FROM STENO PADS TO IPADS
INCORPORATING TECHNOLOGY TO ENHANCE LEARNING

Article and Photos by ERIN OMBERG

The days of steno pads are fading while the days of iPads are here. So much of our culture today has gone digital—shopping, banking, announcements and invitations, employment. Education follows suit. Technology, devices and avenues are varied; the education advantages are great. Faculty are brainstorming, exploring, implementing and evolving along with the digital world. The Department of Bioproducts and Biosystems Engineering at the University of Minnesota understands that technology generates excitement, and elevates learning among students, while faculty significantly improve teaching, on and off campus.

ONLINE OPPORTUNITIES

A prime example of an online course is BBE 2201, the department’s most popular course, with approximately 1,200 students annually enrolled. This class, titled Renewable Energy and the Environment, is co-taught by David Schmidt and Rob Gardner, and is offered every fall, spring and summer semester.

To accomplish the online-only format, lectures are pre-recorded and uploaded for student viewing on Moodle, the University of Minnesota’s preferred learning management system (LMS). Assignments, quizzes, tests, exams, and group work are all digital. BBE 2201 instructor David Schmidt shared that, “Since the class is offered exclusively online, it interests Post-Secondary Enrollment Options [PSEO] students taking college credits while still attending high school. Similarly, the class is popular with those working or living abroad over the summer break.”

In the mid-2000s the class started out as a traditional classroom course. Due to its popularity on campus, it morphed into an online-only option. The online class that students know today began summer of 2011 with 25 trailblazing students enrolled. The initial plan was to start slowly and small, then grow. By fall of 2014, enrollment in the class reached the maximum cap of 400 students. The in-person classroom option dissolved due to the well-received and accommodating online option.

Schmidt affirms that the online class grants students ample learning opportunities. He shares, “[BBE 2201] is flexible for the students, and they have great interaction with our team of instructors. I feel that I
can teach better, and students can learn more in an online learning setting.” Schmidt and Gardner lead six others that help with the implementation of the course. Due to the great enrollment, the class of 400+ students is broken into small, assigned groups. Students taking the course generally are unaware that they are in a class so large, since their work-group is kept to a couple of dozen at most.

At the conclusion of each semester, students of the Renewable Energy and the Environment class are asked for their feedback. Consistently the percentage hovers around 87% saying the online-only class is as good as or better than a traditional classroom setting. Enrollment numbers, student testimonials, and survey feedback add to the affirmation that online learning is on the rise, and BBE is succeeding in online pedagogy and learning.

**LIKEABLE ONLINE TOOLS**
Faculty and Students Share Favorites

“Social media is an important part of how I track and share new scientific publications. Scientists are less likely to track individual journals these days, and instead we track topics and each other. I use Twitter frequently and have a select but engaged network who retweet my papers and keep the conversation up-to-the-minute.”

—Jonathan Schilling, BBE Associate Professor, @shroominn

“Google Apps have proved to be an essential tool at the U for completing group assignments. It is a simple and fast way to share documents, spreadsheets, and presentation slides with several individuals at once in real-time. I’ve also used the Google App Suite for compiling analytical data for lab-based research. I can’t imagine being without it!”

—Kiya Deuel, BBE Sophomore Studying Food Engineering

“Moodle is a handy tool students and faculty use to share class assignments, grades, and more through a private website. I enjoy using Moodle because it’s practical and I have all the class resources and documents at my fingertips organized in one location like a digital folder.”

—Aaron Waldrep, BBE Junior Studying Bioproducts Engineering

To quote some of the survey testimonials, here is what students have said about their online learning experiences from BBE 2201:

“All instructors were great at being present and easy to contact even though the class was online. I thought this was awesome.”

“In comparison to other online courses I have taken, the layout and use of Moodle is very easy to follow, making the course easy to navigate on your own.”

“I didn’t think that I would like taking a class online, but it wound up being about the same as any other class, except with the added benefit of being able to go through the lecture whenever time permitted, as well as being able to rewind the lecture if I missed something.”

**FLIPPED CLASSROOM MODEL**

A “flipped class” is the popular name for a variety of pedagogies that invert or “flip” the traditional roles of the class lecture and homework time outside class. Rather than lecture, classroom time is used for active learning opportunities such as discussion, problem sets, peer instruction, etc., while time out of class is utilized for readings or viewing recorded lectures.

Dr. Kevin Janni’s course BBE 4023W, titled Process Control and Instrumentation, is a required writing intensive undergraduate engineering course which follows the flipped classroom model. Eighty-one narrated PowerPoint videos have been recorded and produced to present lecture and lab materials and writing instruction online. Items are to be viewed in preparation, prior to the scheduled class period.

With three years of implementing a flipped classroom model under his belt, Janni recently presented his experiences to the American Society of Agricultural and Biological Engineers (ASABE) at the organization’s 2015 Annual International Meeting in New Orleans, Louisiana, in a paper titled, “Experience using active learning to flip a required writing-intensive process control and instrumentation course.” In his report, Janni shares that the class activities have been a great way to engage students in the class content and were superior to passively listening to a lecture in-person. “I believe in active-learning because I believe that most students learn more by doing rather than listening. Students benefit by being active in class as they work on the material. They learn as they work together, teach each other and ask questions.”

When asked about the obstacles of a flipped classroom, Janni states that his self-produced videos need to be updated as needed as course content is revised and expanded. Additionally, initial development of the videos and the class activities take more time and effort than traditional preparation for lecture presentations, but Janni’s conviction to the benefits of a flipped classroom model keeps him motivated.

**CAMPUS-WIDE AND BEYOND**

Beyond the department, incorporating technology in the classroom is a campus-wide venture at the University of Minnesota. Several years ago UMN became the first major research university to tap Google for its ever-evolving suite of applications—email, calendaring, file sharing, video chat, and more. Then in 2010, UMN took the leap to become one of the first universities anywhere to offer the entire suite of apps to faculty and staff—not just students.

In support of centralizing and maximizing the utilization of Google productivity apps is Bernard Gulacheck, the Associate VP for UMN’s Office of Institute Technology. Gulacheck shared, “We’ve standardized
our collaboration tools, and in higher ed that’s no small feat. Now the University is able to avoid the effort associated with the never-ending upgrade cycle. We removed ourselves from that pattern by adopting Google Apps. And in the process, we’ve saved millions of dollars.”

In addition to OIT’s support of online educational tools, last year, Provost Karen Hanson created UMN’s Center for Educational Innovation (CEI). Provost Hanson and CEI’s shared goal is to strengthen instructional and academic technology collaboration and support across the University. CEI came to be from the merging of two previously established units: the Center for Teaching and Learning, and the Office of eLearning. CEI provides expertise that supports curricular and pedagogical innovation in campus classrooms and for online courses and programs, including the online-only and flipped classroom courses BBE provides to students.

Technology is all about the next big thing. The days of the dualistic bout between Windows and Mac are over. Now, we’re flooded with the onset of operating systems, apps, clouds and hubs. Along with the University of Minnesota, the Department of Bioproducts and Biosystems Engineering is always evaluating courses and class components which may benefit from going digital. In addition to the aforementioned BBE courses, additional faculty have enhanced their courses by utilizing technology enhanced learning approaches.

• In the summer of 2013, Professor Hill offered the U of M Sustainability of Food Systems class as a MOOC (Massively Open Online Course) via Coursera.org, an online educational technology company. This was a resounding success with over 18,000 students, enrolled from 138 countries. Jason Hill continues to offer BBE 3201 Sustainability of Food Systems as an online only class.

• Professor Ulrike Tschirner’s upper-division Pulp and Paper Technology class (BBE 4305/5305) has been offered as an online only class for more than 15 years and is geared towards current students and industry professionals.

• Professors Gary Sands and Chris Lenhart’s class, Global Water Resource Use and Sustainability (SSM 3301), will also be exclusively online, and first offering planned for Spring 2016.

Several other BBE faculty are also working on implementing technology enhanced learning tools such as prerecorded lectures and digital discussion forums. In a department that welcomes technological advances to benefit research, so too is BBE welcoming technological strides to benefit student learning.

To view this very issue of BioBrief in digital format, visit bbe.umn.edu. BioBrief issue archives are available online as well.

NOTE FROM THE DEPARTMENT HEAD

Dear Colleagues, Alums, Friends and Stakeholders,

I hope your summer is going well and you are enjoying the beautiful weather. Things are well on campus; we completed another successful academic year. We had a total of 63 students graduate from our programs - one of the largest graduating classes we’ve had yet. Congratulations and best wishes to all the graduates.

I am enthused to announce that the UMN Board of Regents approved the name of our BS degree in Bioproducts Marketing and Management (BPMM) to be changed to Sustainable Systems Management (SSM). This name change takes effect September 2015. In addition to the degree’s title change, the span of the program has been broadened and made more comprehensive. For more information and additional details regarding this exciting change, the article on page 9 of this newsletter issue will share more. My gratitude goes to all of our faculty, staff, students, Advisory Council members, and stakeholders for their collaborative effort and support in making this change a reality for our department.

As part of the Minnesota Discovery, Research and Innovation Economy (MnDRIVE) initiative in Robotics, Sensing and Manufacturing, we obtained approval for a new faculty position with a focus and applications in the area of environmental management and sustainable agriculture. I am pleased to announce that Dr. Pete Marchetto from Cornell University will be joining our faculty in January. Be sure to look for a new faculty Q&A article from Pete in the Winter 2016 issue of BioBrief.

Three of our faculty – Drs. Brett Barney, Jason Hill and Bo Hu – were awarded tenure and promotions to Associate Professor. Additionally, Dr. Tim Smith was promoted to full Professor. Congratulations to all four of them for their outstanding achievements.

To announce, our Annual BBE Showcase, that consists of the fall Advisory Council meeting, scholarship recognition luncheon and poster networking session, is slated for Thursday, October 8. Scheduled to give the keynote address is Raj V. Rajan, PhD, PE. Dr. Rajan is the Research, Development and Engineering Vice President and Global Sustainability Technical Leader for Ecolab out of Eagan, Minnesota. In his current role, Dr. Rajan helps drive top-line growth for Ecolab and its customers by embedding sustainability thought leadership into the innovation process, environmental metrics in internal operations and sector-level standardization of sustainability metrics. Please plan to attend, meet our students, and learn more about all the exciting work being done at BBE.

On the budget front, there are continuing challenges. We are facing another serious budget shortfall this year and working on how to effectively manage the same as we approach the 2015-2016 academic year. Your continuing kindness and support has been of immense value to our students and to our programs. Thanks to your support, we provided more scholarships to 70 students last year. Please, consider making a contribution. Visit our web site at www.bbe.umn.edu/giving to learn more about how you can help and make a difference.

I hope you have an enjoyable rest of the summer and year. Please contact us or drop by; we would love to hear from you. Hope to see you on campus this fall for our BBE Showcase, if not sooner.

Sincerely,

Shri Ramaswamy
Professor and Department Head
2015 BBE CAPSTONE DESIGN PROJECTS

DOUBLE THE SENIORS, DOUBLE THE CAPSTONES

On May 6, an unprecedented number of BBE seniors presented their Capstone Design Projects to classmates, and department and industry evaluators. The class nearly doubled in size from last year’s five teams of twenty-three students, to ten teams comprised of forty students this year. Capstone design projects require students to create comprehensive engineering designs for processes, systems or product solutions.

Capstone instructor, Adjunct Instructor Sonia Maassel Jacobsen shared, “Jonathan [Chaplin, co-instructor] and I both feel the quality of students was quite high this year. They were interested and worked hard. It is easier to teach and advise when the students are interested and willing to explore solutions.”

This year’s sampling of projects spanned across a broad spectrum including aquaponics, wood and odor processing systems, applied renewable energy systems, environmental protection, and distillation of whiskey. Students began with a design proposal and worked through the phases of design and evaluation to a final written report and oral presentation. Twelve BBE faculty were involved in advising teams. Projects were largely proposed by outside entities seeking real solutions.

Should you be interested in suggesting design project ideas for students to pursue and attending next year’s Capstone design presentations, as next spring approaches, please email us at bbe@umn.edu, and watch the BBE website for the announcement of the date.

Concluding the Capstone event, Professor Chuck Clanton officiated the Order of the Engineer ceremony—a tradition in which engineers recite an oath to abide by a code of ethics.

CAPSTONE DESIGN TEAMS

**11 WELLS DISTILLERY OPTIMIZATION**
Stephanie Nizzi, Simone Richardson, Yuchuan Chris Wang, Ke Iris Xu

**ADAGYA AQUAPONICS**
Chad Nelson, Hannah Rollin, Madison Rogers, Malcolm Squire

**ROWBOT**
Thomas J. Ebert, Kyle Notto, Bryan Wendt

**CABLE BAY CAMPGROUND STORM WATER MANAGEMENT**
Dylan Blaskey, Justin Fasching, Emily Mickelson, Grace Polverari, Colin Smith

**LAKE VERMILLION CAMPGROUND WATER TREATMENT AND REUSE SYSTEMS**
Rachel Brown, Michael Kramer, Elizabeth Lien, Tori Mack

**MINIMIZING SOLVENT ODORS FROM SMALL DRYERS**
Matt Dulas, Mary Haglund, Sarah Hamilton, Jason Paschke

**REPURPOSING OCC FIBER AT ANDERSEN CORPORATION**
Nathan Lemke, Maggie Nelson, Carla Pulles, Yosub Sim

**SMALL-SCALE ANAEROBIC DIGESTION IN URUGUAY**
Cody Anderson, Amélie Béland, Kristina Coster, Jackie Fleming

**SUSTAINABLE DAIRY COW COOLING SYSTEM**
Trent Brandon, Christina Gleich, Janniena Robles, Kaitlyn Spencer

**WILLOW RESERVE WETLAND RESTORATION**
Sarah Kuhn, Kalene Mulliner, Joe Pohnan, Mariah Weitzenkamp
BIOPRODUCTS AND BIOSYSTEMS CLASS OF 2015

CONGRATULATIONS, GRADUATES!

The Department of Bioproducts and Biosystems Engineering is proud to present our graduating class of 2014-2015.

UNDERGRADUATE DEGREES

College of Food, Agricultural and Natural Resource Sciences

Bioproducts Marketing and Management

David Bauer  Ajaj Chamoun  Jean Noriel  Hidalgo Cruz  Lucas Erickson  Tyler Kitzerow

Bioproducts Marketing and Management

Michael Lehman  Nicholas Marnach  Frank Peeters  Joseph Rumppe  Claire Sauer  Peter Schneider  Casey Simmons  Darren Smith  Alaina Trowbridge  Cavan Waag

Corporate Environmental Management (ESPM)

William Bowman  Quentin Bunnell  Eleanor Harris  Ho Ting Sunny Leung  Alyssa Johnson

Corporate Environmental Management (ESPM)

Jaclynn Klimek  Stephen Labuz  Oscar Maldonado  Michael Pauley  Joseph Ram  MacKenzie Styrlund  Amy Whooley  Qier Xue  Farra Iman  Zainol  Chen Zhang

College of Science and Engineering

Bioproducts and Biosystems Engineering


MS AND PH.D. GRADUATES

Bioproducts and Biosystems Science, Engineering, and Management (BBSEM)

Sibo Cheng, MS  Anna Harmon, MS  Paula Kalinosky, MS  Eric Hanninen, MS  Shannon Pinc, MS  Lloyd Rivera, MS  Tantririge S.U. Ruberu, MS  Yun-Yan Wang, PhD

On May 15th, BBE students gathered in the halls of Mariucci Arena, and awaited the processional into their commencement ceremony.
**FACULTY SPOTLIGHT**

**TRAVEL BRINGS FACULTY TO NATIONAL AND INTERNATIONAL COLLABORATIONS**

Two faculty members took to other regions over their spring semester leave. One traveled to our nation’s capital, the other to a nation on the equator. Read on for more about their research and travel experiences.

**LARRY JACOBSON, PHD  BBE PROFESSOR AND EXTENSION ENGINEER – LIVESTOCK HOUSING SYSTEMS**

With his two Black Labradors, Lily and Ian, Dr. Larry Jacobson explored the Blue Ridge Parkway’s mountain range in southern Virginia while on sabbatical in the region.

**Over the spring semester, you traveled to conduct research. Where did you go?**

I was located at the USDA-National Institute of Food & Agriculture (NIFA) headquarters in the Waterfront Building in downtown Washington D.C. from January 15 to May 15.

**What was the purpose of your research?**

I had two goals during my semester leave. The first was to build capacity and network for the NIFA funded Animal Agriculture-Climate Change (AACC) National Extension Project (co-PI for the Midwest Region). Secondly, to provide an “engineering” perspective on NIFA programs and activities dealing with animal agriculture, especially livestock housing, manure management, and energy use.

**Why did you choose Washington D.C.?**

I went to Washington D.C. because that is where NIFA is located. Also, many of the federal agencies, NGOs, and commodity groups that I wanted to contact to build capacity and network with staff are located in the D.C. area.

**When did you become particularly interested in this area of research?**

My interest in animal agriculture, climate change, and related environmental topics including water and air quality, manure management, and energy use began 40 years ago when I joined the faculty in the department.

**How is your research benefitting our community?**

Hopefully, our AACC project, and my extension programs in these areas, will be beneficial to the animal agricultural community and other key stakeholders including consumers of meat and milk products. Awareness of the environmental impact of a pound of pork, beef, and milk are metrics that are being applied to consumers so they can assess the energy and carbon inputs into their food so they can make informed decisions.

**What excited you the most during your time at NIFA?**

I was pleased to see a number of agencies, NGOs, and industry groups have climate change impacts on their radar screen and are, often times without much fanfare, implementing activities to deal with lowering energy use and other “green” inputs. Additionally, I was surprised to see how few engineering perspectives existed at the NIFA national program level and helped prepare a position description for a new “agricultural engineering” national program leader in the area of manure management and water and air quality from production agriculture.

**How will your research with NIFA apply to UMN?**

Since I have a majority (75%) extension appointment, I will be using the information I learned during my semester leave to further the goals of our NIFA-funded Animal Agriculture-Climate Change (AACC) project in the Midwestern U.S. and also to our Minnesota animal production industry (swine, turkey, chicken, dairy, and beef).

**Is there a way for BioBrief readers to learn more of your work with NIFA?**

Some of my activities while at NIFA were mentioned or reported on the NIFA website, nifa.usda.gov.
Over your semester leave, where did you travel?
I was in Indonesia for January and February, the first two months of my semester leave. Indonesia is a large archipelago, with thousands of islands and hundreds of languages. Some of the more well-known islands include Java, Bali, Sumatra, Borneo, and New Guinea.

What kind of work were you involved with in Indonesia? Who did you collaborate with?
I was in Indonesia to develop the groundwork for a new study-abroad course, tentatively entitled “Bali, Indonesia: Environment and Culture in Paradise”. My central partner is with faculty and the International Programs Office at Gadjah Mada University (UGM), in Jogyakarta, Indonesia, on the island of Java. UGM is sort of like the Berkeley of Indonesia: the largest (and oldest) public university in Indonesia, with programs all over the world. I am also partnering with three other universities: two more on Java [including the University of Indonesia, photographed above], and one in Aceh, Sumatra. I am also partnering with two non-profit institutions, including the Foundation for Preservation of the Sumatran Orangutan.

Why did you want to develop a new study-abroad course in Indonesia, specifically?
I have extensive experience in Indonesia, dating back to the mid-80s, when I worked there for several years. My work was in higher education, so I have quite a few academic colleagues there. I have returned to Indonesia several times over the years to teach short-courses. Because of my experience and connections, and the beauty and rich culture of Indonesia, I thought it would be the perfect destination for a study-abroad course. That, and the fact that to date there are no UMN study-abroad courses to Indonesia.

How will this new course benefit students? What sets it apart from other study-abroad programs?
UMN highly encourages students to pursue an international experience during their tenure at the U. A study-abroad course in Indonesia will give students an opportunity to deepen their understanding of other cultures and explore connections between the environment and culture. In doing so, students will become more self-aware of their own connections with the environment, and gain a broader appreciation of how we all are connected on this planet. The 3-week course should begin being offered in January of 2017 and will explore various environments and environmental issues in Indonesia, from rainforests to the beaches, from village scale to plantations, from water to solid waste, to natural disasters—think volcanoes and tsunamis.

What are the most fascinating things you learned while on leave?
Traveling to this part of the world always involves discovery and excitement. I was able to spend two days with the world’s leading expert on the “Subak” irrigation system on Bali, and learn about these intriguing water management systems that integrate physical, spiritual, and cultural elements of the communities of rice farmers. I visited the Green School in Bali, which provides a “sustainability based” K-12 education curriculum. Their students come from 80 countries and they learn hands-on skills in addition to the basics. The Green School is close to being off-the-grid, by generating all of its own power (through solar and water derived energy) and growing all their own food. I also learned some trivia about the capital, Jakarta (population of 10 million): the population fluctuates by several million every day, with the influx of business commuters.

Did you miss anything from home, here in the Twin Cities?
Well, I was in a tropical country during January and February, and so I didn’t miss winter. Starting January 2017, students will have the same opportunity to dodge winter weather.
NEW LAB EQUIPMENT
LIBERTY PAPER AND BBE’S PARTNERSHIP

By ERIC PRINGLE, LDI Communications Specialist
Photos by MARIA FERNANDA LAGUARDA MALLO, BBE Graduate Student

For the past several years, Liberty Diversified International (LDI) and Liberty Paper, Inc. (LPI) have cultivated close relationships with the Department of Bioproducts and Biosystems Engineering. From providing scholarships to current students to hiring graduates for positions at their mill, LPI is supporting the next generation of pulp and paper industry professionals.

Recently, LDI/LPI made a donation of more than $150,000 to support the department’s purchase of new lab equipment – further enhancing students’ educational experiences. Department Head and BBE Professor Shri Ramaswamy said this donation allowed the department to upgrade critical paper manufacturing related equipment like a drying machine, paper making devices, evaporator and an anaerobic digester that allows students to process waste material and better understand the conversion process.

“LDI Chairman and CEO Mike Fiterman is a very engaged leader in the community,” says Ramaswamy. “Throughout the last few years we’ve had a chance to discuss with Mike and [LPI General Manager] Larry Newell about our need for more modern equipment to enrich our students’ learning – and we are very grateful to receive this gift!”

In addition to providing current Bioproducts and Biosystems Engineering students with richer experiences, Ramaswamy noted that the purchase of new equipment will also serve as a tool to help the University of Minnesota recruit top students into the program. Given the interest in – and importance of – the pulp and paper and other bio-based industry, Ramaswamy said he hopes to one day establish a Liberty Paper Lab at the university.

“This lab would allow us to incorporate additional equipment and help us expand our capabilities,” he said. “We are very much interested in continuing this partnership and creating this lab to provide even greater hands-on experiential learning opportunities for our students.”

Above: BBE Department Head Shri Ramaswamy discusses with Mike Fiterman, and Larry Newell the the thin film evaporator (donated by LDI/LPI), while BBE Junior Scientist Leonard Reynolds inspects.

Right: Mike Fiterman, and Larry Newell were presented with a certificate from the University of Minnesota’s Regents Society for their outstanding generosity to the Department of Bioproducts and Biosystems Engineering, pictured here (center) with BBE students (L to R) Mary Haglund, Yosub Sim, Nathan Korlesky, Christina Gleich, Nathan Lemke.
The Department of Bioproducts and Biosystems Engineering at the University of Minnesota is pleased to announce the unveiling of a new interdisciplinary major, effective fall 2015.

At the May meeting of the University of Minnesota’s Board of Regents, the name of the BS degree in Bioproducts Marketing and Management (BPMM) was approved for change to Sustainable Systems Management (SSM). In addition to the degree title change, the scope of the program has been broadened and made more comprehensive. Sustainable Systems Management aims to provide the education and background necessary for students to pursue a comprehensive systems approach to advancing solutions for processes and products, commercial and industrial businesses, buildings, and energy systems that promote sustainability. Sustainable products include conventional and emerging forest and bio-based products. The areas of specializations (sub-plans) were changed from Marketing and Management, and Residential Building Science and Technology to Sustainable Products Business Management, and Building Science and Technology, respectively. The new major will also expand in that two further specializations were created: Corporate Sustainable Systems, and Energy Systems.

These revisions to the major respond to scientific and technological advances, meet business and industry needs and student interests, and align with the University’s Land Grant mission of developing the vocational, civic, and intellectual capacities of communities across the United States.

Sustainable Systems Management Major Coordinator and Professor Bob Seavey shares that, “The new curriculum is the result of over two years of discussion and planning with faculty, employers and current students. Careers, opportunities and businesses are changing as we move into the 21st century. Curriculum needs to keep pace with these developments and prepare graduates with the skills, tools, and mindset to be able to address these challenges and flourish in this environment.”

Department Head Shri Ramaswamy adds, “I would like to thank those involved in the SSM proposal and planning processes including Profs. Hill, Seavey, McComas, Huelman, Espinoza, and Smith, for all of their hard work over the past two-plus years. This has been a terrific collaborative effort.”

For more information about the Sustainable Systems Management major and its four sub-plans, please visit ssm.umn.edu.
DEPARTMENT OF ENERGY’S RACE TO ZERO STUDENT DESIGN COMPETITION OPTI-MN BRINGS HOME THE W-I-N

Congratulations to Team Opti-MN, 2015 Grand Award winners of the US Department of Energy’s Race to Zero - Student Design Competition. Team Opti-MN, a multi-disciplinary team, was comprised of fourteen students from four different UMN colleges. A team majority of nine current BBE students participated on Team Opti-MN.

GOALS
The team set strict performance goals that met fortified home standards, achieves high indoor air quality, is zero energy ready, and fosters water stewardship. Through integrative design, the home’s estimated total monthly energy bill will be $93 a month, or $10 a month if built with a small solar panel system on the roof.

Team Opti-MN’s design goals were centered on meeting the following:
1. The DOE’s challenge to build a zero energy ready home
2. Urban Homework’s mission to produce equitable, dignified communities
3. Green Homes North Initiative to revitalize North Minneapolis neighborhoods with affordable, sustainable, and quality homes

HOME DESIGN
The Opti-MN home design is compact with careful space planning to ensure that no space goes unused. The first floor has an open floor plan with arched walkways to define each room while simultaneously making the spaces feel larger. Operable clerestory windows bring in additional daylighting and natural ventilation. The team also created unique sectional qualities and increased the square footage of the southern roof so additional solar panels could be installed.

The Opti-MN design uses durable and robust building systems that use a hybrid 2x4 wall with exterior insulation, high-performance windows, exterior foundation insulation, and airtight construction. The home’s heating and cooling system incorporates a high-performance integrated space/water heating system with an inverter heat pump for cooling/dehumidification, energy recovery ventilator, and high-efficiency filter – all delivered through a compact, small duct distribution system. For outstanding indoor air quality, the design focused on pollution avoidance, source-point exhaust, continuous ventilation, and consistent distribution of fresh and filtered air to all habitable rooms. The Opti-MN design specifically grouped water fixtures in close proximity to each other, and utilized an efficient demand recirculation loop to reduce hot water waste and wait times.

INDUSTRY PARTNERS
The students of Team OptiMN came together to design a zero energy ready home. They wanted a build site that would be meaningful and have a positive impact on the community, so they chose a vacant lot in North Minneapolis. This area was hit hard by the foreclosure crisis, followed by a series of tornadoes in 2011 that cut through the heart of the neighborhood. Green Homes North, one of team Opti-MN’s industry partners, plans on building one hundred energy efficient homes in this area over a five year span. By the innovation of Team Opti-MN, these homes are meant to increase both market value and community pride. The team made sure their created Impact Home followed Green Homes North guidelines. The team then partnered with Urban Homeworks to design a high performance, affordable, flexible home. Residential Science Resources stepped up to be the team’s energy rater partner.

LEARN MORE
For more information and design details such as the team’s poster, submission packets, and presentation, visit: bbe.umn.edu/2015-race-zero.
IN MEMORIAM

ROBERT BOB W. ERICKSON, PHD
1929 - 2015
ALUMNUS ’59 & ’66, AND PROFESSOR EMERITUS

Bob was an esteemed Professor Emeritus of the Department of Bioproducts and Biosystems Engineering, and up until his decline he was at work daily in the woodshop of BBE’s north building, Kaufert Laboratory. He earned his BS degree (’59) and PhD (’66) at the University of Minnesota in Forestry (forest products), and soon after became a member of the department’s faculty. Bob’s primary interest was wood/moisture relations. His research sought to determine how the processing and in-use performance of solid wood products is affected by the level of initial moisture content and changes thereafter. One of his more recent focuses was commercialization of a restraint system, developed on campus in Kaufert Laboratory, that has proved to greatly reduce warp in the kiln drying of softwood framing lumber. Near the end of his career, he developed and patented the construction of a hollow wood pole, as an alternative to the commercial industry’s solid wood utility pole.

Bob traveled to every continent with the exception of Antarctica (no trees), and was an apt student of language. During the Korean War, Bob served in a United States Air Force Search and Rescue Unit stationed in Okinawa. He was an avid fan of all types of sports; he loved baseball the most, and in the 1950s played for the St. Louis Cardinals’ minor league team. For over 40 years, he bowled in a University of Minnesota league called “The Woodpickers.” Bob was a man of faith, integrity, irrepressible sense of humor, and a lover of animals. He will be forever missed.

DAVID R. THOMPSON, PHD
1944 - 2015
PROFESSOR 1970-1985

David’s professional career focused entirely on education and improving knowledge and understanding in the world. After graduating with BS and MS degrees from Purdue University and a Ph.D. from Michigan State, all in Agricultural Engineering, David joined the faculty at the University of Minnesota in 1970 and rose to earn the rank of Professor.

With a technical expertise in grain and food storage, food processing, and international trade, his work took him around the world. He was the author or co-author of 120 scientific papers and publications. David was an active member of several professional organizations, including the American Society of Agricultural and Biological Engineers (ASABE), the Institute of Food Technologists, and the American Society for Engineering Education. He served in several key leadership roles in ASABE. His awards include the ASABE Young Researcher Award in 1983 and election to the rank of Fellow in ASABE in 1991.

In his hobbies, David enjoyed woodworking, gardening, water and snow skiing, travel, and automobile repair. David enjoyed annual family trips to Table Rock Lake in Branson, Mo. and snow skiing in Colorado. He will be deeply missed by all who knew him.

ACCOLADES AND HONORS

With the award season at a close for the 2014-2015 academic year, BBE is pleased to announce the following faculty and staff recipients of their respected awards. For a complete listing of all award recipients, please see our website. Congratulations, awardees.

Omar Espinoza, PhD
ASSISTANT PROFESSOR
Richard C. Newman Art of Teaching Award

Tracy Fallon
UNDERGRADUATE RECRUITMENT AND OUTREACH
CFANS College Awards: Civil Service/Bargaining Unit (CS/BU) Administrative Staff Award

Larry Jacobson, PhD
PROFESSOR AND EXTENSION ENGINEER
Richard C. Newman Community Impact Award

Bruce Johnson, ’79
BBE ADVISORY COUNCIL CHAIR
CFANS Alumni Society Distinguished Service Award

Cindy McComas
ADJUNCT ASSOCIATE PROFESSOR
BBE Professor of the Year, as voted exclusively by our undergraduate students

Roger Ruan, PhD
PROFESSOR
2015 American Society of Agricultural and Biological Engineers (ASABE) Fellow Award

David Schmidt
RESEARCH ENGINEER AND INSTRUCTOR
CFANS College Awards: Distinguished Academic Staff Award

Ulrike Tschirner, PhD
PROFESSOR
BBE Professor of the Year, as voted exclusively by our undergraduate students

Shri Ramaswamy, PhD
PROFESSOR AND HEAD
American Institute of Chemical Engineers (AICHE) Fellow

Chuck Clanton
PROFESSOR
Britzius Distinguished Engineer Award for Outstanding Lifetime Achievements in the Practice of Engineering

Outstanding Conservationists for Dakota County, Presented by the Minnesota Association of Soil and Water Conservation Districts
In order to keep tuition at a level that enables the department to serve the broadest possible range of 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

SAVE THE DATE!
THURSDAY, OCTOBER 8
ANNUAL BBE SHOWCASE

The day consists of a Scholarship Luncheon, Advisory Council Meeting, and Networking Poster Session. Come meet undergraduate and graduate students, staff and faculty, college representatives, alumni and industry professionals. Watch the BBE website for details.

www.bbe.umn.edu

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