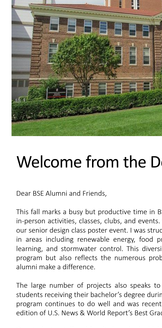
Biological Systems Engineering
COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN–MADISON



Welcome from the Department Chair

Dear BSE Alumni and Friends,

This fall marks a busy but productive time in BSE, as we have resumed all our normal in-person activities, classes, clubs, and events. As I am writing this - I have just exited our senior design class poster event. I was struck by the wide variety of design projects in areas including renewable energy, food processing, machinery design, machine learning, and stormwater control. This diversity speaks both to the breadth of our program but also reflects the numerous problems in which our alumni and future alumni make a difference.

The large number of projects also speaks to our healthy student number with 65 students receiving their bachelor's degree during the 2022 calendar year. Our graduate program continues to do well and was recently ranked among the best in the 2022 edition of U.S. News & World Report's Best Graduate Schools - ranked at number 14.

Our students, staff and faculty have had a highly productive year in terms of research, including numerous high-impact publications and multiple major grants and awards, with several described in this newsletter. We have welcomed an additional new faculty member to BSE this Fall - Dr. Neslihan (Nesli) Akdeniz in the controlled environment area. We have also hired Ms. Andrea Klahn an outreach specialist for the Agrability program and Shanon Hankin as a research program coordinator working with Dr. Thompson on an NSF AccelNet Design project. These new people have brought new ideas, energy, and excitement to our program.

In closing, I would be remiss if I did not thank each of those who made gifts to our program in 2022. These gifts enable our program's many activities to improve student experiences and provide scholarships to students in need. We could not do it without you and are truly grateful for your generosity.

Troy Runge, Department Chair

Welcome

Assistant Professor and Extension Specialist, Dr. Neslihan Akdeniz

Unlike many of her colleagues working in the livestock area, **Neslihan Akdeniz** grew up in the city where the wooden Trojan Horse is located today in Turkey. Her on-farm experiences came later in life. She graduated from Iowa State University (ABE) and worked as a research associate at the University of Minnesota (BBE). Nesli held a clinical assistant professor position in Agricultural and Biological Engineering at the University of Illinois at Urbana-Champaign for 5+ years.

She started in BSE in August and is excited to continue to have an extension appointment and work in the ag facility systems engineering area. Her main focus is livestock environments, but she is also interested in indoor crop-growing facilities and nutrient management. She is glad to be a part of the BSE family and looks forward to learning and growing every day in her new role. Please feel free to reach out to her at nesli@wisc.edu.

AgrAbility Welcomes New Outreach Specialist

AgrAbility of Wisconsin is pleased to welcome **Andrea Klahn** as its new Outreach Specialist. Prior to starting at AgrAbility, Klahn worked as a Marketing & Communications Specialist at AgSource for seven years. For the past four years, she has been a stay-at-home mom to her two daughters, ages 4 and 2. Since 1991, AgrAbility of Wisconsin has been promoting success in agriculture for farmers with disabilities and their families through education and outreach. AgrAbility of Wisconsin is a partnership between the University of Wisconsin Division of Extension and Easterseals Wisconsin.

AgrAbility also works closely with the Wisconsin Department of Workforce Development's Division of Vocational Rehabilitation (DVR) to assist farmers in the state.

Research Program Coordinator, Shanon Hankin

Shanon Hankin is thrilled to join the Department of Biological Systems Engineering at the University of Wisconsin–Madison. She joins the department after six years of working for Wisconsin's Department of Agriculture, Trade, and Consumer Protection as a Plant Pest and Disease Specialist. She worked with Wisconsin's green industry in meeting invasive species regulations. Prior to this, she had been engaged with private industry in a broad scope of environmental research at universities, governmental agencies, and non-profit organizations in the United States and Canada.

Shanon is working on an NSF AccelNet Design project, "Soil and Land Management for Food & Water Security, Adaptaion and Mitigation of Climate Change" led by Biological Systems Engineering professor Anita Thompson and in collaboration with Texas A&M University of Nebraska-Lincoln, Mississippi State University, Kansas State University, University of Alaska-Fairbanks, and University of California-Davis.

Department News

Agricultural Safety Specialist Receives International Award

The American Society of Agricultural and Biological Engineers (ASABE) recognized John Shutske, professor and agricultural safety and health specialist with one of its major organizational awards. The award was presented this past July at the ASABE's 2022 international meeting in Houston, Texas in recognition of Shutske's 37-years of leadership and interdisciplinary teamwork that focuses on tackling long-accepted problems through Extension, engineering, and education for a safer and healthier agricultural workplace.

Alfred Toepfer Faculty Fellow Award

Biological Systems Engineering assistant professor Zhou Zhang and animal and dairy sciences assistant professor Joao Dorea received the Alfred Toepfer Faculty Fellow Awards. The one-year award is bestowed on pre-tenure faculty whose research benefits agricultural activities within the United States and whose areas of interest lie in the scientific fields of crop research, improvements in crop yield and quality, or animal sciences.

Zhang's research focuses on using artificial intelligence techniques for sustainable agriculture, including developing new remote sensing techniques to permit data acquisition from multi-sensors across multi-platforms and utilizing data science techniques to analyze the big data generated through these approaches. The long-term goal is to help producers with decision-making tools, such as crop mapping, automated phenotyping and yield prediction.

CALS Honorary Recognition Award: Richard Straub

Richard Straub was recognized with the CALS Honorary Recognition Award for his 40 years of service to the college. He has served as a faculty member and department chair in Biological Systems Engineering as well as senior associate dean of CALS, director of Agricultural Research Stations, and executive director of the Wisconsin Agricultural Experiment Station.

His achievements working in CALS administration included managing personnel issues, working on plans for new facilities, and obtaining Wisconsin legislature approval to purchase and sell agricultural lands, which eased budgetary reductions imposed on the UW System.

Research interests include forage harvesting, processing of agricultural crops and materials, agricultural machinery, energy management and adapting farm equipment for people of all abilities. He also worked with Agability of Wisconsin (AAW) allowing 2,500 farmers and farm families to continue farming through AAW interventions. He continues to be an active emeritus professor serving on committees in CALS.

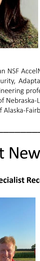
Gunasekaran Returns to the Department After a Year in the US State Department

After working for a year at the US State Department, Professor **Sundaram Gunasekaran** returned to the department this fall. He was a National Academy of Sciences-sponsored Jefferson Science Fellow, which is a nationally competitive program to help infuse science in making US policy decisions. Gunasekaran chose to work at the Afghanistan desk in the Bureau of South and Central Asian Affairs to lend his scientific expertise in food processing to address food security and sustainability issues in the region.

The Taliban takeover of the Afghanistan government in August 2021 and the ensuing tumultuous situation in Afghanistan made his task particularly challenging. However, Gunasekaran worked closely with the top officials in the State Department, including Secretary Tony Blinken (see photo), USAID, FAO, and the World Food Program (WFP) to develop strategic plans to provide food and nutritional assistance to the Afghans.

Prebiotics Research in Pan Lab

Prebiotics (mostly oligosaccharides) are the ingredients that can modulate the composition and/or activity of the gastrointestinal microbiota and confer a wide range of health benefits including inhibition of pathogenic microorganisms, constipation alleviation, obesity reduction, improvement of mineral absorption, enhancement of the immune system, to name among the few, as illustrated in the figure. Prebiotics can be obtained by chemical/enzymatic synthesis and by genetic engineering of microorganisms. The global prebiotics market as a supplementary ingredient in the food and pharmaceutical industries is expected to reach USD 13 billion in 2030.



Prof. **Xuejun Pan**'s group has successfully developed patented technologies to synthesize high-value prebiotic oligosaccharides from low-cost and abundant sugars (such as glucose, galactose, xylose, and lactose) or directly from lignocellulosic biomass (such as corn stover). Pan's group is also working on the genetic modification of certain bacterial species to produce these prebiotic oligosaccharides. For example, **Dr. Ning Li** (former BSE Ph.D. student) and **Meijun Zeng** (current BSE Ph.D. student) synthesized prebiotic oligosaccharides using green and inexpensive solvents (such as inorganic ionic liquid and acid) with high yield and selectivity. Their

studies have generated two patents and several publications. **Dr. Sonali Mohapatra** (current postdoc) has been working on the modulation of the genes of the salvage pathway of *Escherichia coli* to produce human milk oligosaccharides (HMOs) that can be targeted for inducing beneficial proteins in the human gut. These research activities in Prof. Pan's lab are currently supported by Hatch and Dairy Innovation Hub (DIH). Proposals based on these concepts are in the pipeline to pursue extramural support from USDA, NIFA, NIH, and NSF.

Pan's group is to investigate the beneficial efficacy of low-cost biomass-derived prebiotics on the selective growth of beneficial gut microbes and gut-related disease models. The group also intends to explore the applications of these oligosaccharides as supplementation in poultry feed to promote health and productivity and in ruminant feed to suppress the emission of greenhouse gas (methane). Further, Pan's group anticipates producing HMOs through friendly genetically modified microorganisms that can be directly fed to lactating mothers.

Shutske Co-hosts International Workshop with University of Illinois Urbana-Champaign's Center for Digital Agriculture

In November, BSE Professor and Extension Agricultural Safety and Health Specialist, **John Shutske**, co-hosted an international workshop in Champaign-Urbana, Illinois at the University of Illinois in partnership with their Agricultural and Biological Engineering Department and the U of I's Center for Digital Agriculture. The conference, funded by USDA-NIFA and CDC-NIOSH was moved from Wisconsin to Illinois in mid-2022 and focused on developing a comprehensive research agenda around needs connected to autonomous and highly-automated agricultural machinery. Three groups worked over two days to identify needs and cross-disciplinary research questions in three main areas: occupational safety research and human factors; engineering design standards, policy, and regulation; community and workforce issues associated with new machine forms. About 100 people participated in the workshop, representing the ag machinery companies, academia, regulators, and producers. Shutske was the Co-PI and co-chair of the activity along with Dr. Salah Issa in Illinois. MS graduate student Ellie Dukes of BSE assisted with session documentation and facilitation. This work will result in a special, peer-reviewed issue of ASABE's Journal of Agricultural Safety and Health in early 2023 and is likely to result in focused federal research funding for projects and overall national leadership based on the needs outlined in the workshop.

BSE graduate student, **Ellie Dukes**, at the research workshop.

The Flow Project

Watershed by **Gabrielle Whisler**

The Flow Project pairs undergraduate student artists in the University of Wisconsin System with water professionals from across the state to create art inspired by water.

Biological Systems Engineering senior, **Gabrielle Whisler** created *Watershed* as a visual interpretation of Professor **Anita Thompson's** research in watershed management. Thompson and her research team develop tools to assist with understanding the relationship between water and the land.

Thompson's research on Green Lake served as inspiration for this painting. The water and land colors showcase the effects of land management in urban and agricultural uses. The patterns in the lake resemble an algae bloom. Blooms happen when excess phosphorus and nitrogen enter our waterways from mismanaged land use, an essential topic in Thompson's research. The pattern represents the land's influence on our water resources and brings awareness to the impacts of watershed management.

BSE Fall Fest

The tradition is back! After a few years hiatus due to COVID, the BSE Thanksgiving meal was held again where we serve students a fall feast as our way of saying thanks!

BSE Shop Night

Fall 2022 BSE Shop Night participants and advisors. Left to right: **Micah Robinson** (advisor), **Rachel Steiner**, **Paulina Baker**, **Ciera Keough**, **Allison Boeckmann**, **Jackie Garwood**, **Kody Habeck** (advisor). Not pictured: **Zach Jamieson**, **Ellie Dukes**, and **Troy Runge** (advisor).

This fall the BSE fabrication shop held another successful semester long BSE Shop Night consisting of seven evening sessions throughout the semester. Seven BSE students partook in this semester's activities which included woodworking, metalworking and sand casting. Started in 2017, the purpose of BSE Shop Night is to give students, particularly those with little not no fabrication experience, the opportunity to learn various fabrication skills making projects that they can take home in the end. This is done in a welcoming environment aimed at giving all the support, guidance and oversight that is needed for new shop users. This semester the department Chair, **Troy Runge** as well as BSE senior, **Micah Robinson**, assisted shop manager, **Kody Habeck**, in guiding the shop projects. In the wood shop, participants each fabricated a collapsible camping chair from a single 8 ft 1x6 board. This project exposed students to the table saw, miter saw, drill press, disk sander, palm sander and hand drill while also having them consider part layout on their board to minimize required material usage. The metalworking project involved designing a sign or other art piece in a computer aided design (CAD) software and programming the computer numerically controlled (CNC) plasma cutter to cut their piece out of sheet metal. Once cut the excess dross was ground off the back with an angle grinder prior to painting. Finally, participants were exposed to aluminum sand casting where they cast the UW crest using a 3D printed die by packing casting sand into a casting flask before boring the vent and sprue for the molten aluminum to be poured into. Once poured and cooled the vent and sprue were cut off with the vertical band saw and edges were filed down in a hand file.

When asked about their experience with shop night this is what a few participants said:

"Shop Night was my favorite part of the semester! I was able to get a ton of hands-on experience with a multitude of machinery I normally do not get the opportunity to use. I was able to give my wooden folding chair and plasma cut sheet metal designs as Christmas gifts. New skills and free hand-crafted gifts; killing two birds with one stone." – Jaclyn Garwood

"I had a great experience with shop night this semester. We performed sand casting, plasma cutting, and chair building, giving us the opportunity to learn how to use a variety of different tools in the shop. Kody, Troy, and Micah were all fun, patient instructors, and it was awesome getting to know other BSE students better. I definitely highly recommend shop night to anyone looking to build their confidence in the shop, have some fun, and create some cool projects!" – Ciera Keough

"My experience in BSE Shop Night was purely positive. With people of all skill levels, it encouraged learning and collaboration. From activities I never thought I'd have the opportunity to participate in like designing an object and seeing it come to life using a plasma cutter, to activities as useful and multifaceted as woodworking, each project gave me an entirely new skill to appreciate. It was a privilege to have this opportunity and I can confidently recommend this club to any BSE student and promise them a positive experience." – Allison Boeckmann

Projects include, left - aluminum sand casted UW crest; tight - collapsible camping chair

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Student Awards

Graduate student, Meijun Zeng, receives travel awards

Meijun Zeng (the first from right, a BSE Ph.D. student in Prof. Xuejun Pan's lab) won the AIChE (Division of Forest and Plant Bioproducts) Student Travel Award and UW-Madison Graduate School Student Research Grants Competition (SRGC) Award (Research Travel), which supported her to present her study on "Chemical synthesis of potential prebiotic oligosaccharides from simple sugars and lignocellulosic biomass in concentrated acids" at 2022 AIChE Annual Meeting held in Phoenix, AZ. Meijun has been working on the synthesis of prebiotic oligosaccharides from low-cost sugars (such as glucose from biomass and lactose from milk) and lignocellulosic biomass (such as corn stover) for her Ph.D. project.

Graduate student, Weizheng Wang, receives a distinguished fellowship award

Based on his excellence in research, **Weizheng Wang**, a Ph.D. student in the Gunasekaran lab, was awarded the Richard M. Heins Wisconsin Distinguished Graduate Fellowship. This is one of the few highly competitive college-wide fellowships awarded in CALS. Weizheng's research is focused on the synthesis and applications of nanomaterials for biosensing to enhance food quality and safety. Congratulations, Weizheng!

BSE 509 – Biological Systems Engineering Design Practicum II

As we come to the end of the calendar year, we are also wrapping up another round of senior design projects here in BSE. Our senior design courses, which consist of sequential spring and fall courses, had a total enrollment of 42 this year with a total of 11 design projects covering all aspects of BSE. Each of the design teams were assigned a BSE faculty advisor to provide guidance and support as they worked their way through the engineering design process. Throughout this process teams were encouraged to critically think through various aspects of their design with regards to sustainability, safety and manufacturability and incorporate these ideas into their final designs. Teams were able to obtain real world experience with teamwork and time management skills as they created and updated Gantt charts to help them set deadlines and goals that were sometimes a struggle to meet on time. The BSE department was fortunate to have many of these projects have industry clients and advisors that assisted teams with technical aspects and provided industry specific guidance throughout the process.

As with all engineering courses, the main purpose of this course is to help prepare our BSE seniors for their first engineering position after graduation and their future careers. This course is a culmination of their college career where they are asked to demonstrate that they can take concepts from past coursework and apply it to a real-world design problem. When asked what this course meant to the students, these are a few of their replies:

"Senior design was challenging; we worked on a real-world project, were faced with challenges we didn't already know the answer to, and we had to quickly develop the knowledge and skills needed to find solutions. Taking this course gave us a look at what it's like to be an engineer, and passing it helped us realize that we have what it takes to be one. " – Thomas Leja-Brennan

"While the prospect of creating a product and detailed report by the end of the semester initially seemed daunting, I really enjoyed the process of Senior Design. The large-scale research effort and iterative report writing offered me a preview of what to expect from graduate school and helped me fine-tune my analytical and writing skills. Over the semester my time management and planning skills also improved, as I was forced to map out tasks and deadlines months ahead of time. It was incredibly rewarding to take principles covered in other BSE classes and apply them to a situation right in front of me and be able to walk away having not only made something, but something that works." – Ellie Froelich

"Senior design showed me the importance of working with a client in a timeframe that has hard deadlines. It showed me that hard work and dedication can help keep a project on track to finish on time. Most of all, it really gave me the opportunity going into the engineering world where I could see a project start from the whiteboard and become a product." – Lee Hermus

Projects this year included the following:

- Corn yield prediction modeling for Midwestern states on a county level using publicly available data fed into machine learning algorithms.
- Redesigning of a mini skid steer log grapple that previously had weld failure due to fatigue loading. The team used finite element analysis (FEA) models and collected stain gauge data to verify the model before making design change recommendations.
- Developing an automated watering and monitoring system for a hydroponic system that is used to grow basil in one of the university dormitories.
- Developing an IoT system to collect data from a benchtop model of a dairy barn to monitor and control ventilation fan speed based off of temperature and humidity index (THI).
- A continuation of a universal attachment system for a tracked wheelchair where the team specifically looked at lifting and tilting techniques of the system to assist wheelchair bound chair users to use the chair as a light duty utility vehicle.
- A wetland restoration plan for a area of land in Green county Wisconsin adjacent to the Sugar River that is currently used as marginal yielding agricultural land.
- A stormwater retention pond redesign for a site in Madison, WI that would reduce total suspended solids (TTS), maintain current peak flow rates and minimize the cost for capturing phosphorus within the contributing area of the pond.
- Designing a semi-automated at home coffee roasting system using a repurposed popcorn popper. The system monitors the temperature rate of rise (ROR) and adjusts the ventilation to the system autonomously to maintain a desire ROR.
- A variable seed spacing metering unit used in a corn planter row planter unit to be used for research purposes at the university. The seed metering system varies the planting rate between 0.5 in and 7 inches across a 10 foot distance to be used in field plots.
- The development of a low-cost small scale hydroelectric system for powering lights in a pavilion at a remote location in Jefferson, WI utilizing the outflow from a artesian well fed pond.
- Designing and testing a proof of concept analog tree moisture meter used to monitor the moisture level of oak trees. The system works off the principle of electrical resistance through the wood and relates that resistance to a calculated dry basis moisture content based off of a specified calibration curve.

In Memoriam

Marshall Frederick Finner (June 6, 1927 ~ July 5, 2022) – Marshall "Marsh" attended the University of Wisconsin-Madison where he completed a Bachelor's degree in Agricultural Engineering and Mechanical Engineering, and a Master's degree in Agricultural Engineering. Following his service in the U.S. Army as a Field Test Engineer, he returned to UW-Madison becoming a professor before accepting the Director of UW Agricultural Research Stations position. He retired in 1994 with emeritus professor status.

Janice Fay Mary Detaeje Janssen (September 17, 1932 ~ September 4, 2022) – Janice and her husband, Gail, were long time farmers and supporters of UW-Madison and the Department of Biological Systems Engineering. While her husband studied agriculture and mechanical engineering at UW-Madison, Janice taught at various schools during her career. In their devotion and support for UW-Madison and the Dept. of Biological Systems Engineering, they established the *Gail E. and Janice F. Janssen Agricultural and Life Sciences Scholarship Fund*.

Alumni News

Society of Plastics Engineering (SPE) Donald McCoy Education Scholarship

Allen Roman, former UW-Madison Biological Systems Engineering Bachelor's degree and Mechanical Engineering Master's degree student, received the Society of Plastics Engineering (SPE) Donald McCoy Education Scholarship. Roman is currently the Chief Engineer in the UW-Madison's Polymer Engineering Center.

ASABE Update

The American Society of Agricultural and Biological Engineers (ASABE) is a student organization for any student interested in agriculture, food, and biological systems. This club focuses on bridging the gap between students, faculty, and nearby companies to expose students to the endless opportunities when looking for future employment. There are many ways to make connections with peers and professionals in industry to build networking relationships. The ASABE Pre-professionals Club at UW-Madison also holds monthly meetings, social events, fundraisers, and service opportunities to allow students and faculty to get to know each other. This organization allows students to gain an outside understanding of industries they might be interested in, while obtaining valuable life skills such as leadership and teamwork.

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The fall season of ASABE began with a Biological Systems Engineering Department Welcome Back Event in September where students and faculty enjoyed a grilled brats and burgers dinner and caught up with each other after a summer away. October brought us BSE alum Laura Rodriguez speaking about her experience at the Department of Natural Resources and a Corn hole Tournament Social! Laura Rodriguez is a recent graduate from the University of Wisconsin and provided helpful insight to students looking for employment post-grad as she explained her experience writing permits with the Wisconsin DNR. November included speaker Parker Williams from BouMatic, LLC explaining his robotics work as an Implementation Engineer and our November social of decorating Gingerbread Houses and having a game night! Parker Williams gave a great presentation explaining his mechanical work to efficiently milk cows and his approach to develop and perform tests to validate new manufacturing methods. To finish off the fall 2022 semester, our December General meeting will include Aidan Morrow from ConAgra Brands. She will discuss her experience as a Quality Team Lead and the relationship between her work and those interested in the Food and Bioprocessing track. After meetings, students have the opportunity to introduce themselves, ask questions, and develop a network of contacts in fields of interest.

Our biggest fundraiser of the year, Lawn Mower Clinic, took place in November where the UW-Madison Chapter of ASABE raised $4,325! This event allows students to assist residents in the Madison area to prepare their lawnmowers and snow blowers for the long winter! During the Lawn Mower Clinic, the students and faculty in the Department of BSE repair, provide oil changes, and power wash machines. Residents in Madison benefit from leaving with a better machine than they came in with, and students learn the fundamentals of a working lawnmower or snow blower.

The Executive Board of ASABE, UW-Madison Chapter is very proud of the connections made and work accomplished this year, and we cannot wait to continue our efforts into the New Year!

2022-23 ASABE Officers

President – Collin Klaubauf
Vice President – Austin Yeast
Treasurer – Jaya Suneja
Secretary – Brenna Kouba
Fundraising – Karly Van Dorsten & Mitchel Kudronowicz
Social – Seeham Binyat
Public Relations – Lindsey Blanchfield
Engineering Expo – Micah Robinson
CALS Rep – Laura Sroda
Grad Students Reps – Rachel Steiner & Ellie Dukes

Wisconsin Section of ASABE

The WI Section hosted an outstanding Summer Social Event in July 2022 attended by 35 people from both the WI and IA Sections. The day included a tour and beer tasting at New Glarus Brewery in New Glarus, WI. That was followed by a meal and wine tasting at Bailey's Run Vineyard also in New Glarus. The WI Section is planning another similar Summer Social Event for 2023 – stay tuned!

WI ASABE summer social event at New Glarus Brewery

The Fall 2022 WI Section meeting featured a tour of the MacDon Enterprises US Design Studio located in Sun Prairie. The attendance was excellent with over 80 folks from the WI, IA, and Chicago Sections. This relatively new MacDon facility has an engineering center and experimental shop. Vice-President of Product Development **Neal Barnett** (UW BSE MS 1998) and Product Engineering Leader **Cyrus Ngon** (UW BSE 2018) provided presentations about the MacDon product development process. Almost 200 engineers, students, and guests attended WI Section meeting in 2022, showing that the WI Section is an active and engaged organization.

Recent Graduates

Biological Systems Engineering - Bachelor's Degrees

- Abdallah, Amir Mahmoud
- Berger, Adin Joseph
- Boeckmann, Allison Jaye
- Dustman, Paul
- Fisher, Ashley
- Henneberry, Finn
- Jannusch, Zachary Thomas
- Klaubauf, Collin Anthony
- Lee, Donggun
- Leja-Brennan, Thomas
- Loya, Charles Steven
- Myse, Roman Laine
- Pham, Aaron Tyler
- Rachum, Emma Leila
- Rauch, Joshua Paul
- Schult, Joseph Thomas
- Trast, Owen
- Udelhoven, Tanner
- Widowski, Luke Richard
- Xiong, Cheng

Biological Systems Engineering - Master's Degree

Wang, Yueqing (Pan)

Our Donors (June 2022 - November 2022)

- Jonathan Accola
- Marjorie Accola
- Patrice Accola
- Eliot Bergeland
- Robert and Linda Brown
- Martin and Kathleen Burkhardt
- Diann and Maynard Chapman
- CNH Industrial America LLC
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- Andrea Klahn
- Richard and Cynthia Klemme
- David and Marlese Lindsay
- David Logan
- Elaine and Nicholas Mischler
- Dwight and Mary Mueller
- Astrid Newenhouse and Kurt Meyer
- Daniel Pederson
- James Peterson
- Carol Philipps and Roderick Rynes
- Kathy Rutten
- Nan and Bob Schaefer
- Ronald and Barbara Schuler
- Jennifer Sheridan
- John and Kathleen Shutske
- Rakesh and Sunita Singh
- Elaine Staley
- Richard and Margaret Straub
- Melissa and Craig Sylte
- Vivian Vaudreuil

Support BSE

We are sincerely grateful to our friends and alumni who continue to support our department through generous donations. These gifts help support our faculty and students through education, training, outreach, and research. Interested in joining other alumni, friends, and co-workers in supporting the BSE mission? Click the link below to learn more.

Learn More

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