FIRST-CLASS FEMALE FACULTY: BBE BOASTS SOME OF THE BEST

by DEBBIE KUEHN

Even with the best plan, you don’t always know where life is going to take you—and that can end up being a very good thing.

The female faculty in the Department of Bioproducts and Biosystems Engineering (BBE) each took different paths to get to their positions today as esteemed instructors in the department. And while there were a few unexpected detours through the traditionally male-dominated field of engineering, each woman’s path was marked by great successes in their respective fields and by their vision and depth of experience.

VARIED BACKGROUNDS

Born in Germany, Dr. Ulrike Tschirner obtained her B.S. in Chemistry, M.S. in Organic Chemistry and Ph.D. in Lignin Chemistry from the University Karlsruhe. In 1985 she took a post-doc position in Syracuse, NY, where she worked on developing an environmentally friendly hydrogen peroxide bleaching process and where she also met her husband, BBE Department Head Shri Ramaswamy. In 1986, she accepted a position in the Philadelphia research center of Scott Paper Company. After Scott Paper was sold to Kimberly Clark, Tschirner and Ramaswamy headed to the University of Minnesota in 1995 to take two open positions—her in chemistry, him in engineering. She has been in her BBE position for the last 21 years, “Even in the same office!” she says.

A native of North Dakota and BBE alum, Adjunct Instructor Sonia Maassel Jacobsen graduated with her B.S. in Agricultural Engineering with High Distinction (1978) and in less than four years. She attended the University of Illinois at Urbana-Champaign on a full fellowship, receiving her M.S. in Civil Engineering (1980). She became a hydraulic engineer for the USDA’s Natural Resources Conservation Service, a position she held for 36 years. Shortly after she “retired” from that position, and at the request of BBE Department Head Ramaswamy, she joined the adjunct faculty as course coordinator for the senior capstone design course in Bioproducts and Biosystems Engineering.

Adjunct Associate Professor Cindy McComas received her B.S. (1978) and M.S. (1980) in Environmental Science at Texas Christian University. While the broader environmental science field was her passion, she was also interested in the rigorous and more in-depth field of engineering so got her second M.S. in Civil Engineering, a duo of degrees she says served her well in her career. Her first job was as a
FIRST-CLASS FEMALE FACULTY continued from page 1

project manager for the Gas Research Institute. She then served as the director of the Minnesota Technical Assistance Program (MnTAP) at the University of Minnesota for 25 years. In 2005, she joined BBE’s adjunct faculty team-teaching courses on Pollution Prevention and Renewable Energy and the Environment.

COMMON BONDS

While they took different routes to get here, all three women share a love of and obvious talent for teaching—both Tschirner and McComas were winners of the student-vote based “Professor of the Year” award. Tschirner has always been interested in chemistry (“I literally decided that in fifth or sixth grade!”) but says, “I hadn’t really planned on teaching, always heading more toward research. However, I found I really enjoyed it. I never took a teaching class so being able to do a good job with that has been one of my biggest accomplishments. I love teaching! It is a lot of fun,” she says.

The opportunity to teach also came about somewhat unexpectedly for McComas when she was invited to teach BBE’s Pollution Prevention course with Sangwon Suh in 2005. “The nice thing about it was that I was able to take my practitioner experience from MnTAP and teach it to students so they could take those approaches into their own jobs in the environmental field,” McComas says. For many years, the course included the opportunity for students to gain real-world experience solving problems for companies. “We recruited companies to allow students to come in and assess parts of their plant. Students brought real data to the company and in some cases the companies implemented students’ recommendations. That was very rewarding.”

Jacobsen has also been instrumental in helping students get real-world experience through the capstone design class she has been leading for four years. “This is a unique class where students are expected to apply everything they have learned in seven semesters to one real-world project,” she says. Co-taught with Jonathan Chaplin, the course gives students 15 weeks to work in a team with a faculty advisor on their project then present it at the end of the class to an industry advisory council that rates them. “It is a really good experience for students and the humanitarian projects are the most popular. Students have designed a water distribution system for a Somalian village, a hydroponics operation coupled with a fishpond for a community in Ghana, and many other such projects,” she says.

ACHIEVEMENTS IN THEIR FIELD

While teaching has been the tie that binds, Tschirner, McComas and Jacobsen have many other achievements on their lengthy CVs. One

WORDS OF WISDOM

I got all three degrees from one place. Think about spreading your wings more and getting some broader experience, like maybe getting your Ph.D. somewhere else. (U.T.)

Take advantage of internships! Get company experience to have an understanding of what businesses’ priorities are. Maybe consider a minor in business or applied economics. (C.M.)

Always go for lifelong learning. The world is changing so much and you have to be ready to change with it. Open yourself up to new technology and new ways of thinking, as everything soon becomes obsolete. Don’t expect what you learned in college to help you do your job for the next 40 years. (S.M.J.)

If you’re a woman, remember that having an engineering degree can definitely help give you credibility in the field. I knew as a woman running an engineering program, I would need the credibility of an engineering degree. (C.M.)

Be ready to be a pioneer. Make allies and partners in every way possible; for example, joining organizations like ASABE. (S.M.J.)

Go for it! If this is what you are interested in, don’t let anyone tell you, you can’t do it. That was the great thing my father did for me. I was initially only going for a technician job, but he told me, if you are interested in chemistry, you can do it. Just do it properly. (U.T.)
Agricultural University to study precision agriculture, where she
13 percent of the ASABE membership is women. Even in BBE, where
Her career path was re-mapped by attending graduate school at China
electrical engineering, where she was introduced to agricultural
s as a girl in China, Ce Yang helped pull weeds by hand on her
growers. “Florida blueberries are harvested by hand. Harvest labor takes more
Then she realized that using hyperspectral aerial images gathered via
and researchers. In one project, hyperspectral and color imaging
Farmer’s market, it is critical to
limited information. A hyperspectral camera sees beyond human
his father (a husband and three grown children, and all engineers as well)
high cost. “The goal is to select the wavebands that are the most helpful
They needed. She moved her research to CFANS in 2014, in part, she
Someday she’d like to apply that approach to using advanced technologies in the large rice and cotton fields of northeastern China, where
Farmers are adopting data-gathering technologies on their own, and
their data can be used in collaboration with researchers’ work, she
Farmer’s market, it is critical to
find ways in estimating the best harvesting time
farmers. “Some farmers are using GoPro cameras and drones to get a
high cost. The goal is to select the wavebands that are the most helpful
creatures in the pulp process. McComas cites
their need and potential applications are great, she says. “I love being
and researchers. In another, a research assistant in her lab is work-
low-cost solution is the key in populating the advanced technology to farmers.”
and labor deployment for different areas in a large blueberry field,” she says.
BBE Assistant Professor Ce Yang explores new ways to use remote sensing in agriculture and natural resources. Minnesota Agricultural
Experiment Station project #12-089, “Remote Sensing and Novel Sensor Development of Precision Agriculture,” principal investigator Ce Yang.
ANNUAL BBE SHOWCASE

Held on October 27, 2016 in the St. Paul Student Center was the Annual BBE Showcase. This event shares with attendees the accomplishments and research of the department over the past year.

The Scholarship and Fellowship Recognition Luncheon celebrated the students receiving departmental and college level scholarships for their academic and leadership accomplishments over the past year. The luncheon keynote was presented by Jim Bowyer, PhD. Dr. Bowyer is a Professor Emeritus of the Department of Bioproducts and Biosystems, and currently the Director of the Responsible Materials Program for Dovetail Partners, Inc. Dr. Bowyer’s keynote, “Raw Material Issues for the 21st Century”, was based on his recently released book “The Irresponsible Pursuit of Paradise.”

The Showcase also acts as a day of meeting for the department’s Advisory Board and Council. For bios on the newest members of the Advisory Board, see page 6.

The day’s events concluded with record breaking attendance at the networking and research poster session. This portion of the Showcase featured the innovative and advanced solutions based on the research conducted by department students and researchers. Posters covered a broad spectrum of topics including environmental sustainability, water quality, air quality, ecological restoration, renewable energy, biofuels, bioplastics, food safety, precision agriculture, zero energy homes, and much more.
A small red fishing boat pulls away from the shore of Minnesota’s Fleming Lake, towing behind it an unusual haul—a man-made island.

The boat is captained by Steve Hughes, district manager of the Aitkin County Soil and Water Conservation District (SWCD). It travels to the northeast corner of the 300-acre lake, where three anchors are lowered to hold in place the 50-square-foot floating island.

Fifteen other islands will follow—13 the same size, and two larger ones. Resembling Wisconsin and Minnesota’s natural floating peat bogs, the islands will provide a similar function: they will help clean the lake water.

“Fleming Lake is experiencing problems related to excess nutrients,” Hughes says. “It has a noticeable algae bloom starting early July; there’s a green tint to the water.”

A serious odor accompanies the discoloured water, and, as the algae dies, it uses up oxygen in the water, killing fish.

The nutrients, which are often carried in agricultural or stormwater runoff, enter the lake from the surrounding watershed, Hughes explains. “In Aitkin County, phosphorous is abundant in the soil,” he says. “Runoff carries it into the lake… and that’s what we’re trying to solve.”

The floating islands, manufactured by Midwest Floating Island from Minneapolis, are a proven technology when used in smaller bodies of water, such as stormwater ponds.

“This is the first time the islands have been put in such a large area,” Hughes says.

The islands are made of recycled plastic bottles and PET plastic, shredded up and woven together into a seven-inch thick pad. According to the manufacturer, the Fleming Lake project will keep 25,000 bottles out of landfills. Holes are drilled a foot apart through the plastic matrix, with soil inserted into it.

On Aug. 23, official launch day for the Fleming Lake islands, a team of about 40 Bioproducts and Biosystems Engineering students from the University of Minnesota planted 2,000 aquatic plants native to the area in the islands, capping a year-long research project under the direction of UMN Professor Joe Magner.

Hughes says that as the plants grow, their roots will dangle into the water and attract microbes and bacteria that will tie up the excess nutrients so they aren’t floating free in the water.

“The plants growing on the islands will use some of the nutrients and take it out of the water,” Hughes says.

The floating islands project is a partnership between the Aitkin County SWCD and the University of Minnesota’s Department of Bioproducts and Biosystems Engineering. Enbridge’s Ecofootprint Grant Program provided the funding, with a contribution of $101,500.

“This project has a water quality component as well as a research component,” says Cindy Finch, Enbridge’s senior public affairs advisor based in Duluth-Superior.

“It will help clean the lake water for recreational and environmental purposes, and the researchers will track the progress of the plants, monitoring their growth and effectiveness at removing algae.”

Says Hughes: “We hope these islands do exactly what they need to do.”
SPECIAL WELCOME TO NEW CSE DEAN

The Department of Bioproducts and Biosystems Engineering welcomes Samuel B. Mukasa, who became Dean of the University of Minnesota College of Science and Engineering, effective August 31, 2016.

As Dean, Mukasa is Chief Executive Officer and Chief Academic Officer of the College of Science and Engineering, the University’s second-largest college, which spans 12 departments and is ranked among the top engineering and science academic programs in the country. He provides strategic and intellectual leadership and administrative oversight for the school and works to advance its research, teaching, and service.

Mukasa previously served as the Dean of the College of Engineering and Physical Sciences and Eric J. Essene Professor of Geochemistry at the University of New Hampshire. Prior to his role at the University of New Hampshire, he spent 21 years on the faculty at the University of Michigan, where he was chair of the Department of Geological Sciences from 2007 to 2010. As dean at New Hampshire since 2011, he has led the development of a strategic plan for the college, new undergraduate degree programs, and faculty cluster hiring initiatives to enhance interdisciplinary scholarship.

Mukasa holds a Ph.D. in geochemistry from the University of California, Santa Barbara, an M.S. in geology from Ohio State University and a B.S. in geology from UNH. He completed a postdoctoral fellowship at Lamont-Doherty Earth Observatory of Columbia University in New York. He also received a D.Sc. honorary degree from Nkumba University, Entebbe, Uganda, in 2008. He is highly regarded for his research in geochemistry, geochronology and petrology. His work on the origin and evolution of rocks in the Bering Sea and Arctic Ocean regions has helped to shed new light on the evolution of continents and has relevance to issues of climate change. He has served as president of the Geochemical Society and in leadership positions for programs at the National Science Foundation and National Academy of Sciences focused on polar climate issues, among many other scientific and professional leadership roles. He is a Fellow of the American Association for the Advancement of Science and the Geological Society of America.

BBE ADVISORY COUNCIL BOARD UPDATE

In October at the 2016 Annual BBE Showcase, the department’s Advisory Board met. As part of the meeting, reelections and new elects were completed. Welcome to all new members. And a sincere thank you to all board members for your volunteer efforts to make our Department of Bioproducts and Biosystems Engineering the best version of itself. All board members are listed here.

For more information, visit: http://bbe.umn.edu/alumni-friends/advisory-council

BOARD MEMBERS

Chair, Bruce Johnson, Viking Forest Products
Vice-Chair, Walter Eshenaur , SRF Consulting Board Members
Ted Bather, AMEC Foster Wheeler
Anita Hall, General Mills (Retired)*
David Kolsrud, DAK Renewable Energy, and The Funding Farm
H.S. Muralidhara, Cargill (Retired)
Dan Peterson, Toro Company
Jack Stanley, AstenJohnson and LST/PIIMA*
Ben Wallace, Marvin Windows and Doors*

*Denotes new board member  *Denotes reelected board member
Bioreactors are essentially optimized microbial habitats for bacteria that permanently remove excess nutrients from water. In agricultural regions of the state, these nutrients typically come from agricultural fertilizers. When the bacteria are under water in the ground, they use the oxygen off these molecules to breathe and release harmless gases as a result.

Bioproducts and Biosystems Science, Engineering and Management (BBSEM) PhD student Lori Krider’s bioreactor design is novel in that it incorporates a systems approach similar to what might be found out in the field. Not only is she using numerous media (wood chips, charred walnut shells, and a fibrous recycled plastic material called Brotex), she is incorporating soil, plants and gravel. She is also housing her experiment in large temperature control chambers that she built so she can simulate spring time air and water temperatures, when the denitrifying bacteria tend not to work very efficiently. The purpose behind her novel bioreactor design, and specifically design temperature control chambers, is to test combinations of different media known in other application to boost levels of denitrification (conversion of nitrate to nitrogen gas). The idea is that if these media increase the quantity of denitrifying bacteria then the levels of denitrification will be improved even if they are only partially as efficient as they are at warmer temperatures.

Thus far, Krider has completed the setup of the experiment, including setting up indoor testing apparatus (tanks, pumps, water chillers, ACs, plumbing, chambers, flow meters, etc). This phase took over a year for her to complete. She is currently preparing the media for denitrification. In new environments, time and effort are needed to establish a large, healthy population of the bacteria wanted. She plans to start collecting nutrient data early December and run the experiment through February. She has applied for further funding to perform a second run of the experiment with different flow rates for the water through the media. This will tell Krider how fast the water can flow while still treating it, and how slow it can run while still maintaining a healthy population of the right kind of bacteria.

Lori Krider is working closely with her PhD advisor Professor Bruce Wilson, as well as Professor Joe Magner—a committee member for her degree program. Another graduate student, Nadine Hackshaw, from the Civil, Environmental and Geo-Engineering Department has been on Krider’s biofilter project since the spring of 2016 and will be analyzing the microbial community in the reactors. Krider also received MnDRIVE funding to support one BBE undergraduate student, Sam Padelford, since October of 2015. She also has a running list of near 30 more people who have contributed in some way and will be listed in the acknowledgements of Krider’s dissertation.

Krider states: “This project has been an immense learning experience for me. Before starting this project I knew very little about how to build things. There has been a lot of troubleshooting to make every component work in-sync the way I had imagined it in my mind 3 years ago. I have had a lot of support in numerous ways from the department, advisors and colleagues as well as friends and family and I am very grateful for that. I am proud of what has been accomplished and very excited to start getting some data!”
SPOTLIGHT ON FEMALE STUDENTS
UNDERGRADUATE PROFILES

SRIJANA BALASUNDAR

Major: Sustainable Systems Management – Sustainable Products Business Management
Hometown: Kampala, Uganda

Srijana decided on her major because she feels it uniquely combines business, science, and sustainability. Coming into college, she says “I was not sure what area I wanted to go into. SSM gave me a chance to take a wide range of subjects and helped me clarify my interests. With the University of Minnesota being so big and having so many students, it is hard to build relationships and get to know your professors. I really like how welcoming and friendly my professors are. I have found them to be very approachable and willing to help.”

In her studies, Srijana is interested in developing and working with biofuels to generate energy in a sustainable way. Her experiences outside the classroom have helped her prepare for her after graduation plans of attending graduate school for an M.S. in Biotechnology. She has worked in two University labs, and completed two internships. As a first year student, Srijana worked in the Department of Agronomy and Plant Genetics developing a cheaper and more efficient technique of extracting DNA. During her second year, she worked in the BBE department to develop nitrate sensors to detect low levels of nitrogen in the soil. Her internships have both been for DiaSorin, a biotechnology company located in Stillwater, MN. She worked with DiaSorin’s Quality Systems Department and completed a range of activities from participating in audits to training employees on a system called SmartSolve. In her extracurricular time, Srijana keeps busy as the Vice-President of the Habitat for Humanity Campus Chapter and the SSM Major Representative on the CFANS Undergraduate Student Board. She is also a team member of the University’s Bollywood-fusion dance team called DOOM.

CHRISTINA VANG

Hometown: East Side St. Paul, MN

During her freshman year at UMN-Morris, Christina volunteered with the U.S. Fish and Wildlife Service and fell in love with the environment and the work she was doing for Stevens County. She has always been intrigued by nature and enjoys spending her time being outdoors. This led her to transfer to the UMN-Twin Cities campus at the end of fall semester of her sophomore year. Christina first majored in Environmental and Ecological Engineering, but she found herself to be more interested in sustainability and energy efficiency. Once SSM became a major, she switched her major and focused on the Energy Systems specialization. While working on her major, she has also picked up her two minors. Upon graduation this spring, Christina’s goal is to work with a non-profit or a passionate company that wants to help the environment, and provide resources for communities to become more aware, sustainable, and energy efficient. She is interested in helping local communities get educated and change their behaviors for the better to help protect the environment. Christina shares, “Everyday our society is making unsustainable decisions without knowing. I would like to provide resources and help communities understand that they can play a big role in how our future generations live on Earth. I believe there are a lot of resources, technologies, and alternatives that are affordable for communities. I look forward to working with companies in making these options more affordable so more lives can become sustainable and energy efficient.”

LAYNE KORTBEIN

Major: Bioproducts and Biosystems Engineering – Bioproducts Engineering Minor: Sustainability Studies
Hometown: Baraboo, WI

Layne is a senior this year, and chose this major because she wanted to go into a field in which she can create new technologies for change in our energy and environmental industries. She is earning a minor in Sustainability
Studies, and was able to travel to Costa Rica for a winter term class in 2016 to study eco-tourism. Her favorite activity from her trip to Costa Rica was whitewater rafting.

Over the summer, Layne interned at Ever Cat Fuels, LLC researching their bio-diesel process and tested a more efficient process method for possible full-scale production. She has been continuing her research experience this fall semester in the Bioproducts and Biosystems Engineering Department through the Undergraduate Research Opportunities Program (UROP). Her current research focuses on removing phosphorous, nitrogen, and pesticides from agricultural runoff using a modified bioreactor containing natural materials including wood chips and biochar. Layne is excited to see where her final undergraduate semester will take her as she continues to explore full-time career opportunities in the renewable energy and environmental engineering sector.

TAHNI JUNGST

Major: Bioproducts and Biosystems Engineering - Environmental and Ecological Engineering
Minor: Geology
Hometown: Morris, MN

Tahni first came to the University of Minnesota initially thinking she would go into geo-engineering since she had taken a couple of geology courses at the Morris campus during high school, sparking her geo-interests. After visiting the Twin Cities campus and learning more about different majors, she decided a major in Bioproducts and Biosystems Engineering and a minor in Geology would best suit her interests. Throughout her life she has been influenced by her parents who are both environmentally minded having worked for Soil and Water Conservation Districts and the Minnesota Department of Natural Resources. They instilled in her a love for the outdoors and a fascination to learn new things.

Throughout Tahni’s college career she has been fortunate to have opportunities to work, be involved in student groups, and explore areas of interest outside BBE. Tahni has worked for the Minnesota Geological Survey, the Outdoor StreamLab at the University’s St. Anthony Falls Laboratory (SAFL), and in our department as a TA for throughout Tahni’s college career she has been fortunate to have opportunities to work, be involved in student groups, and explore areas of interest outside BBE. Tahni has worked for the Minnesota Geological Survey, the Outdoor StreamLab at the University’s St. Anthony Falls Laboratory (SAFL), and in our department as a TA for Professor Sands and Lenhart’s online water sustainability course—SSM 3301 Global Water Resource Use and Sustainability. Next semester she will be continuing freshwater mussel research with SAFL through a Undergraduate Research Opportunities Program (UROP). Tahni is involved in student groups like the Society of Women Engineers (SWE), and she currently holds a cabinet position as Co-President for the University’s American Society of Agricultural and Biological Engineers (ASABE) student chapter. Tahni shares, “I am grateful to be a part of our BBE community where I have had many wonderful, character building opportunities!”

NEW SCHOLARSHIPS

IN MEMORY THOMPSON SCHOLARSHIP

Anita Hall graduated in 1978 with her bachelor’s degree in Agricultural Engineering, during a time when female students were often not encouraged to enter engineering or accepted in the profession. She was one of only a few female engineering students at the entire university. Fortunately, Anita had the support of Dr. David R. Thompson, a faculty member in BBE from 1970 to 1985. Dr. Thompson had an unwavering support for individuals in pursuit of making the world a better place. He made Anita feel like she belonged and could succeed as an engineering student and professional.

To honor Dr. Thompson’s instrumental role in her success, Anita has established the Dr. David R. Thompson Scholarship. This scholarship will carry on Dr. Thompson’s legacy of championing individuals who are using engineering for the common good.

“Thank you...for this wonderful gesture of a scholarship endowment; education and the pursuit of knowledge in betterment of society were absolutely pillars of Dad’s life. I can think of no greater tribute to him than to endow a scholarship ensuring and encouraging students to continue that endeavor.”

—Darin Thompson, Son of Dr. David R. Thompson

PONNAMMA KURIAN AND H.S. MURALIDHARA SCHOLARSHIP

This fall, a new scholarship was established by H.S. Muralidhara (Cargill, retired) to support the undergraduate studies of students in the Department of Bioproducts and Biosystems Engineering. Drs. Ponnamma Kurian and H.S. Muralidhara, both originally from modest middle class families in South India, had the good fortune of receiving scholarships for their own educations in India, as well as during their pursuit of their doctoral degrees in the United States. Dr. Ponnamma was even the recipient of a Fulbright Travel Grant to support her studies. Dr. H.S. Muralidhara established this scholarship in the memory of his late wife Dr. Ponnamma Kurian to ensure that her memory, and her dedication to the pursuit of education remains.
NEW MAKERSPACE FOR STUDENTS
DEPARTMENT OPENS FIRST MAKERSPACE ON THE ST. PAUL CAMPUS

By EMMA VOLBRECHT

The Biosystems and Agricultural Engineering building is adjacent to the Engineering and Fisheries Laboratory, built in 1911. Throughout the beginning of the 1900s this was the classroom for teaching woodworking, welding and farm mechanics and the testing of clay tile drainage pipe. As the century progressed, the space morphed into a shop for agricultural researchers to build equipment needed for field research. No longer was it a space for student learning.

Through initiatives led by David Schmidt, Research Engineer and Instructor, and Peter Marchetto, Assistant Professor, the Department of Bioproducts and Biosystems Engineering has renovated nearly 4,300 square feet of the Engineering and Fisheries Laboratory to create the BBE Makerspace. The original idea behind the BBE Makerspace came from a nationwide understanding of the importance of experiential learning. Now, the student experience is highly theoretical and computational, and students are spending less time creating and tinkering to build physical products. “We had the space here in BBE and we recognized the need for students to have the hands-on work. Whether it’s cooking, or creating, or artwork, all of that is creative. As educators we need to do a better job connecting the brain with the hands,” says David Schmidt.

A makerspace is a place to create, discover, invent, explore, design, and learn. It combines tools and manufacturing equipment, community, and education. A makerspace allows members of a community to collaborate, prototype, and create manufactured works that would not be possible with resources available to individuals working alone. It allows creativity to flourish and ideas to be tested, and our BBE Makerspace is no exception!

Currently, the BBE Makerspace houses a ShopBot, laser cutter, 3-D printer, table saw, drill press, and a basic set of hand tools. The space is scheduled to open January 15, 2017 for BBE students.

BBE is looking for partners to improve both the quality, quantity and diversity of tools in the space which will allow for greater creativity and experimentation. The department is also seeking partners to ensure that the space is managed safely and that the cost of supplies (e.g. screws, wood, plastic, electronic components, plastic panels, 3-D printer filament) does not keep students from designing, innovating, creating, discovering and learning.

If you or your organization are interested in learning more about the makerspace, or would like to partner with the BBE Makerspace, contact Shri Ramaswamy, BBE Department Head, at shri@umn.edu, or call 612-624-8797.

For more information on the Makerspace, visit bbe.umn.edu/makerspace.
ALUMNI SPOTLIGHT

MAGGIE NELSON

Class of ‘15
Project Engineer, Cargill

Upon graduating from BBE in spring of 2015, that August alumna Maggie Nelson moved to Fort Dodge, Iowa to work for Cargill Starches and Sweeteners as a Production Management Engineer. The Cargill, Fort Dodge facility is a corn wet mill that produces dextrose, ethanol, and cattle feed. She was excited about this career offer because Cargill’s Technical Development Program (TDP) introduced her to other first-year engineers and Cargill leadership. The on-boarding process included travel to other Cargill facilities, participation in conversations around troubleshooting and best practices, leadership development, and networking.

After one year with Cargill, she graduated from the TDP program and became a Project Engineer. Her day-to-day work involves identifying, developing, and implementing data-driven solutions to increase safety, reliability, quality, and reduce operating costs. Maggie finds it rewarding to apply what she learned in school—and continues to learn on the job—because each project is a new puzzle. The projects she has most enjoyed involved increased safety through engineering controls, and implementing solutions to make systems function better.

The foundational BBE classes pertaining to Maggie’s career are fluids, and heat and mass transfer. A conceptual understanding of unit operations—saccharification, fermentation, distillation—is also important. That said, Maggie shares that “The most important thing BBE taught me, I learned outside of the classroom: Be able to work effectively in a team, and motivate others toward a common goal. Identify how you best learn new things, and know what personally motivates you.”

Maggie continued, “I chose BBE as a major because I loved the program’s culture, and I choose to work for Cargill for the same reason. I enjoyed collaborating with my classmates, as I do now with my coworkers. My degree taught me how science, engineering, and math can be used to develop sustainable solutions for our future. I now work for a company that is committed to nourishing the world’s growing population while protecting the planet. That’s exciting!”

To prospective students, Maggie shares to, “Get involved, ask questions, pursue your passion relentlessly. Learn how to learn independently and through others. Use the time you have at the University to explore—be Driven to Discover. If you’re learning, you’re growing. Don’t stop.”

NOTE FROM THE DEPARTMENT HEAD

Dear Colleagues, Alums, Friends and Stakeholders,

Greetings! On behalf of the faculty, staff and students of the Department of Bioproducts and Biosystems Engineering, I would like to wish you and your family the very best and a happy, healthy, prosperous New Year.

As many of you learned during the fall meeting, we are making progress on many fronts. One of them being a new Makerspace. The space provides opportunities for students to make things, do hands-on projects, learn from the experience, and be better prepared for their future careers.

As you will note in the newsletter, this edition is focused on our outstanding female faculty, instructors, students and alumni. We now have almost 50% female undergraduate students, one of the highest in the STEM fields on campus. They are highly qualified, motivated, strong achievers and leaders. Please read more about their interesting stories in this issue.

We are in the process of hiring two new faculty members in the areas of sustainable animal agricultural systems, and big data analytics in agriculture - both of them supported by the AGREET initiative. We will keep you posted.

We appreciate your continued support of our students and programs. Student scholarships, fellowships, facilities, and infrastructure continue to be our top priorities.

Again, best wishes for the New Year. I hope to see you in the near future on campus. Please, feel free to give us a call or send an email (shri@umn.edu).

Sincerely,
Shri Ramaswamy
Professor and Head
In order to help make higher education affordable for highly qualified and dedicated students, BBE relies on the generous support of alumni, friends, and industry partners. If you are interested in donating, visit our website and click on the Give to BBE tab.

[www.bbe.umn.edu/giving](http://www.bbe.umn.edu/giving)

**INSIDE:**

New BBE Student Makerspace opens with goals of providing experiential learning opportunities! See article, on page 10.