MICHIGAN STATE UNIVERSITY | Department of Biosystems and Agricultural Engineering

Virtual
2020 Biosystems Engineering Showcase
April 23, 2020, 3-5 pm
www.egr.msu.edu/bae/SS20NewsBEShowcase

msu.zoom.us/j/764405813

Biosystems Engineering

Graduates of the MSU Biosystems Engineering Undergraduate Program are expected to succeed in diverse careers where they integrate and apply principles of engineering and biology to a wide variety of globally important problems. MSU Biosystems Engineering graduates are expected to attain that success by:

- identifying and solving problems at the interface of biology and engineering, using modern engineering techniques and the systems approach;
- analyzing, designing, and controlling components, systems, and processes that involve critical biological components; and
- demonstrating vision, adaptability, creativity, a practical mindset, effective communication skills for technical and non-technical audiences, the ability to work in diverse, cross-disciplinary teams, and a commitment to sustainability, continuing professional growth, and ethical conduct.

MSU Biosystems Engineering graduates are having a positive impact on the world working in the areas of food: food safety and quality; environment: sustainable ecosystems and resource conservation; energy: bioenergy and bioproduct solutions; and health: diagnostics, systems models, and risk-assessment tools to enhance public health.

Integrating Engineering and Biology Since 1906

Biosystems & Agricultural Engineering
524 S. Shaw Lane, Room 216
East Lansing, MI 48824
517-355-4720
www.egr.msu.edu/bae

College of Agriculture and Natural Resources & College of Engineering
www.canr.msu.edu www.egr.msu.edu

Schedule

Program

Online Program ***www.egr.msu.edu/bae/SS20NewsBEShowcase***

Virtual Zoom Meeting (Industry Advisory Board, Industry Evaluators, and Project Sponsors Only)

2:00 pm - Individual Senior Design Team Evaluations

Virtual Zoom Webinar ***msu.zoom.us/j/764405813*** (Open to all – no registration required)

Senior Design Team Presentations (10 minutes each)

3:00 pm - **Baby Snack Pack** - Nestlé Nutrition (project under Non-Disclosure Agreement) - *Development of Manufacturing Model for Popped Snacks*
Allyson Gower, Ricci Lopez, Emma McDonald, & Nama Naseem

3:10 pm - **Team Techmark** - Techmark, Inc. - *Potato Storage Ventilation Analysis*
Amanda George, Sean Pelfery, Caroline Schuetz, & Christopher Wells

3:20 pm - **Team Trident** - Trident Biometrics (project under Non-Disclosure Agreement) - *Operational Analysis of Trident Biometrics' Drug Testing Process*
Natalie Coaster, Scott Lyon, & Courteney Roberts

3:30 pm - **Food ACCELs** - Food, Agriculture, Research, and Manufacturing Business Incubator - *Determining Equipment and Utility Recommendations for a Food Business Accelerator*
Rachelle Crow, Meredith Freeby, Erin Keller, & Alexandrea Peake

3:40 pm Break

3:45 pm - **Team PawPaw** - Treeborn - *Pawpaw Fruit Skin Removal Improvement*
Jessica Mehall, Rachel Paulson, Taylor Pelland, & Brandon Wilsdon

3:55 pm - **Team AIM** - Dr. Nirajan Bhusal - *Tuberculosis Diagnosis using Artificial Intelligence*
Anna Carmody, Alysa Gonzalez, Daniel Millar, & Tyler VanBuren

4:05 pm - **Team Tillamook** - Tillamook Creamery (project under Non-Disclosure Agreement) - *Ice Cream Inclusion Analysis and Process Optimization*
Stephanie Gardner, Esha Jain, & Alicia Ziegler

4:15 pm - **Sensible Energy Solutions** - Perrigo (project under Non-Disclosure Agreement) - *HVAC Energy Efficiency at Pharmaceutical Manufacturing Plant*
Mario Aliaj, Emily Peruski, Aryn Thomas, & Matthew Wholihan

4:25 pm Break

4:30 pm - **Phantom** - Stryker (project under Non-Disclosure Agreement) - *Simulation of Thermal Energy Transfer through Neurological Tissue during Electrosurgery*
Leah Allen, Peter Jansen, Rosemary Laurito, & Scott Piper

4:40 pm - **WasteWatchers** - *Large Food Manufacturer (project under Non-Disclosure Agreement) - Wastewater Optimization for Cost Efficiency*
Keegan Mackin, Devin Martin, Jillian Meade, & Sydney Shellhouse

4:50 pm - **Blake's By-product Bash** - Blake's Hard Cider Co. - *Blake's Hard Cider Apple Pomace Utilization and Optimization*
Meghan Donovan, Taylor Quillan, Anna Raschke, & Jacob Wright

5:00 pm - Acknowledgements and Wrap up (Dr. Darrell Donahue, BAE Department Chair)

Virtual BE 230 Poster Session (Open to all – no registration required)

5:15 pm - BE 230 Virtual Poster Session ***www.egr.msu.edu/bae/SS20NewsBE230PosterShowcase***

Message from BAE Chair Darrell W. Donahue, CQE

BE Showcase is an annual event to highlight the accomplishments of our students. Showcase success would not be possible without the continued support of our alumni, board members, industry partners, university administration, parents, and sponsors. Thanks to everyone who contributes to the continuing BE Showcase success.

Participants

Biosystems Design Project Participants

Mario Aliaj
Leah Allen
Anna Carmody
Natalie Coaster
Rachelle Crow
Meghan Donovan
Meredith Freeby
Stephanie Gardner
Amanda George
Aly Gonzalez
Allyson Gower
Esha Jain
Peter Jansen
Erin Keller
Rosemary Laurito
Ricci Lopez
Scott Lyon
Keegan Mackin
Devin Martin
Emma Mcdonald
Jillian Meade
Jessica Mehall
Daniel Millar
Nama Naseem
Rachel Paulson
Alexandrea Peake
Sean Pelfery
Taylor Pelland
Emily Peruski
Scott Piper
Taylor Quillan
Anna Raschke
Courteney Roberts
Caroline Schuetz
Sydney Shellhouse
Aryn Thomas
Tyler Vanburen
Chris Wells
Matt Wholihan
Brandon Wilsdon
Jacob Wright
Alicia Ziegler

Staff

Design Project Instructor
Dana Kirk, PE
BE 485/487

Design Project Co-Instructor
Luke Reese
BE 485/487

Team Projects

Development of Manufacturing Model for Popped Snacks - (3:00 pm)

Nestlé is looking to expand Gerber Organic Popped Crisps globally. Currently, this product is manufactured in the US by a co-manufacturer. The project scope centered on developing a regional finishing site, where the puffed product is in-house produced, bagged, and sent to a distribution facility. For the preliminary design recommendation, a region was chosen, and equipment was selected based on the needs of the line and the region. The client was provided with a functional piping and instrumentation diagram and an operational description. The design met the client's payback period constraint, and in-house production reduced supply chain and distribution costs.

Team Members (L to R)
Nama Naseem
Allyson Gower
Ricci Lopez
Emma McDonald

Faculty Advisor
Kirk Dolan

Sponsor
Nestlé Nutrition (project under Non-Disclosure Agreement)

Potato Storage Ventilation Analysis - (3:10 pm)

Techmark Inc. is an international agricultural company that specializes in stored crop ventilation systems. Techmark designed and implemented an air cup ventilation system in a Greenville, MI, potato storage facility. The 10,570 ft^2 facility has experienced product losses in previous years from improper storage conditions. Important system characteristics hypothesized to be involved in product loss were the following air properties: temperature, humidity, and overall airflow distribution in the storage room. CFD analysis and data collected served as tools to determine condensation possibility within the air cup. A data collection plan was created for further analysis with potatoes present.

Team Members (L to R)
Sean Pelfery
Amanda George
Caroline Schuetz
Christopher Wells

Faculty Advisor
Wei Liao, PE

Sponsor
Techmark, Inc

Operational Analysis of Trident Biometrics' Drug Testing Process - (3:20 pm)

Trident Biometrics, a drug testing laboratory in Holland, MI, specializes in urine testing. Trident needed to optimize their process to handle an expected sample volume doubling while maintaining their promised 48-hour results turnaround time. Based on time study data collected by the team, a Work Breakdown Structure and Gantt Chart were created in Microsoft Project to identify the critical pathway. The critical path determined five tasks that directly affected testing time and was used to identify resource limitations. To increase sample throughput, the team recommended labor and equipment solutions and re-arranged methods on machines, which optimized testing time and reduced risk of bottlenecks.

Team Members (L to R)
Natalie Coaster
Scott Lyon
Courteney Roberts

Team Trident

Sponsor
Trident Biometrics (project under Non-Disclosure Agreement)

Faculty Advisor
Jade Mitchell

Determining Equipment and Utility Recommendations for a Food Business Accelerator - (3:30 pm)

The Food, Agriculture, Research, and Manufacturing Business Incubator is being built in Muskegon, MI, to provide a facility for food businesses to test and produce products, establish brands, and grow their businesses. To accomplish this goal, Team Food ACCELs designed six processing lines accommodating fruit, vegetable, and beverage products. The team recommended equipment and utility requirements necessary to produce the selected products at a rate of up to 40 gpm. These deliverables assisted in purchasing ancillary equipment within the $200,000 budget, applying for grants, determining rental rates, and configuring the facility with necessary utilities including electricity, water, air, and steam.

Team Members (L to R)
Erin Keller
Meredith Freeby
Alexandrea Peake
Rachelle Crow

FOODACCELS

Sponsor
Food, Agriculture, Research, and Manufacturing Business Incubator

Faculty Advisor
Darrell W Donahue, CQE

Team Projects

Pawpaw Fruit Skin Removal Improvement - (3:45 pm)

Pawpaws are a relatively unknown North American fruit native to lower Michigan. Their taste is often described as a tropical mango -banana blend. Pawpaws must tree ripen, have a very thin skin, and damage easily in transport thus making them difficult to market fresh. Treeborn creates a puree with the pawpaw pulp which requires complete skin removal prior to processing. Skin removal must be efficient as skin remnants in the pulp and the resulting oxidation after peeling can cause puree off-flavor and color. Treeborn uses a labor and time intensive manual skin removal process. The selected design provides an appropriate-scale solution that improves skin removal efficiency, reduces processing time and labor, and increases pulp yield.

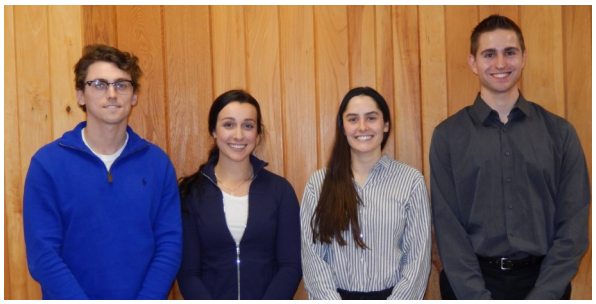
Team Members (L to R)
Rachel Paulson
Taylor Pelland
Jessica Mehall
Brandon Wilsdon

Sponsor
Treeborn

Faculty Advisor
Daniel Guyer

Tuberculosis Diagnosis using Artificial Intelligence - (3:55 pm)

In Nepal, Tuberculosis (TB) affects nearly 32,000 individuals annually, resulting in around 7,000 deaths. Team AIM was challenged with creating a cost effective and accurate TB diagnostic tool. The new diagnostic method removes human error and improves detection accuracy using an Android smartphone application. The application utilizes Artificial Intelligence (AI) in combination with the Nanoparticle-based Colorimetric Biosensing Assay (NCBA) test method to rapidly diagnose TB. The team anticipates that this new method's accuracy will exceed 83% and result in an efficient and affordable diagnosis for Nepalis. The implementation of AI to TB detection will create rapid diagnosis for individuals to begin treatment, overall decreasing the spread of TB in affected areas.



Team Members (L to R)
Daniel Millar
Alysa Gonzalez
Anna Carmody
Tyler VanBuren

AIM
Artificial Intelligence for Medical diagnosis

Sponsor
Dr. Nirajan Bhusal

Faculty Advisor
Evangelyn Alocilja

Ice Cream Inclusion Analysis and Process Optimization - (4:05 pm)

Team Tillamook worked with Tillamook Creamery; a farmer owned dairy co-op located in Oregon. Tillamook is interested in improving their customer satisfaction, specifically related to quantity and distribution of inclusions in their ice cream. Research conducted by the team identified that inclusion distribution was not uniform throughout the ice cream cans. The team identified several design improvements to enhance handling and distribution throughout the manufacturing process. Two solutions, to maintain temperature and improve mixing, were recommended by the team and were tested. These solutions improved inclusion distribution and will help maintain company quality standards for less than 10% of the client's project budget.

Team Members (L to R)
Esha Jain
Alicia Ziegler
Stephanie Gardner

Faculty Advisor
Susie Liu

Sponsor
Tillamook Creamery (project under Non-Disclosure Agreement)

HVAC Energy Efficiency at Pharmaceutical Manufacturing Plant - (4:15 pm)

Perrigo is interested in HVAC energy efficiency solutions to reduce energy costs and meet plantwide sustainability goals. SE Solutions researched dew point control and supplemental cooling coils as a customized approach to Perrigo's current system where the whole plant is controlled to setpoints required in only two suites. The team performed an HVAC energy balance to assess the theoretical impact of these designs and provided complete cost models to Perrigo. Dew point control met the required payback period and the design implementation is completed. SE Solutions analyzed HVAC data to quantify the actual savings realized with this new system.

Team Members (L to R)
Matthew Wholihan
Aryn Thomas
Emily Peruski
Mario Aliaj

Faculty Advisor
Chris Saffron

Sponsor
Perrigo (project under Non-Disclosure Agreement)

Simulation of Thermal Energy Transfer through Neurological Tissue during Electrosurgery - (4:30 pm)

Electrosurgery has many medical applications, one of which involves the use of radiofrequency technology to resect tumorous brain tissue. Stryker is interested in simulating the transfer of thermal energy from an electrosurgical instrument in a synthetic tissue model to characterize the propagation of heat through actual brain tissue. Team Phantom evaluated two materials that mimic the thermal and physical properties of the human brain to accurately quantify heat dissipation during electrosurgery. The team evaluated a polyacrylamide gel containing bovine serum albumin (BSA) protein and an evaporated milk agar, and then compared these to pig brain tissue results to make a final model recommendation.

Team Members (L to R)
Rosemary Laurito
Peter Jansen
Leah Allen
Scott Piper

Faculty Advisor
Ilce Medina Meza

Sponsor
Stryker (project under Non-Disclosure Agreement)

Wastewater Optimization for Cost Efficiency - (4:40 pm)

Our client, a large food manufacturer, pretreats their wastewater before sending it away for further treatment. Wastewater must be pretreated properly before discharge to abide by permit regulations and not negatively impact the environment. This company was looking for an opportunity to minimize the overall cost but still properly treat the wastewater. WasteWatchers discussed nine design alternatives to address the opportunity. After research and an economic analysis, managing the residual product was deemed the best solution. Areas of focus for this solution were how to properly treat and handle the residual product and possible post-treatment utilization options.

Team Members (L to R)
Devin Martin
Keegan Mackin
Sydney Shellhouse
Jillian Meade

Faculty Advisor
Steve Safferman, PE

Sponsor
Large Food Manufacturer (project under Non-Disclosure Agreement)

Team Projects

Blake's Hard Cider Apple Pomace Utilization and Optimization - (4:50 pm)

Blake's Hard Cider Company located in Armada, MI, was looking for an opportunity to reduce apple pomace by-product, which they now land apply as a soil amendment. Through research and experimentation, the team determined that an enzymatic pretreatment of the apple mash before pressing is the best method to reduce apple pomace. Enzymatic pretreatment breaks down long-chained sugar molecules before pressing, increasing juice yield up to 30%. With a simple one-step addition to their production process, Blake's has the potential to reduce apple pomace by 72% and increase profits.

Team Members (L to R)
Taylor Quillan
Jacob Wright
Meghan Donovan
Anna Raschke

Faculty Advisor
Brad Marks, PE

Sponsor
Blake's Hard Cider Co.

Biosystems Engineering
2020 Distinguished Alumni Award

&

Biosystems Engineering
2020 Outstanding Alumni Award

To be presented at a later date.

Industry Advisory Board 2019-2020

Janelle Boosi is a Senior Manager as Global Lead for Integrated Project Delivery as part of the Engineering Department at Kellogg Company. She has held roles in Research & Development, Engineering, Operations, and Continuous Improvement within North America and spent 2 years in Europe in Supply Chain Strategy. Janelle holds a B.S. in Biosystems Engineering.

Holly Bowers (Chair Elect) is Executive Director of Geospatial and Gas Asset Management at Consumers Energy. Holly is responsible for the engineering, system improvements, enhancements, and integrity for over 27,000 miles of distribution lines and 2,467 miles of transmission pipelines that serve 1.6 million customers in Michigan. Holly holds a B.S. in Biosystems Engineering and a MBA in Business Administration.

Jessica Bruin is a Process Engineer with Nestlé Nutrition – CTCU Fremont. Jessica has worked for Nestle Nutrition R&D Centers in Fremont, MI starting as an intern in 2011 and full-time since 2013. Jessica supports Nestlé's 10 global baby food factories with new line installations and technical assistance on existing lines. Her time with Nestlé has also included a 6 month assignment in Konolfingen, Switzerland in 2015 leading the global CIP Community and supporting the infant formula and dairy businesses. Jessica holds She has a B.S. and M.S. in Biosystems Engineering.

Lisa Buchholz is Global Leader of Analytical Regulatory Sciences with Corteva Agriscience. Corteva Agriscience, the agriculture division of DowDuPont, is a global leader in providing pest management and biotechnology products that improve the quality and quantity of the earth's food supply and contribute to the health and quality of life of the world's growing population. Lisa holds a B.S in Biological Sciences.

Matthew (Matt) Burtt is Assistant Director Clinical Quality Assurance with AbbVie. AbbVie's 29,000 employees are scientists, researchers, communicators, manufacturing specialists and regulatory experts located around the globe. Matt holds a B.S. in Biosystems Engineering and a MBA.

Shelley Crawford is Plant Manager for Chelsea Milling Company manufacturer of Jiffy Mix. Prior to Chelsea Milling Company, she was with Kellogg Company for 15 years as Group Engineering Manager. Shelley holds a B.S. in Biosystems Engineering and a MBA in Marketing.

Michelle Crook, PE, is Senior Project Engineer for the Michigan Department of Natural Resources. She provides engineering project management and oversight for DNR projects. Michelle holds a B.S. in Environmental Engineering.

Laura Doud, PE, is an Environmental Engineer Specialist in the Michigan Department of Agriculture and Rural Development. She works with waste storage facilities, fuel storage, drinking water and irrigation wells, concrete and soils investigations, aquaculture, food processor waste water issues, and the siting of livestock production facilities under the Michigan Right to Farm program. Laura holds a B.S. in Biosystems Engineering.

Cassaundra Edwards (Chair) is Supplier Quality Engineer for Tillamook in Tillamook, OR. Prior to Tillamook, she was the Production Manager at Bimbo Bakeries. Cassaundra holds a B.S. in Food Engineering and a M.S. in Mechanical Engineering.

Gene Ford is (retired) Vice President R&D, Head of PTC Fremont, at Nestlé Nutrition in Fremont, Michigan. He has more than 25 years of experience in domestic and international product development, manufacturing, logistics, and sales within the consumer food industry. Gene holds B.S. and M.S. degrees in Agricultural Engineering and an Executive M.S. degree.

Jeremy Hoeh, PE, is Environmental Health Programs Unit Supervisor in the Department of Environmental Quality (DEQ) Drinking Water and Municipal Assistance Division. He has a broad range of education and experience across DEQ programs. Jeremy holds a B.S. in Chemical Engineering.

Eric Iversen, PE, is Senior Project Manager with LSG Engineers and Surveyors in Lansing, MI. Eric is well versed in local and state regulatory agency procedures regarding site planning, permitting, SRF public financing, floodplain and wetland permits, storm water management and treatment, ground and surface water discharge permits, sanitary sewers, water, onsite wastewater (drainfields), wastewater lagoons and well systems, etc. including the standards and requirements of MDOT, MDEQ, MDTMB, and MDLARA. Eric holds a B.S. in Civil Engineering.

Andrew Knowles is Stein & Freezer Applications/Sales Support Manager at JBT FoodTech, a leading supplier of integrated food processing solutions. Andrew holds a B.S. in Biosystems Engineering and a M.S. in Applied Statistics.

Industry Advisory Board 2019-2020

Kevin Kowalk, PE, (MI and WI), is a Project Manager and Senior Engineer for Water and Natural Resources and Site Characterization and Remediation Divisions for EA Engineering, Science and Technology, Inc., PLC. Kevin holds B.S. and M.S. degrees in Biosystems Engineering.

Jeffrey Mathews, PhD, is the R & D Director for PepsiCo Beverages. Pepsi Beverages Company (PBC) handles approximately 75 percent of PepsiCo's North America beverage volume. Its diverse portfolio includes some of the world's most widely recognized beverage brands, including Pepsi, Mountain Dew, Sierra Mist, Aquafina, Gatorade, SoBe, Lipton, and Amp Energy. Jeffrey holds B.S., M.S. and Ph.D. degrees in Chemical Engineering/Paper Science and Engineering.

Mitch Miller is the Senior Processing System Engineer for the General Mills-Yoplait Plant, Reed City, Michigan. General Mills is among the world's largest food companies with U.S. shoppers on average placing at least one General Mills product into their shopping cart each time they visit the grocery store. Mitch holds B.S. and M.S. degrees in Agricultural & Biosystems Engineering.

Eric Van Middendorp is a Biomedical Engineer at Spectrum Health Innovations where he leads the design and development of FDA Class I and II medical devices. Eric works with the 25,000+ physicians and staff members across the Spectrum Health system to drive development of healthcare products and technologies. Eric holds a B.S. Product Design and Manufacturing Engineering and a M.S. in Mechanical Engineering.

Nathan (Nate) Wood, PE, is manager of the facilities engineering and maintenance team for Perrigo in Allegan, MI, a leading global healthcare supplier that develops, manufactures and distributes over-the-counter (OTC) and prescription (Rx) pharmaceuticals, nutritional products, and active pharmaceutical ingredients (API). He started his career in 2003 with Innotec in Zeeland, MI before moving to Perrigo as a production engineer in 2010. Nate holds a B.S. in Mechanical Engineering.

Rob Yoder, CFPS, (Past Chair) is Southeast Region Fluid Power Specialist for BDI, Inc. a large industrial Distribution Company based in Cleveland, OH. Rob provides Fluid Power technical solutions to BDI customers, and Fluid Power product sales support to all local branch sales personnel in the southeast region of the U.S. Rob holds a B.S. degree in Agricultural Engineering Technology.

Ex-officio

Hannah Brodhead, Undergraduate Advisor, Biosystems & Agricultural Engineering
Darrell W. Donahue, CQE, Professor and Chair, Biosystems & Agricultural Engineering
Fahmi Dwilaksono, Graduate Student Representative
Ron Hendrick, Dean, College of Agriculture and Natural Resources
Leo Kempel, Dean, College of Engineering
Annaliase Marks, Undergraduate Student Representative
Luke Reese, Industry Liaison, Biosystems & Agricultural Engineering
Larry Walker, CANR Alumni Association
Michael Wozniak, PE, ASABE Michigan Section Representative

Industry Evaluators

Mr. Mitch Baldwin ~ Stryker
Dr. Nirajan Bhusal ~ Kathmandu University, Nepal
Mr. Keith DeBates ~ Perrigo
Mr. Sam Effa ~ Techmark, Inc.
Ms. Sarah Flowers ~ Trident Biometrics
Mr. Todd Forbush ~ Techmark, Inc.
Ms. Megan James ~ Stryker
Ms. Rebecca Jones ~ Trident Biometrics
Mr. Matt McAlpine ~ Blake's Hard Cider Co.
Mr. Jim Molchan ~ Nestlé Nutrition
Mr. Bill Nash ~ Treeborn
Mr. Matthew Rycenga ~ Trident Biometrics
Mr. Luke Stahle ~ Tillamook Creamery
Mr. Chris Walker ~ Cargill

Scholarship Descriptions

Undergraduate Scholarships

F. W. Bakker-Arkema Endowed
F.W. Bakker-Arkema was a professor of Agricultural Engineering at MSU for over 30 years. His scholarship recognizes students that contribute to the cultural and intellectual diversity of Biosystems Engineering through their leadership experiences.

DeBoer Family
The DeBoer Family scholarship is awarded to students that excel academically while demonstrating a passion for Biosystems Engineering.

A.W. Farrall
The Farrall Scholarship, named in honor of A.W. “Doc” Farrall, is the most prestigious undergraduate scholarship awarded by the department. Dr. Farrall chaired the department during its pivotal years from 1945 -1964, which included establishment of the first Agricultural Engineering Ph.D. program in the nation. Farrall Scholars have excelled both academically and professionally, demonstrating leadership within Biosystems Engineering.

Clarence and Thelma Hansen
The Clarence and Thelma Hansen scholarship is awarded to Michigan natives and U.S. students who have demonstrated academic achievement, leadership, and experience working in agriculture.

George E. and Betty L. Merva Endowed
Dr. George Merva was a faculty member in the department for 30 years. This endowment, named in his and his wife’s honor, recognizes upperclassman who have demonstrated leadership and academic success.

John and Julianna Merva Endowed
Dr. George Merva’s father, John, was an immigrant from Slovakia, who, despite of receiving no formal schooling and working full time in ore mines, was able to teach himself three languages. In this spirit the John and Julianna Merva Scholarship is awarded to an undergraduate student who has balanced leadership and academic success while also working to cover their educational expenses.

Howard F. and Esther L. McColly
The Howard F. and Esther L. McColly Scholarship honors Dr. Howard McColly who served on the faculty of the Department of Agricultural Engineering for more than 21 years and his wife, Esther. The scholarship is awarded to students who have demonstrated academic achievement, leadership, and service to the profession.

Michigan ASABE Section Scholarship
One award for a freshman and one for a sophomore student registered as an Agricultural Engineering or Biological Systems Engineering student at a University or College. The student must be a registered as a Pre-Professional member of the American Society of Agricultural and Biological Engineers, ASABE.

Scholarship Descriptions

Freshman Scholarships

Robert J. Gustafson
The Gustafson scholarship is awarded to students with a high academic ability and/or financial need with a first preference for incoming freshman students.

Alfred & Mary Murray
The Murray scholarship is awarded to students with a high academic ability and/or financial need with a first preference for incoming freshman students.

Graduate Scholarships

Outstanding BE Research Fellowship & Fitch H. Beach Award
Presented to one of the top PhD students in the BE graduate program who has excelled in research productivity and who's work suggests a high-level of direct impact on society. Awardee presents at the college level against similar nominees in other College of Engineering disciplines. Funding is based on placement in the competition at the college level and is funded by the College of Engineering and the BAE Endowment for Graduate Studies.

Most Outstanding BE Graduate Student Fellowship
Presented to top students in the Biosystems Engineering (BE) graduate program to recognize their breadth of excellence and direct and indirect contributions to the Biosystems and Ag. Engineering (BAE) Department through professional productivity, service to the department and university, and contributions to the extended community. Funded by the BAE Endowment for Graduate Studies established and funded by past and current BAE faculty and other donors wishing to support graduate education.

Galen & Ann Brown
To support graduate students working in the domain of engineering related or applied to the fruit and/or vegetable industries; a field to which Dr. Galen Brown dedicated his career to provide many improvements and advancements. Funded by the family of Galen and Ann Brown and others who respected and/or worked with Galen.

Katherine and Merle Esmay
To support international graduate students with a clear passion and plan to return to their home country to implement their knowledge gained through their MSU BAE degree. Funded by the family of Merle and Catherine Esmay and others who have the passion, as did Merle, to make a difference around the globe.

2020-2021 Scholarship Recipients

Undergraduate Awards

F.W. Bakker-Arkema Endowed Scholarship
Yassah Bah-Deh
Alec Christy
Nyilah Congress
Kasey Nelson

DeBoer Family Scholarship/Fellowship Fund
Julie Celini
Taryn Hanses
Miriam Kaburu
Annaliese Marks
Narindra Randriamiarintsoa
Rachel Shapin

A.W. Farrall Scholarship
Alicia Ziegler

Clarence & Thelma Hansen Scholarship
Aaron Newberry
Alex Seybold
Chris Wentworth

Howard & Esther McColly Scholarship
Megan Curtin
Emma Dester
Erica Peer

George E. and Betty L. Merva Endowed Scholarship
Sydney Burtovoy

John & Julianna Merva Undergraduate Excellence Fund
Ian Chesla

Michigan Section ASABE Scholarship
Alicia Ziegler
Alex Seybold

Graduate Awards

Outstanding BE Graduate Student Fellowship
Kaitlyn Casulli

Outstanding BE Research Fellowship & Fitch H. Beach Award
Juan Sebastian Hernandez Suarez

Galen & Ann Brown Scholarship
Oznur Caliskan-Aydogan
Carly Gomez

Katherine & Merle L. Esmay Fellowship
Yousef Abdalaal

2019-2020 Freshman Awards

Robert J. Gustafson Scholarship
Christina Berels
Grant Gmitter

Alfred and Mary Murray Scholarship
Ryan Bartlett
Jeswin David
Grace Dempsey
Andrew Kearney
Emma Savage
Anthony Schulte
Blake Smerigan
Jacob Willsea