Welcome to the latest issue of ABE@Illinois. Our department continues to lead the field in research, teaching, extension/outreach, and international engagement. You will see that reflected in the articles in this current magazine.

I would like to update you on some of the day-to-day activities going on in our department. Since fall 2014, we have been conducting a strategic planning process, “Vision 2020,” to update our goals, objectives, and action plans for the next five years. We have engaged our faculty, staff, graduate and undergraduate students, and external Advisory Committee members during the SWOT (strengths, weaknesses, opportunities and threats) analysis and the brainstorming retreat. A draft strategic plan is being shared with all the participants for further input. A final version of the plan is expected to be available in fall 2015.

In the fall of 2013, we told you about the future construction of the Integrated Bioprocessing Research Laboratory (IBRL). Well, the future is here, and we have a parking lot filled with construction vehicles and a view of the steel frame of a building that changes daily. Any inconvenience is offset by the excitement we feel as we watch the progress of this truly innovative new facility.

We are pleased to announce the first annual Loren Bode Memorial Scholarship Golf Outing. The outing will be held Monday, August 10, 2015 at the Stone Creek Golf Club in Urbana. Loren was a valued member of our faculty and department head for many years. Please join us as we honor Loren and his many contributions to our department. (Visit our website for more information.)

Finally, we hope you enjoy the new format and design of ABE@Illinois. Our faculty, students, and alumni always strive to bring new levels of excellence to our profession, and we want our magazine to showcase that in the best way possible.

As always, we want to hear from you – you are part of the foundation of our great department!

Best regards,

K.C. Ting

Department Head
The Innovation Immersion Program (IIP) began three years ago at the University of Illinois. It is a student-led business consulting organization that boasts chapters in six different countries with participants from ten different universities.

Michael Stablein, a master’s student in TSM, has been active in IIP as a consultant and project manager. He worked as student director of the program in the fall of 2014, helping oversee the global growth of the program, and he is now a senior manager.

Stablein said the organization provides business enhancement research for clients around the world, but each semester they focus their projects in one region, primarily for logistical purposes. “We do this so that one chapter can be in charge of acquiring all the projects from that region of the world. The clients are sourced by the advisor or the leadership team from the local university. This semester [spring 2015] our coordinator, Erica Buck, works at the Royal Institute of Technology in Sweden. She contracted eight projects to local companies.”

Stablein said teams consist of students from a multitude of disciplines, including liberal arts, engineering, and business. Students are interviewed before joining the organization, and positions progress from consultant to project manager to senior manager. After consultants are trained and project managers are selected, project teams are tailored to the individual talents and attributes of IIP members.

“No one is excluded, and we run the gamut from undergraduates who are new to campus through Ph.D. students,” said Stablein. “Additionally, our international diversity is amazing, and we believe those two things are our greatest strengths.”

For their project research, each team uses the consulting services available at Illinois, and they leverage those same services that are available at their partner universities. The teams meet weekly in person and online for 12 weeks to talk with each other and with their client. Given the international nature of the teams, scheduling those meetings can be a challenge, but they make it work.

Each team gives their client a midpoint presentation, after which they make adjustments and review expectations for the final six weeks of work. At the end of the 12 weeks, they travel to the area for their final presentations. The visit to the participating country or region is a week-long event and can include company tours, team-building activities, and local cultural events.

In January of 2016, the teams traveled to Silicon Valley to make final presentations to their clients. This immersion trip began with an exhilarating ropes course at Synergy Learning Systems Santa Cruz to create new bonds among the international consultants who were meeting in person for the first time.

Highlights of the trip included tours of Accenture Technology Labs, Tesla, Google, and Microsoft. They also visited the Benziger Family Winery, where they toured the vineyards, saw the cellar-cave, and tasted some great red wines in the tasting room.

Since its inception, the organization has been to Israel twice, Singapore and Taiwan, California, and the current teams will travel to Sweden at the end of the spring 2015 semester. There is also a pilot project with Korea, one of the newest chapters, planned for the fall of 2015.

Other ABE students who have participated in IIP include Wanyi Chen, Abhishek Dhole, Joshua Dietrich, Christopher Guida, and Jamison Watson. Stablein said, “It’s also important to note that Farva Jafri, the UIUC executive director, and Howard Liu, executive international director, have been instrumental in the robust growth of the program in the last year. They’ve definitely propelled this organization to new heights.

“I’m proud of what this organization has done,” Stablein concluded, “and I’m proud of what we have to offer. I can only imagine the potential we have if we continue to do what we’ve done for the last three years.”

Since its inception, the organization has been to Israel twice, Singapore and Taiwan, California, and the current teams traveled to Sweden at the end of the spring 2015 semester.
“Retirement,” said Marvin Paulsen, “is doing what you want, when you want.” And like so many other retired ABE professors, one of the things Paulsen wants is to continue the research he conducted during his long career at the University of Illinois.

The time he spends on that research is limited now, interspersed with time with the grandchildren, travel, gardening, exercise, and community service, but he is still a familiar face in the Agricultural Engineering Sciences Building, and his continued contributions to the field of grain quality and grain drying, storage, and handling are significant.

Since his retirement in 2006, Paulsen has worked with other ABE faculty on projects for the ADM Institute for Postharvest Loss. He was instrumental in a recent research collaboration between the University of Illinois and three universities in Brazil. There he assisted professors Grace Danao, Richard Gates and Kent Rausch with postharvest losses in a study that measured and documented combine harvest losses of soybeans and corn.

More recently Paulsen and Rausch with Indian cooperators and graduate students completed a small study in India to determine quality changes in wheat stored in hermetically sealed bags, as opposed to the more conventional storage methods of jute bags and small metal bins. Their newest project (still in the making) is with two universities in the state of Bihar, India, and will involve the study of drying, storing, and possibly milling rice affecting losses and quality of lentils, wheat, rice, and maize.
For the last four years Paulsen has given his time as a member of the team that develops the Corn Harvest Quality Report, an effort coordinated by Centrec Consulting Group LLC and published by the US Grains Council. He is a newly selected member of the USDA Federal Grain Inspection Service Advisory Committee, a position appointed by the Secretary of Agriculture, and he works as an associate editor for manuscripts submitted to ASABE for publication in the food process engineering area.

Paulsen came to the University of Illinois in 1975, and much of his work in the area of grain quality was groundbreaking. On one project, Paulsen collaborated with agricultural economist, Lowell Hill, to document changes in the quality of yellow dent corn shipped from New Orleans to Japan.

“There was some controversy in the mid-80s about grading standards and the amounts of breakage and foreign material in corn that was loaded at elevators,” said Paulsen. “Typically corn would leave the states as U.S. No.3 yellow dent corn, meaning it could have up to four percent breakage. In our study, we probe-sampled and analyzed samples of the corn before it left the U.S. on the ship at New Orleans, and finally at Japan.”

Paulsen said a foreign buyer is always going to talk about the broken corn, and this study showed them exactly what happened to grain as it went through normal handling in the marketing channel. “Corn that started at four percent breakage could easily be at seven, eight, or nine percent when it arrived at its destination. Nobody was doing anything wrong,” Paulsen said, “it was just the nature of corn with that level of stress cracks. There is cumulative breakage each time it’s handled. This was a scientific study that showed how much breakage one could reasonably expect out of corn under normal handling conditions. Since price was set before the grain shipped, if it arrived with breakage higher than expected, the buyer wasn’t happy and not inclined to buy more grain. This study showed them how much breakage can be expected and why it occurs.”

Outside his continued involvement with the department, Paulsen’s retirement is an active one. He is a member of the Champaign Lion’s Club, where he has cycled through a variety of offices, including program chair, second and first vice president, president, and Lions zone chair. He and his wife Karen enjoy traveling, ballroom dancing is a favorite pastime for them, exercise is a priority, and gardening is a passion – he tries at least one new crop a year. This year it is cowpeas.

The Paulsens have two children, David and Sarah. David is married and lives in San Diego with his wife and two daughters, ages three and one. Sarah is married and lives in Seattle with her husband and two sons, ages four and one. Needless to say, much of the Paulsens’ travel time involves visits to the west coast.

In a final reflection on his career in ABE, Paulsen said, “I want to acknowledge all the hardworking undergraduate and graduate students I have had the privilege of working with over the years. It is rewarding to think that perhaps some of the things I taught helped them in their careers. I marvel at their progress and their accomplishments.”

“Retirement is doing what you want, when you want.”
Xeros is currently a project manager for Goby LLC, a sustainability consulting firm. Her primary responsibility is managing a team of consultants helping certify building under LEED certification.

“I really enjoy the people I work with at Goby LLC,” said Xeros. “I have the opportunity to make a difference in the built building sector, helping one of the largest sectors of energy users make sustainable and energy efficient choices.”

Xeros is also a co-founder and owner of The Salty Prawn, a sustainable saltwater shrimp urban farm in the city of Chicago. “This has to be one of the hardest and most rewarding jobs that I have ever had,” said Xeros. “I get to bring something new and innovative to the Chicago-land area. I’m lucky enough that I have a network of support, and I get to meet amazing people doing really cool things.”

Xeros said the work is always interesting. “There’s one thing I did learn the hard way,” she said. “Shrimp don’t like to have a sudden change in their environment, and they’re also afraid of total darkness. To save electricity, we had our emergency lights disconnected. The first night after they were disconnected, I left the building and shut the lights off. I heard all this splashing and immediately turned the lights back on. About 4000 shrimp were jumping in the open water in a circular pattern. The next day there was water all over the floor, so I never had them in total darkness again!”

Looking back on her time in ABE, Xeros said she most enjoyed the specialty classes she took in biological engineering. “At the time I probably would have said I enjoyed some extra circular activity, but now I realize how much I enjoyed the environment of collaboration with students and professors. That’s how I made some really close friends.”

David Didier graduated in May of 2011 with a degree in TSM, minoring in crop and soil management. In June of that year, Didier began work as a marketer-in-training with Agrium, Inc., a major supplier of agricultural products and services. He completed the training in September, and was hired as an Agrium wholesale fertilizer sales representative for the Pacific Northwest and Alaska.

“I sell wholesale bulk nitrogen, phosphorous and potassium products by truck or rail,” said Didier. “After growing up in the Midwest, I love seeing agriculture in so many different areas of the country. The diversity of agriculture in the west blows my mind. I’ve seen vegetable growing regions in Arizona, I’ve traveled throughout multiple grape and orchard growing regions, and I’ve even been able to harvest wheat in the Palouse area of eastern Washington.”

Didier said he is an avid hunter and fisherman. “I do a lot of hiking in and around Bend, Oregon. I’ve also been getting into paddle boarding. Anything outdoors, count me in.” Didier is a Big Brother in the Big Brothers Big Sisters program (“an amazing experience”) and he raises money for causes that support service men and women.

Didier said if there was one thing he could change about his time at Illinois, he would take the opportunity to study abroad. “I just wasn’t ready to be that far away from home for an extended period of time. Now I live on the other side of the country and travel often.”

He said he most enjoyed the camaraderie of the other students in the TSM program. “Wherever we were, in class or out, we were a tight knit group, and we always had a blast together.”

When asked what he would tell graduating seniors, Didier said, “Take it all in. Don’t limit yourself to what you are capable of doing. Travel abroad if it scares you. Push outside your comfort zone. Get in with a great group of people and be relentless in pursuing your dreams.”

Jaclyn Burke is a 2013 ABE graduate with a specialization in food and bioprocess engineering. Soon after graduation, she began working in R&D at Kraft Foods as a product developer in Glenview, Ill.

“I focus on core business initiatives such as productivity, brand business, line extensions and renovation within the Enhancers
group, specifically on Mayo and Miracle Whip products,” said Burke. “At the moment, I’m working on improving a current formulation, which requires analyzing ingredient costs, ensuring the flavor profile matches consumer expectations, working with the plant to address any scale-up concerns, making sure the new formula meets Kraft’s quality & micro expectations, as well as working closely with the cross-functional team to commercialize the final product.”

Burke said there are challenges each day, but that’s what she enjoys most about her job. “Recently, I had to execute a 29 prototype design of experiment in the pilot plant. I worked with our statistician to set up the design, our pilot plant technician to review each of the 29 formulas, and then managed the execution of manually filling, capping, sealing, labeling, and packing over 3,500 jars of product. There were lots of small details that needed to fall into place in order to successfully complete the design – which was a very rewarding feeling after it was completed!”

Looking back at her time in ABE, Burke most enjoyed the relationships she formed with other students through classes and the ASABE organization. She could always count on them for homework help, career advice, or unique situations.

On a particularly cold night following an ASABE meeting, she went to the parking lot to retrieve her bicycle, and her bike key broke in the lock. Burke said, “You can always count on the Illini Pullers to save the day. I ran back to their shop and got plenty of help. They grabbed an electric saw, ran an extension cord down the hall, and easily cut off my lock.”

Burke said the hardest part going into a career is having to start back at the beginning. “I spent the last 15-plus years mastering the art of school; it was going to take time to master the art of a full-time career.”

So her advice to new graduates? “Absorb as much as possible during your first six months of work and don’t be afraid to make mistakes – you’re not going to get into too much trouble for those yet!”

Doug Barker
Doug Barker graduated from Illinois in 2012 with a Ph.D. in agricultural and biological engineering. Barker works as a senior robotic systems engineer at Energid Technologies based out of Cambridge, Massachusetts. Currently, he is managing a small team of engineers to create a custom robotic system that will work closely with people. He is responsible for the project logistics and leading hardware and software development.

“I really enjoy the wide variety of research and development projects I’ve been able to work on,” said Barker. “When I first started with the company, my job was to create vision algorithms for a robotic citrus harvester funded by the USDA. We developed a multi-camera system to track oranges on a tree and a pneumatic “frog tongue” mechanism to knock the targeted fruit to the ground.”

From there Barker went on to work on rover simulations for NASA and a robot training platform for the Department of Defense. Later this summer, he will be starting a new project with NASA to create a lightweight robotic arm for flying drones aboard the International Space Station.

Barker worked with fellow graduate students to found the ABE Graduate Student Association in 2011. “Some of my favorite memories in ABE involved events organized with other graduate students. We once put on an elevator pitch competition. Each graduate research group condensed years’ worth of highly technical work into a two-minute pitch. It was awesome to see everyone come together for a little friendly competition.”

Barker said he would advise seniors to remember, “Great opportunities will exist for you in and outside of agricultural engineering if you go after them. You’ve learned how to learn at U of I, and you can learn whatever is needed to land your dream job if you have a little grit.”

Jaclyn Burke (right) at the Eiffel Tower with a friend

Doug Barker
Whether it’s touring the Nuclear Radiation Laboratory or talking with an FBI agent, CHP students benefit from a program that enhances and expands their undergraduate education.
Matthew Niewiara had a unique experience the second semester of his first year at Illinois. "I had the opportunity to hear a man from the FBI talk through the process of becoming an agent," said Niewiara. "We watched a video that agents show their families to let them know what they go through for training, and the agent also talked about cases he had worked on that had been declassified."

Niewiara doesn't plan on joining the FBI any time soon, but he said it was an interesting experience and "pretty cool. Most people don't get to see or hear about the FBI from that perspective."

Niewiara's opportunity came through his involvement in The Campus Honors Program (CHP) on the Illinois Urbana-Champaign campus. CHP offers unique opportunities to "academically gifted and adventurous students" to encourage breadth and excellence from the outset of a student's college career. The program admits approximately 125 freshman each year, and those students can be enrolled in any undergraduate curriculum.

Lucia Dunderman and Grace Kurcab are two other ABE students in CHP. Dunderman was able to tour the Nuclear Radiation Laboratory where students and faculty have been assembling the Hybrid Illinois Device for Research and Applications (HIDRA), a medium-sized fusion device that will be used primarily as a materials test bed for fusion research.

Kurcab took advantage of the CHP agreement with Krannert Center for the Performing Arts. CHP students may attend select dress-rehearsals at Krannert, and Kurcab attended a modern dance performance. "The choreographer talked to us beforehand about each dance and gave us some background," said Kurcab, "so we knew going into it what the dance was about."

CHP sponsors four series of noncredit co-curricular events that offer students the opportunity to learn from disciplines outside their chosen field. Niewiara's and Dunderman's exposure to the FBI and fusion research came from the "Scholar Adventurers" series on faculty research. In addition, there is the series on dress rehearsal visits to Krannert, a "Study Abroad at Home" series of seminar-workshops centering on other cultures, and an "International Tasting Club" lunch series.

CHP coursework offers intensive and specialized versions of general education courses that provide an honors-quality way of satisfying general education requirements. For their first CHP course, all three ABE students enrolled in ABE 199: Water in the Global Environment. The course is taught by Prasanta Kalita, a professor in ABE, and all three students agreed the course was a game-changer for them.

"I loved that class," said Dunderman. "I'm interested in water management on an international scale, and this class really opens your eyes to international water problems. I would say it doesn't matter what your major is or what you're interested in, it's a very important class to take. It educates you on the water problems that we have and how important it is to start conservation efforts."

Niewiara agreed, saying, "It gives you a different perspective on things that are right in front of you. For instance, how many gallons of water do you use in a day? The average is 115 gallons, but most of us guessed less. Things like brushing your teeth, taking a shower, flushing the toilet, or doing laundry – they all add up."

Kalita is assisted in the course by ABE faculty members Paul Davidson and Rabin Bhattarai. Kurcab said the knowledge and enthusiasm of all the professors was inspiring, and Niewiara said the class solidified his interest in the field of soil and water.

"It was a great opportunity to take this class my freshman year," he said. "Most of the time you start off taking intro classes in ABE and you learn a little bit about each specialization. This class gave us an in-depth look at soil and water that you don't usually get until later on in your career."

Although the young scholars are only beginning their sophomore year, all three are taking the opportunity to study abroad: Niewiara travelled to the Dominican Republic over the winter break, and he made another trip to Guatemala with Engineers without Borders during the 2015 spring break. Dunderman traveled to Tanzania over the winter break to work on wildlife conflict. This summer she will go to Stockholm for two weeks and the Arctic for two weeks to work on climate change research. Kurcab will be going abroad for the first time this summer to spend eight weeks in Brazil doing research in soil and water.

The CHP website states that participants in the program must make a special commitment to intellectual life and be ready for a challenge. These young ABE students have already proven themselves capable of all that – and more!
SPOTLIGHT ON...

EMELIE MIES...winner of the J. Kent Mitchell Teaching Excellence Award

J. Kent Mitchell, a professor emeritus in ABE, sponsors this award, given to recognize excellence in teaching by faculty and graduate assistants.

Emelie Mies came to the department in 2001 and began her position as a full-time member of the teaching faculty in 2013. She co-teaches ABE 469 (Industry-Linked Design Project) with Steve Zahos, and TSM 311 (Humanity in the Food Web) with Luis Rodriguez. Both classes are considered advanced composition courses, and Mies does all the writing instruction and grading. TSM 311 has been identified as an exemplary general education course by the Provost's General Education Self Study Committee. Both Mies and Rodriguez were named to the List of Teachers Ranked as Excellent by Their Students for their roles in TSM 311.

“These classes are incredibly different every semester,” said Mies. “That's the blessing and the challenge. It’s never stale. The students come in quite strong, and they’re very ambitious. They know where they’re going, and they’re quite invested. It’s a joy to race through the semester with them.”

MORGAN FUEHNE...winner of the John Deere Foundation Minority Student Scholarship

This is an annual scholarship provided by the John Deere Foundation to recognize and support minority students in the ABE program.

Morgan Fuehne is a senior from Highland, Illinois. She is an agricultural and biological engineering major and has done undergraduate research through the Illini Algae Club. She is a member of ASABE and will be president of Alpha Epsilon in the fall.

Fuehne has studied abroad in the Dominican Republic and Ireland. “Both opportunities resulted in some of the best experiences of my life,” said Fuehne. “My trip to the DR gave me a chance to learn about agricultural problems in developing countries; the semester in Ireland was more about personal growth and a chance to explore another part of the world.”

Upon graduation, Fuehne hopes to work researching renewable energy sources or studying genetically modified crops. “Being part of a small department like ABE gave me easy access to faculty members,” she said, “but it was large enough to provide essential opportunities to becoming a successful engineer.”

NIKOU PISHEVARFESFAHANI...winner of the John Deere Foundation Award

This award is given by the John Deere Foundation to recognize scholarship, leadership and sustained involvement in campus and community activities.

Nikou Pishevaresfahani is a junior from Carol Stream, Illinois. She is an ABE student concentrating in nanotechnology and pre-medicine. Nikou will be an engineering learning assistant for the 2015-2016 school year. She also works as a supplemental instructor for organic chemistry and as a student leader at Carle Foundation Hospital.

The 2015 ABE Spring Awards Banquet was held Sunday, April 12, at the I-Hotel and Conference Center. A complete list of the award winners can be found online at abe.illinois.edu.
Nikou studied abroad in Dublin, Ireland in the spring of 2015. “Life abroad was nothing short of extraordinary,” said Nikou, “and I was immersed in the Irish culture learning new things apart from daily academics. The experience taught me how to be open to new ideas and take advantage of what the world has to offer.”

Nikou aspires to become a “physician of integrity” and said, “The ABE department has opened countless doors for me, and I am extremely grateful to be a part of a program that sincerely cares for a student’s success.”

MARCOUS PHILLIPS...winner of the Steve Eckhoff and Pioneer Hi-Bred International Agricultural Engineering Scholarship

This award is made available through a gift from Pioneer, a DuPont Company, in recognition of Professor Emeritus Steve Eckhoff’s contributions to the corn processing industry.

Marcous Phillips is a senior from Villa Park, Illinois. Phillips is majoring in technical systems management with a focus on renewable energy systems. He is a member of ASABE and has done undergraduate research with two professors in the department.

“Dr. Kalita and Dr. Bhattarai have been very influential in my career,” said Phillips. “They brought me on to be a part of their undergraduate research team, and they always made sure I worked hard to reach my goals.”

Phillips will study abroad this summer with the International Business Immersion Program in Europe, as well as intern with Cargill in the AgHorizons Division to learn production/business. He hopes to work in the renewable energy field upon graduation.

EarthH2Oasis (H20)...winners of the Richard C. and Helen Coddington Design Team Award

This award is made available by an endowed fund established by Professor Emeritus Richard Coddington and his wife Helen to recognize outstanding achievement by an ABE 469 design team.

Christopher Helenowski, Nora Onstad, Savana Savage, and Matthew Stoklosa, members of EarthH2Oasis (H2O), worked with students at the University Primary School to design and build an aquatic play feature. The team surveyed all the children at the school to learn what would best engage them with water.

“Some children wanted very simple things, like buckets with water, and others wanted a full-blown water park with water slides,” said Nora Onstad, senior in ABE. The team worked primarily with 15 children in the 5th grade class, and they designed a pond with an electric pump and two shoots going into the pond.

“It was amazing to work with a non-engineering client,” said Onstad. “The parents were very involved and volunteered their time to help construct the feature.” Construction on the pond was completed at the end of the 2015 spring semester.

Design team winners, left to right, seated: Nora Onstad, Savana Savage, Christopher Helenowski, and Matthew Stoklosa. Left to right standing: Dr. Ali Lewis, Director, University of Illinois Primary School, Richard Coddington, Professor Emeritus, Helen Coddington, Steve Zahos, instructor for ABE 469
Never tell LeRoy Hagenbuch he can’t do something – he considers it a challenge. Hagenbuch’s professional career has been a testament to his ability to find a way to meet a challenge, whatever it might be.

Hagenbuch, ’66 AgE, was named the ABE 2015 Distinguished Alumni and Professor for a Day. Hagenbuch is the co-founder and past president of Philippi-Hagenbuch, Inc., an engineering firm that builds haulage accessories for the construction, aggregates, and mining industries.

It has always been important to Hagenbuch that the products Philippi-Hagenbuch develops show a substantial improvement over whatever is currently available. He cited two products that he considered milestones in the firm’s history and in the industry.

“When we looked at water tanks, everyone’s tanks had rounded corners,” said Hagenbuch. “We didn’t have anything to do rounding with, so we put two bends in. Because water sloshes around, one of the problems with water tanks on trucks is stability of the vehicle. By putting two bends in there was no natural flow for the water.”

Philippi-Hagenbuch also introduced a product that provided a method for monitoring the volume of material loaded into a truck body. The On Board Data Acquisition System (OBDAS) was first used on mining trucks, and the technology was later licensed to companies like Hitachi and Caterpillar.

Hagenbuch’s ability to analyze the company’s capability to produce a product has been instrumental in the success of the business. “I can look at a project and know how we would make it with the equipment we have or other equipment we might need. I might not have it fully figured out, but I know enough to say, yes, we can do that.”

Hagenbuch has had that skill for a good portion of his life and said he probably acquired it from his father, a man with an eighth-grade education. “One year my parents bought an 80-acre piece of ground with a dog-leg ditch through it,” said Hagenbuch. “My father said if we could close up that ditch we could farm right across it.”

It would require a “pretty good-sized tile to do that,” said Hagenbuch, so they began building steel forms to pour concrete to make the...
tile. (They also made a backhoe to dig the trench for the tile.) They poured the forms full of concrete three times a day — at six in the morning, early afternoon, and eight in the evening. “We made 21 foot of tile every time we filled the forms,” he said. “That was 63 feet a day for about 30 days. Most people would think that wasn’t possible, but my father didn’t understand the word ‘no’ either.”

Hagenbuch said that kind of drive is necessary to “live the business 24/7. If a project made any sense at all, I figured out a way to do it. That meant I sometimes woke up at four in the morning and made a sketch, took it to work, someone created a CAD drawing, and it became a product that we could turn around and patent.”

“He also did a fair amount of napkin and placemat sketches,” said Danette Swank, Hagenbuch’s daughter and current president of Philippi-Hagenbuch. Swank joined the firm in 1997 and worked in almost every aspect of the company before taking over as president in 2013.

“Danette has done an excellent job as president,” said Hagenbuch, “which means I can delve into other areas. I don’t anticipate retiring completely. I’m always looking to improve things and make that better product.”

Hagenbuch lives in Peoria, Illinois with his wife Pat. He is credited with over 90 patents, both United States and foreign. He was inducted into the Association of Equipment Manufacturers Hall of Fame in 2008 and the Pit and Quarry Hall of Fame in 2014. Hagenbuch is actively involved in more than half-a-dozen professional societies and continues to contribute to the professional development of the industry through his writing on various industry topics and speaking at national and global conferences and trade shows.

“I don’t anticipate retiring completely. I’m always looking to improve things and make that better product.”
Laura Hahn and AE3 raise the bar for engineering educators

AE3 fosters excellence in teaching and learning in engineering. Hahn leads a staff of four, and each have a unique area of expertise to aid faculty, instructors, and students in improving the quality of undergraduate education.
Laura Hahn is a teacher who helps teachers. Her career at Illinois has influenced hundreds of educators, including many in the Department of Agricultural and Biological Engineering, where she is an adjunct professor.

Hahn has worked closely with faculty in the department, helping revise curriculum and presenting lectures at the Friday I4 seminars. She has also worked with professors Al Hansen and Prasanta Kalita on learning outcomes assessment of co-curricular activities.

“I worked with Al to study what students learned from being in the Illini Pullers,” said Hahn, “and I’ve traveled with him and his students on the study abroad trips to South Africa. We wanted to examine how students learn to communicate with people in a different culture. How do you do engineering in an unfamiliar context? When they get in the workplace, they’re going to be working with people from all kinds of backgrounds, so this is important.”

Hahn also conducted a learning outcomes assessment with Prasanta Kalita after students from the department were winners in a national competition, “People, Prosperity, and the Planet,” sponsored by the Environmental Protection Agency.

Hahn received three degrees at Illinois; a bachelor’s in teaching Spanish, a master’s in teaching English as a second language, and a Ph.D. in educational psychology. After earning her master’s Hahn began work at the Center for Teaching Excellence (CTE), developing courses that would help international teaching assistants improve their English skills.

After earning her Ph.D., Hahn went back to CTE (they later changed their name to the Center for Innovation in Teaching and Learning) and continued working with international students. She also developed an “informal” association with the College of Engineering at that time. “CTE did instructional consulting,” said Hahn, “and I was assigned to engineering. I come from a family of engineers, so the mindset was familiar to me. I loved it.”

Hahn next took a position as the director of the Intensive English Institute, where she worked for three years before she was “persuaded to come over to the College of Engineering.” She is currently the director of the Academy for Excellence in Engineering Education (AE3), and she is excited about the programs AE3 offers to the faculty.

“The Collins Scholars program is the centerpiece of AE3,” said Hahn. “It’s a program for first-year faculty; this year we have about 85 percent participation. We meet weekly to discuss topics related to teaching and research.” Two of ABE’s newest faculty, Maria Chu and Rabin Bhattarai, were members of the program in the 2014-15 academic year.

Hahn said topics include how to motivate your students, how to ask questions effectively in the classroom, and how to use progressive teaching strategies. “We try to help them find ways to engage their students, so we talk about using projects in class, and ‘flipping’ the classroom.” Flipping the classroom takes the traditional model and ‘flips’ it; students listen to lectures at home and come to class to do their homework.

Members in the Collins Scholar program are observed in their classroom by one of the AE3 staff and a senior faculty member from a different department in the college. “That makes it less threatening,” said Hahn. “We have about 20 professors who volunteer to observe. [ABE professors Hansen and Kalita have both observed for the program.] It gives the younger faculty members feedback early in their career so they can make changes early on. And it sends a clear message to the junior faculty that there are people who care and want them to succeed.”

The program also organizes opportunities for small groups of junior faculty to visit the classrooms of professors who are well-known for their teaching skills. There are some social activities offered throughout the year, and at the end of the second semester, participants receive a certificate and are acknowledged at a celebration with the Dean of Engineering. To see other programs offered by AE3, visit their website, http://ae3.engineering.illinois.edu.

Hahn had only good things to say about her involvement with the department. “I’ve really loved being affiliated with Agricultural and Biological Engineering. They’re unique among the departments I’ve worked with. The people are very impressive – and just a lot of fun!”
Can we do it?

Meeting the challenge of food production in the future

Bangladesh farmer excavates rice panicles from a rat’s nest
Photo by Robert S. Zeigler, Director General, International Rice Research Institute, Los Baños, The Philippines. Reprinted from the November/December 2014 issue of Resource, the magazine of the American Society of Agricultural and Biological Engineers, with permission from the publisher.
How will we feed a predicted world population of 9 billion people in the year 2050? That’s the question Tony Grift and Martin Bohn, both professors in the College of ACES, posed to more than 60 of their colleagues around the world.

Grift, an agricultural engineer, and Bohn, a plant geneticist, envisioned a collaborative publication between their respective professional societies, the American Society of Agricultural and Biological Engineering (ASABE) and the Crop Science Society of America. They solicited contributions from scientists, engineers, economists, architects, and journalists. The response was such that ASABE devoted two recent issues of their magazine, Resource, to the topic “Feed the World in 2050.”

Grift and Bohn have been friends and colleagues for more than a decade. They often discuss this topic, and they have somewhat conflicting opinions. Grift, a self-proclaimed realist, asserts that we live in a world hooked on oil with no truly viable plan for an alternative energy source. “Oil is a limited resource,” he said, “and I don’t know if we’ll have the energy to produce the inputs we’ll need to produce that much food. If we don’t decouple food production from oil, then the end of oil will drag us down to widespread poverty and hunger.”

Bohn is more cautiously optimistic, saying, “We might not be able to feed the population of 2050 using the tools of today, but we will make discoveries that pave the way to future food security.”

However, both agree that any solution will have to come from the cooperation of experts across multiple disciplines. “Even if we find a sustainable energy source that doesn’t put Co2 into our atmosphere, we still have a water issue and a nutrient issue,” said Grift. “And, of course, we have to take into account the impact of climate change. It’s not a problem that can be solved easily, and we have to see it from a bigger picture.”

The articles they received confirmed the complexity of the challenge. Contributors wrote eloquently (and often bluntly) on the numerous problems of feeding 9 billion people. Some examples:

“When I Think About Poverty,” by Robert Zeigler, Director General, International Rice Research Institute, The Philippines. Zeigler describes the experience of watching a farmer in Bangladesh ‘excavate’ a rat’s nest to take back rice panicles that the rats have stolen. Zeigler wrote, “Poverty is more than not having money in your pocket – it’s not having food to feed your children, not having enough to provide them a decent education or health care. When we talk about dealing with food shortages, we’re also talking about poverty…Under no circumstance should farmers have to steal back their harvest from rats.”

“A Truly Wicked Problem,” by Otto Doering, Professor and Public Policy Specialist, Department of Agricultural Economics, Purdue University. “Achieving adequate sustainable food production in the future is what I call a truly wicked problem because it is not amenable to the traditional scientific method of problem solving. There is no universal agreement on the definition of the problem, alternative solutions are infused with strongly held values, and there is not even agreement on what a correct goal or solution might look like.”

“Playing Politics with the Future,” by Charles “Merf” Merfield, Head, BHU Future Farming Centre, Biological Husbandry Unit, Canterbury, New Zealand. “The elephant in the room of the “feeding the world” debate, in my humble opinion, is the flip side of food production – that is, food consumption…Increasing our food supply to “feed the world” not only feeds the current population but also increases future populations. The Green Revolution is therefore a double failure: it has failed to achieve its fundamental aim of feeding the world after fifty years of trying, and it has doubled the human population, thus doubling the size of the problem.”

“Sobering Numbers,” by Bruce Dale, University Distinguished professor, Department of Chemical Engineering and Materials Science, Michigan State University. “Take away petroleum-based fuels, abundant electricity, and natural gas for fertilizers, and modern agriculture also disappears…A society built on non-renewable power is simply unsustainable, and it will become increasingly fragile and perilous as the non-renewable sources are depleted.”

All the contributors provided a “useful and intelligent” perspective, said Grift, and they included people such as USDA Deputy Secretary Krysta Harden, World Food Prize laureate Mary-Dell Chilton, and Don Erbach, retired national program leader for the USDA Agricultural Research Service and past president of ASABE. Contributors from the College of ACES included Craig Gundersen (Agricultural and Consumer Economics), Peter Goldsmith (Food and Agribusiness Program), Stephen Long (Institute for Genomic Biology), James Lowe (College of Veterinary Medicine), Gene Robinson (Director, Institute for Genomic Biology) and K.C. Ting, (Head, Department of Agricultural and Biological Engineering).

If Grift sees a positive side to feeding the world in 2050, it is the quality of the people and resources that surround him. “At Illinois we have the College of ACES, the College of Engineering, Beckman Institute, the Institute for Genomic Biology, and a group of really top-notch people to work with. We should be working on the really big problems.”
RESEARCH

Color from Corn

Consumers care about the foods they eat and serve to their families. They want improved nutrition and ingredients that are nutritious, simple and natural, including the colors used in foods. Through a collaboration with Kraft Foods, a multi-disciplinary group of researchers in the College of ACES has been charged with the task of studying the technical and economic feasibility of extracting food colors from one of the most plentiful resources found in the Midwest—corn.

One aspect of the study is to determine what processing techniques will be most effective at recovering color from a variety of corn hybrids. Vijay Singh, of the Department of Agricultural and Biological Engineering (ABE), is an international leader in developing new technologies in corn processing.

“In the U.S., we process close to 6.3 billion bushels of corn each year, out of 14 billion that are produced,” said Singh. “Three major commercial techniques are used to process corn into food, fuel, and industrial products: the first is wet milling, the second is a dry grind ethanol process, and the third is dry milling. My work is to look at these three techniques and see if we can tap into them to extract color pigments from one of the co-products that they’re already producing.”

“We need to determine what will happen to each process if we change to a colored corn instead of using the traditional yellow dent corn,” Singh continued. “Does it change the process? Where does the color go? Will we still get clear white starch, like we do with yellow dent corn?”

ABE graduate students Pavel Somavat and Zhaoqin Wang began the study using the dry grind ethanol process, where the raw corn is finely milled and cooked. The starch is fermented and converted into ethanol, and the three non-fermentable fractions—germ, fiber, and protein—are carried through the process and recovered at the back end as distillers dried grain with solubles, or DDGS, a co-product fed to ruminant animals.

“We ran close to 20 very different colored cultivars through the dry grind ethanol process, and we found two things,” said Singh. “First, we got fairly good ethanol yields from these corn types; second, we found that most of the pigments go in the DDGS.”

Elvira de Meija, a professor of food science and human nutrition, extracts the pigments from the DDGS (and other co-products) to determine the functionality and stability of the color. Singh’s study has a second component. “We are running one type of purple corn through all three corn processes. In the Department of ABE, we have lab techniques that can simulate the three traditional processes very closely. We can process anywhere from 100 grams of corn to a kilogram to 25 kilograms. We are generating co-products from each process, and we will work with Dr. de Meija to do a complete mass balance to study where these color pigments are going in the different co-products.”

Singh said they hope to show that the different corn varieties can be plugged into one of the traditional commercial processes without any negative effects. “What if an ethanol plant can use these colored corns, rather than number 2 yellow dent corn, and still get good ethanol yields? But now they’re also pulling high value color pigments from the DDGS. That would significantly increase the value of that co-product. After they extract the color, they can put whatever residue is left back in the traditional market where DDGS are sold.”

Singh said after evaluating the traditional commercial processes, the next step will be to determine if there is “a better way.”

“For instance, could we design a new system that would efficiently recover the color pigment at the front end of the process and still use the remaining material in one of the existing commercial processes? Our goal,” he concluded, “is to develop the most effective and efficient bioprocess possible.”

Other key faculty involved in the project include Jack Juvik, a crop sciences professor of plant breeding and genetics, and Gary Schnitkey, a professor of agricultural economics. Juvik will study the different corn hybrids to determine whether the yield of a hybrid is comparable to yellow dent corn, and what are the traditional breeding techniques that can be pursued with genetics to improve the yield. Schnitkey will do an economic evaluation of the project to determine the cost of producing and processing the corn, and ultimately, the value of the dye that is produced.

Kraft Foods is providing $1.4 million in funding to the College of ACES for the research project as well as an additional $150,000 for fellowships for the university.

Kraft and the University of Illinois have had a mutually beneficial relationship for many years spanning a number of disciplines. This project is a continuation of what has been a long-standing heritage of innovation and cooperation between Kraft and U of I, which has benefited both organizations.
Vijay Singh, center, works in the lab with graduate students Zhaoqin Wang (left) and Pavel Somavat.
Any ABE or TSM alumni will recognize these iconic pipes! Bring back memories?

We want your feedback about ABE@Illinois. Please send your comments to Leanne Lucas at llucas@illinois.edu.