lauren is a member of the BSE Alumni Engagement Committee.

In anticipation of completing her Ph.D. degree by the end of 2020, Lauren is pursuing opportunities to continue studying antibiotic resistance through bioinformatic related research that incorporates a One-Health lens.

2020 Outstanding Masters: Charles Aquilina



Charles entered the BSE graduate program in fall 2018 to pursue a Master of Science degree with Dr. W. Cully Hession as his advisor. Charlie's research focuses on using utilizing drone-based laser scanning (DLS) to measure floodplain roughness for improved flood modeling (2-D modeling). He has excelled in coursework, learned several complex software packages for analyzing large laser point clouds and 2-D hydraulic modeling, and obtained his FAA Part 107 Remote Pilot Certificate to legally fly unmanned aerial vehicles (UAVs, or drones). Charlie has given two poster presentations of his research, at the 2019 Annual Meeting of the American Ecological Engineering Society (AEES) in Asheville, NC, and at the 2019 OGIS Symposium hosted

by the Organization of Geographic Information Systems and Remote Sensing Research at Virginia Tech. In addition to pursuing his research and coursework, Charlie has served each semester as a graduate teaching assistant for BSE courses in hydrology, geographic information systems (GIS), and computer-aided design (CAD). He has received high praise from course instructors and students for his work.

Charlie serves as the BSE Departmental Representative to the Virginia Tech Graduate Student Association and is the volunteer liaison for the BSE Graduate Student Organization. He led efforts to clean-up, and to plant trees along, Stroubles Creek. As an undergraduate, Charlie was a member of The Marching Virginians and has continued to perform in the Virginia Tech Symphony Band and the Blacksburg Community Band during his graduate studies.

Prior to entering the BSE graduate program, Charlie earned a B.S. in Environmental Science and a B.A. in Geography at Virginia Tech in 2016. He then gained experience as a GIS intern with the City of Roanoke Stormwater Unit, as a GIS Technician with Timmons Group, and as an Environmental Scientist with Sol Solutions in Fort Gordon, GA. After completing his M.S. degree in summer 2020, Charlie will join Klienschmidt Group in Strasburg, PA. He will work on projects in dam removal, stream restoration, and drone surveying.



Chung-teh Sheng (MS '82), Mary Leigh Wolfe (BS '79, MS '82), John Reid (BS '80, MS '82), Bobby Grisso (BS '78, MS '80), and Chris Butts (BS '79, MS '81) (l-r) visiting Chicago for 1980 Winter Meeting of the American Society of Agricultural Engineers

Focus on Senior Design

Under the supervision of Dr. Bobby Grisso and Dr. Cully Hession, both registered professional engineers, ten BSE teams worked together (both in-person and, later, virtually) through each of the steps in the engineering design process to develop their final products. Below are the descriptions of the individual team projects, and we invite you to explore more of the details at the teams' web pages, accessible from our Senior Design poster gallery at: https://www.bse.vt.edu/class_of_2020.html

Process Optimization of Newborn Metabolic Screening

Galactosemia Student Team Members:

Samantha Bond, Jordan Hemmen, Morgan Herrera, Claire McClenny, Alexis Petrosky

Project Website:

<https://sites.google.com/vt.edu/galactosemia-senior-design/home?authuser=0>



Project/Problem Statement: The Clinical Opiate Withdrawal Scale (COWS) is a pen-and-paper assessment administered by The goal of this project was to reduce breastfeeding interruption time by improving and optimizing the newborn screening process performed at LewisGale Montgomery Hospital. We generated a quality assurance document to outline our new design for the procedures carried out by the hospital and state lab, including product recommendations, quality verification checks, and helpful figures for reference. The document we developed is accessible and applicable to other hospitals across the country for implementation. Not only will the use of this document reduce interruption in breastfeeding time for the infants, but it will reduce costs for stakeholders as well. An economic analysis outlines the cost savings for each stakeholder: the family/infant, the hospital of birth, and the state of VA.

A Novel Design for Detecting Galactosemia

GLTs Student Team Members:

Mohammed Bader, Charlie Fletcher, Spencer Lewis, Ryan Miller, Huaiyao Peng, Zhu Zhao

Project Website:

<https://sites.google.com/vt.edu/glts/home>



Project/Problem Statement: Our project aims to reduce the false-positive rate of galactosemia, the time delay in breastfeeding, and the cost burden on the families by developing a novel approach to detect the disorder with the same accuracy and higher specificity. The current screening for classical galactosemia measures the activity of the enzyme galactose-1 phosphate uridyl transferase (GALT) from a blood sample, a method which has a high false-positive rate of up to 1 in every 200 screens. This means that babies who do not have galactosemia have screening results of a galactosemia positive baby. There are follow up tests to verify the results, but this can take up to two weeks to get parents in and retest the child. It is important to decrease the false positive rate of this newborn screen to decrease costs and to best help newborns and their families.

Focus on Senior Design

VT Brewery Pilot Plant Optimization

BSE Brewers Student Team Members:

Matthew Blake, Dana Dabson, Payton Roberts, Maria Schilling, Joseph Zaino

Project Website:

<https://sites.google.com/vt.edu/bsebrewers/home?authuser=0&pli=1>



Project/Problem Statement: Virginia Tech has a small brewery pilot plant located on campus in the human and agricultural biosciences building. It is used to teach students the science and process of brewing beer. For this project we were tasked to improve the brewing process in the VT brewing pilot plant by reviewing and standardizing three unit operations: milling, yeast addition, and sparging, as batches have been inconsistent and inefficient. Additionally, previous standard operating procedures were not easily readable for students and new users of the system, and the tanks and piping of the system had not been properly labeled.

Development of Electronic Opiate Withdrawal Scales

eCOWS Student Team Members: **Maiya Booker, Ben Donnan, Jack Dorsey, Will Krisko, Yamilet Macias-Orihuela, Madison Slager-Laurent, Ally Young**

Project Website:

<https://sites.google.com/vt.edu/vtecows/home?authuser=0>



Project/Problem Statement: The Clinical Opiate Withdrawal Scale (COWS) is a pen-and-paper assessment administered by physicians in a clinical setting to score the severity of withdrawal symptoms in an opioid user. The development of an electronic Clinical Opiate Withdrawal Scale (eCOWS) will allow for immediate, remote assessment of withdrawal symptoms within a clinical setting—as opposed to a delay in the matter of interface with a physician. Real-time data obtained by wearable sensors is capable of achieving faster, more accurate assessments of withdrawal patients and more suitable treatment to combat withdrawal.

Lake Taylor Community Stormwater Improvements

Lake Taylor Student Team Members:

Katie Clatterbuck, Courtney Dalimonte, Benjamin Mauldin, Grant McMillan, Sydney Scherer

Project Website: <https://courtd20.wixsite.com/laketaylorsrdesign/project-goals-objectives>



Project/Problem Statement: Due to increased storm intensity and a high water table, the Lake Taylor residential neighborhood in Norfolk, Virginia is experiencing issues with runoff at a higher flowrate, causing frequent flooding and low water quality. Our mission is to design low-impact stormwater system improvements and rainwater harvesting techniques to achieve increased water quality and minimize flooding.

Focus on Senior Design

Lake Anna (HAB) Investigation (IAM) Process Design

Lake Anna Student Team Members:

Graham Brittain, Kevin D'Andrea, James Die, Zach Dove, Kevin Johns

Project Website:

<https://sites.google.com/vt.edu/habs-in-lake-anna-2020/home>



Project/Problem Statement: As it increases in popularity for recreation and industry, the health of Lake Anna is being put under a microscope. What was once an occasional nuisance, the prevalence of toxic and nontoxic algal blooms within Lake Anna has increased in the past decade, particularly in the upper forks of the lake. We will design a process for assessing HAB issues in freshwater systems, and implement this process within the Lake Anna watershed. This will help Lake Anna stakeholders take a unified approach in combatting HABs, and lay a framework for assessing HAB issues throughout the United States.

Macroplastic Remediation at Niagra Dam in Roanoke, VA

Macroplastic Remediation Student Team Members:

Emma Aguero, Nicholas Lainhart, Steven Pflugshaupt, Thomas Schubert

Project Website:

<https://sites.google.com/view/micro-plastic-remediation/welcome?authuser=0>



Project/Problem Statement: Floating plastic debris has become commonplace in freshwater systems in the last 50 years. While there have been recent efforts to capture and remove plastics from marine environments, little focus has been put on freshwater mitigation of plastic waste. Left untreated, plastic has the potential to accumulate and persist in freshwater systems for hundreds to thousands of years. Additionally, evidence has shown that larger plastic debris has the potential to abrade, forming micro and nano sized plastics. Plastic pollution can have negative affects on local flora and fauna, as well as humans dependent upon these systems. Our team will work toward a solution to help ameliorate plastic pollution, reduce micro-plastic formation, and prevent negative effects for humans and biota we will be designing a system to capture and remove floating debris.

Agrivoltaic System in Guatemala

Guatemala Solar Shade Student Team Members:

Georgie Alvis, Becki Broyles, Anna Dykshorn, Kate Lusco, Abby Simonpietri

Project Website:

<https://sites.google.com/view/guatemala-solar-shade/home?authuser=0>



Project/Problem Statement: ENCA (Escuela Nacional Central de Agricultura) is Guatemala's Center for agricultural and forestry education located near Villa Nueva, Guatemala. Currently, ENCA uses shade cropping to reduce sunlight exposure to crops. We are designing an agrivoltaic system to be implemented at ENCA. This system will integrate renewable energy generation with shade crop production. Our goal is to balance crop and energy production with the cost of the system.

Focus on Senior Design

Stream Corridor Improvements to Tom's Creek Tributary

Stream Flow Student Team Members:

Sara Freix, Shawn Johnson, Valeria Martinez, Ben Smith

Project Website:

<https://sites.google.com/vt.edu/thestreamteam/home?authuser=0>



Project/Problem Statement: There is currently a double barrel culvert stream crossing on the driveway into a private neighborhood two miles northwest of Blacksburg on an unnamed tributary of Tom's Creek. This crossing structure is experiencing embankment erosion and structural failure. The structure is also causing disruption in sediment transport and fish passage. We aim to design a replacement for this existing culvert that will maintain safe access to the client's private property, alleviate downstream bank instability, allow for aquatic organism passage, and minimize flooding during high flow events. Additionally, we developed management recommendations for the downstream reach on our client's property which is incised with eroding banks and lacks substantial woody riparian vegetation.

Designing Software Automation and User Interface Control for RAMETRIX(TM) AutoScanner

Team Kidney Student Team Members:

Ben Agnor, Yuanzhi Bian, Kate Johnson, Gabrielle Martinez, Shuyu Zhang

Project Website:

<https://https://sites.google.com/vt.edu/teamkidney19-20/home?authuser=0>



Project/Problem Statement: Chronic Kidney Disease (CKD) is characterized by the progressive loss of renal function which eventually leads to End Stage Renal Disease (ESRD). CKD affects roughly 30 million Americans, costs billions of dollars in healthcare spending annually, and leaves thousands of patients reliant on burdensome dialysis treatments while waiting for a transplant. Fortunately, CKD may be controllable if diagnosed early in the disease progression. Team Kidney designed and produced a more sophisticated prototype for the efficient scanning of biological samples - named the AutoScanner. The Team developed a fully integrated automatic system with a graphical user interface to provide quick sample processing and data analysis for large-scale applications. The final design is a functional system that can process many different types of fluid samples, with applications not only to CKD but also to water quality testing, liquor analysis, etc.

Senior (Recent Graduates) Spotlight

Want to know what our 2020 graduates are doing next? Here's a sampling – you can find more on our Facebook Group, Virginia Tech Biological Systems Engineering.

Ben Agnor (Staunton, Virginia), in Biotechnology / Pre-Med with Biomedical Engineering and Chemistry minors, will be working as a Clinical Assistant at Raphine (Virginia) Medical Associates.

Matthew Blake (Fincastle, Virginia) focused on our Biotechnology path of coursework and will be working as a management trainee for Westrock in Murfreesboro, TN right outside of Nashville.

Graham Brittain (Salem, Virginia), Environmental Health with a minor in Green Engineering, will be working with ALL4 LLC, an environmental consulting firm specializing in air quality, in Herndon, Virginia.

Becki Broyles (Madison, Virginia), Watershed Science and Engineering / Environmental Health with a minor in Green Engineering, will be pursuing a master's degree in Water Resources Engineering at the University of Virginia.

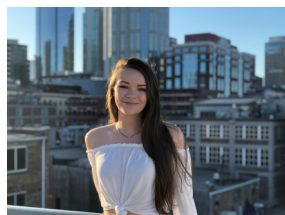
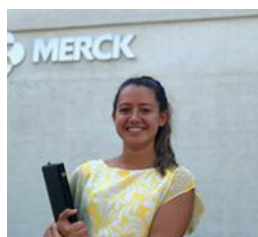
Sara Freix (Chantilly, Virginia), Watershed Science and Engineering with a minor in Green Engineering, also an accomplished NCAA student-athlete (cross-country) will be remaining at Virginia Tech to work on a master's degree in Educational Psychology.

Morgan Herrera (Burke, Virginia), Biotechnology with a minor in Biomedical Engineering, will be an Associate Engineering Specialist working with Merck & Co. in Durham, NC on their Deviation Management Team.

Kate Johnson (Crozet, Virginia), Biotechnology, will be working as a Research Assistant at Luna Innovations in Charlottesville, Virginia in their Health Group focusing on biomedical-related inventions and research.

Gabi Martinez (Virginia Beach, Virginia) focused on our Biotechnology path with a minor in Biomedical Engineering and will be attending the University of Virginia to pursue a PhD in Biomedical Engineering doing cancer research.

Alexis Petrosky (Pittsburgh, Pennsylvania), Biotechnology with a minor in Biomedical Engineering, will be working as a Validation Engineer for Barry-Wehmiller Design Group in Raleigh, North Carolina doing consulting for biotechnology, pharmaceutical, and life science companies in the Research Triangle Park area.



Alumni Recognitions 2020

Distinguished Alumnus (Industry/Government)

Dr. John Reid (B.S., 1980, M.S., 1982) is honored for his career engineering achievements in systems sensing, automation and control as well as visionary corporate leadership. In February, Dr. Reid embarked on his new duties as Vice President - Enterprise Technologies with Brunswick Corporation following over 30 years of highly accomplished technology leadership experience. Prior to his move to Brunswick, Dr. Reid was a senior member of Deere & Co., where he served most recently as Director, Enterprise Product Innovation and Technology and Technical Fellow. Over his tenure at Deere, Dr. Reid was instrumental in the development and implementation of the enterprise innovation strategy and processes, driving enterprise capability building through product technology roadmaps that included, among other critical initiatives, the company's strategy for automation and autonomous machine systems. Prior to his work with Deere & Company, and after obtaining his Ph.D. from Texas A&M University, Dr. Reid was a professor at the University of Illinois for 14 years where he was recognized for his automation research contributions.

Distinguished Alumnus (Academic) Award

Dr. Sanjay Shukla (M.S., 1995, Ph.D., 2000) is recognized for his career contributions in developing sustainable solutions for water availability and quality, with focus on watershed hydrology and modeling as well as irrigation and drainage. Dr. Shukla's scholarly productivity during his career at the University of Florida has been prodigious; he is author or co-author of nearly 60 peer-reviewed scientific journal articles, 29 peer-reviewed extension publications, and nearly 80 non-refereed publications such as proceedings, technical reports and trade publications. Additionally, he has delivered 119 technical presentations and 120 invited extension presentations, all while garnering over \$8M in external funding. Dr. Shukla is highly active in his professional society, serving as an Associate Editor for Transactions of the ASABE and Applied Engineering in Agriculture and holding numerous leadership positions on technical committees throughout his career.

Outstanding Recent Alumni (Industry/Government)

Richard P. "Rich" Allevi (B.S. 2010, M.S. 2012) is honored for his global-scale impacts on developing and promoting solar energy. Rich's entire career has been devoted to environmental and social stewardship. While obtaining his M.S. degree with the Biological Systems Engineering Department, Rich's research in the bacterial and chemical contamination of household drinking water aided in the development of an outreach program that subsidized water quality analyses for members of rural and underserved communities in Virginia. Later, as a member of Juwi Colar, Inc., a global leader in the utility-scale solar industry, Rich was central to the management and construction of over 60 megawatts of utility scale solar installations throughout the United States. Rich currently serves as Vice President of Utility Construction at Sun Tribe Solar, a leading Virginia-based solar energy company that he co-founded, where he uses his extensive industry experience to manage the overall growth strategy of the company.

Outstanding Recent Alumna (Academia)

Aishwarya "Ash" Venkat (B.S., 2014) is honored for her efforts and achievements in identifying solutions to global-scale challenges in food security, sustainability and resilience. Since graduating from the Biological Systems Engineering Department as the recipient of the J. Lawrence & Lucille G. Calhoun Scholarship, Ash has expanded and refined her technical portfolio of geospatial, statistical and econometric tools through a combination of graduate study at Tufts University and wide variety of service-oriented experiences. Ash completed her M.S. degree in Environmental and Water Resources Engineering - with a certificate in Watershed Systems, Science and Society Certificate - at Tufts University in 2018, during which time she was recognized with the N. Bruce and Lorry Hanes Endowed Fellowship and the US Geospatial Intelligence Foundation Scholarship. She is now pursuing a PhD in the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts University.

Universities Council on Water Resources Awards

Congratulations to **Dr. Zach Easton** and **Dr. David Sample** for the recent recognition by the Universities Council on Water Resource (UCOWR).



Dr. Easton was selected for the UCOWR 2020 Mid-Career Award for Applied Research. This award recognizes outstanding contributions in applied research related to water. Dr. Easton holds an extension and research appointment in BSE, working in the related areas of hydrology, water quality, and watershed modeling.

Dr. Sample is the recipient of the 2020 Mid-Career Award for Extension-Outreach-Engagement, awarded for outstanding contributions through Extension, Outreach, and Engagement activities related to water. Dr. Sample holds an extension and research appointment in BSE (stationed at the Hampton Roads Agricultural Research and Extension Center in Virginia Beach) and works on stormwater management, modeling, and design.



UCOWR is a consortium of academic institutions and affiliates invested in water resources research, education, and outreach. Their mission is to expand the capacity of universities and their partners to address current water resources challenges through sharing expertise, fostering leadership, and developing interdisciplinary collaborations.

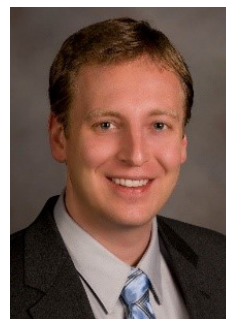
ASABE Massey-Ferguson Educational Gold Medal



Dr. Mary Leigh Wolfe is the 2020 recipient of ASABE's Massey-Ferguson Educational Gold Medal. The Massey-Ferguson Educational Gold Medal is a major award that honors those whose dedication to the spirit of learning and teaching in the field of agricultural engineering has advanced with distinction our agricultural knowledge and practice and whose efforts serve as an inspiration to others. Dr. Wolfe is a BSE graduate (1979, 1982) and pioneer in the profession whose distinctions include past president of both ASABE and the American Board of Engineering and Technology (ABET), Fellow member of ASABE, ABET and the American Institute for Medical and Biological Engineering (AIMBE), and many others. Dr. Wolfe, currently a Professor in the BSE department, joined the faculty in 1992 and served as Department Head from 2009 to 2018.

Research Leave

Dr. Ryan Senger, BSE Associate Professor specializing in the biotechnology area, returned to the Department this semester following research leave. Over the Fall 2019 semester, Dr. Senger established partnerships with the Veterans Administration medical Center in Salem, Virginia Commonwealth University School of Medicine, Wake Forest School of Medicine, the University of Luxembourg and others. Among other interests, Dr. Senger is heavily involved in adapting Raman spectroscopy as a screening tool in diagnosing kidney disease and injury.



Dr. William C. "Cully" Hession, BSE Professor specializing in the watershed science and engineering area, completed research leave in Spring 2020. Dr. Hession's overall goal was to develop a "Virtual Watershed" for Strouble's Creek in Blacksburg, to consist of 3D virtual tours, 360o online tours, and smartphone-driven walking tours, all powered by state-of-the-art technology. Dr. Hession is a BSE alumnus (B.S., 1984, M.S., 1988) who has been a member of the Department since 2005.

Dr. Venkat Sridhar, Associate Professor, was approved by the Board of Visitors for research leave. Dr. Sridhar joined the BSE faculty in 2014 after serving six years at Boise State University. Dr. Sridhar was promoted to his current rank in 2018 and works in the Department's watershed science and engineering area. His leave is scheduled for the Spring 2021 semester, during which he will emphasize strengthening and expanding his already-extensive network of international collaborations on global water sources issues.



Promotion

Dr. Zach Easton was approved by the Board of Visitors to be promoted to the rank of Professor, effective this summer. Dr. Easton is a graduate of Cornell University (M.S., Ph.D.) and the University of Massachusetts Amherst (B.S.) who joined the BSE department in 2011. Dr. Easton leads highly productive research and extension efforts in BSE's watershed science and engineering area and has been previously recognized by the North Central Association of State Agricultural Experiment Directors, Virginia Tech's Office of the Vice President for Research and Innovation, the Virginia Tech College of Engineering, and the American Society of Civil Engineers.



Welcome New Faculty Member



Dr. Juhong Chen joined the department in August 2019 as an Assistant Professor and is quickly establishing a productive research program in BSE's biotechnology area. Dr. Chen earned his Ph.D. in Food Science from the University of Massachusetts in 2016 and completed post-doctoral fellowships at Cornell University and the University of California, Berkley. Dr. Chen and his research team will be housed in the Human and Agricultural Biosciences Building

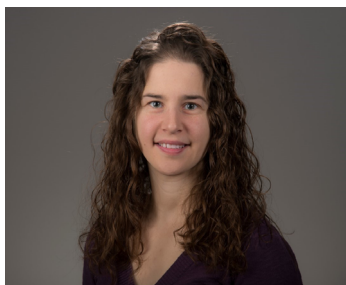
1 (HABB1) and will be investigating CRISPR- and phage-based detection of foodborne pathogens, rapid detection of antibiotic-resistant genes, and similar topics. Dr. Chen will also be teaching graduate and upper-level undergraduate courses in BSE's Biotechnology area.

Welcome New Research Faculty

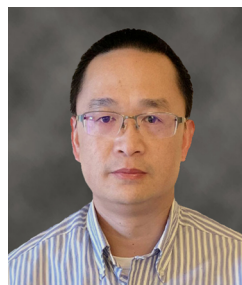
Dr. Debra Walter and **Dr. He "Andy" Hu** have both joined the BSE Department as part of Dr. Mike Zhang's research group investigating vaccines.

Dr. Walter received her Ph.D. in Molecular and Cellular Biology from Ohio University in 2018 and most recently worked as a postdoctoral research fellow with the University of Michigan Internal Medicine Department.

Dr. Hu received his Ph.D. in Chemistry from Fudan University (Shanghai, China) in 2009 and has research experience at Shanghai Normal University, the University of Southern California, the University of Turin, Case Western Reserve University, and the University of California, San Diego.



Dr. Debra Walter



Dr. He 'Andy' Hu



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Virginia Tech
Biological Systems
Engineering

Biological Systems
Engineering at
Virginia Tech



@vt_bse

Biological Systems Engineering Dept.

Seitz Hall, Room 200, Virginia Tech

155 Ag Quad Lane (MC 0303)

Blacksburg, VA 24061



BSE Newsletter Staff:

Editor-in-chief:

Leigh-Anne Krometis

Managing Editor

Design & Layout Editor:

Laura Eanes

Current Issue Contributors:

Priscilla Baker

Leigh-Anne Krometis

Mary Leigh Wolfe

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