



Dr. Brent Shanks becomes Mike & Jean Steffenson Chair



Dr. Surya Mallapragada named Anson Marston Distinguished Professor



CBE Hall of Fame welcomes alumnus Dr. W. Mark Saltman



CBE's faculty continues tradition of excellence



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Professor & Reginald
R. Baxter Endowed
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Dear Alumni and Friends,

Welcome to another edition of Active Site, the annual newsletter of Iowa State University's Department of Chemical and Biological Engineering. It has once again been a very busy year. We continue with our mission of producing highly trained and sought after engineers and technical leaders and to pursue highly creative, impactful, and cutting-edge research. Thanks to all of you - our supportive alumni, dedicated faculty and staff, talented students, and friends, for all of your involvement and support. We are delighted to give you another update of the happenings in our department in the following pages. Enjoy.

Students – The department is now the academic home to more than 800 undergraduates studying chemical engineering and over 70 graduate students who are furthering their chemical engineering education at Iowa State. Our undergraduate program now ranks as the sixth largest of its kind in the nation. This past year, we celebrated the graduation of 159 B.S. degrees (an all-time record) along with a combined 14 M.E., M.S. and Ph.D. degrees. The job market remains strong, and our students have been very successful in garnering full time industrial positions and placements in the top graduate programs in the country.

Many of our students are helped by the generous support of our alumni and friends through scholarships and fellowships. In this academic year alone, the department was able to provide nearly \$420,000 in undergraduate scholarships to over 200 students; and fellowships of nearly \$80,000 to our graduate students. Your support helps make the goal of earning a degree in chemical engineering a reality for many of our students. Read more about department statistics in "By The Numbers," p. 4.

Student group involvement continues to be a great source of pride. The local student chapter of the American Institute of Chemical Engineering (AIChE) again organized and hosted the CBE tailgate event (our second) prior to the Iowa State football game against San Jose State on September 24. The students

also held the second annual CBE Showcase event to promote research and education activities and opportunities in the department. Members of our AIChE organization have also been impressive in competitions. In the group's regional AIChE meeting in April (held at the Kansas State University) one of our ChemE Car teams placed second in the event's poster competition, and also in the race, which automatically qualified them to compete for national honors at the AIChE Annual Meeting in San Francisco in mid-November (see photos on pages 15 & 18).

Faculty – We continue to add new faculty, and this year welcomed Dr. Nigel Reuel as a new assistant professor (p.6). He comes to CBE after earning a Ph.D. in chemical engineering from MIT and then working at DuPont in Wilmington, DE.

We are also delighted and honored that alumnus Lanny Robbins was recently named distinguished faculty fellow in the department (p.6). He will begin working with the faculty, staff, and students on January 1, 2017. His role will involve support of both faculty and students as an adviser on faculty advancement and industry engagement, providing expertise in undergraduate teaching labs, preparing students to work in industry and leading seminars and workshops on professional development and leadership.

We have a number of other successes to celebrate with our faculty. Dr. Surya Mallapragada continues to be recognized for her highly regarded work and was recently promoted to Anson Marston Distinguished Professor, which is the highest faculty honor at Iowa State University (p.6). Dr. Brent Shanks has benefitted from the generosity of alums Mike and Jean Steffenson and has been selected as the inaugural Mike and Jean Steffenson Chair (p.5). I myself have had the good fortune of being named Reginald R. Baxter Endowed Department Chair (p.6). "Barney," as Reginald is more commonly known, and Jameson Baxter, continue their valued support of the department with this most generous gift. This endowed position coincides with the start of my second term as department chair, which I have agreed to serve for an additional five-year term.

We congratulate Dr. Ian Schneider for being successfully promoted to associate professor (p.7), which will help him to further pursue his important work in such areas as cellular and molecular mechanisms of metastasis in cancer cells. Several other faculty members have received honors and awards and they are highlighted in these pages.

Research – CBE's research continues to flourish, with nearly \$8 million in externally funded research expenditures for the year. Dr. Wenzhen Li received the prestigious Bailey Research Center Career Development Award from Iowa State University for his investigation of photoelectrochemical conversion of biomass (p.7). Dr. Yue Wu was awarded the 2016 AIChE Nanoscale Science & Engineering Forum (NSEF) Young Investigator Award (p.10). The prestigious honor recognizes outstanding interdisciplinary research in nanoscience and nanotechnology by engineers or scientists in the early stages of their professional careers. It will be officially presented at the AIChE Annual Meeting in San Francisco in mid-November. Dr. Matthew Panthani is one of a select group of researchers who received a grant from the Air Force Office of Scientific Research Young Investigator Program for a project involving novel materials for integrated photonics (p.10). Dr. Rodney Fox received two prestigious awards from the AIChE. Read about these and other projects and awards within.

Alumni – We continue to recognize the many contributions of, and take great pride in, the accomplishments of the department's alumni. In the last year we inducted Dr. W. Mark Saltzman (B.S.'81) of Yale University and former CBE department chair and current acting president of Ball State University Dr. Terry S. King (B.S.'75) into the CBE Hall of Fame (p.11); and as this issue of Active Site goes to press we are preparing to induct Dr. Michael D. Brady (B.S.'65) and Gayle A. Roberts (B.S.'81) into the Hall (p.12).

We were delighted to celebrate one of our alumni, the Honorable Charles Lettow (B.S.'62), for receiving Iowa State University's highest alumni award, the Distinguished Alumni Award (p.13). And as this publication goes to press we are preparing to honor alums Dr. Matthew Kipper (B.S.'00, Ph.D.'04) as a recipient of the Professional Progress in Engineering Award (PPEA) and Dennis Vaughn (B.S.'70), who will receive the Professional Achievement Citation in Engineering (PACE) award.

The CBE Advisory Council continues to be a dynamic and insightful departmental resource. This year we welcomed five new members (p.14), all Iowa State chemical engineering alumni: Tess Duckett (B.S.'02); Jane Newman-Ford (B.S.'91); W. Mark Saltzman (B.S.'81); Jeff Swierczek (B.S.'94); and Meghan Watt (B.S.'02). We also say a big thanks to Terry King (B.S.'75) and Karen Albertson (B.S.'83) for their excellent service to the Council as they finish their terms.

Department – New student and laboratory work spaces have been added to Sweeney Hall (p.15), including a new research laboratory made possible by the generosity of Reginald and Jameson Baxter; important new computerized lab equipment installed; a new multimedia student computation and collaboration center; and a new graduate student office space. I am particularly excited about the opening of a new shared equipment lab, which will be used to support experimental teaching and research activities in the department. As always, we thank alumni and friends of the department for their invaluable assistance and financial support in helping us make these improvements happen.

I hope you enjoy reading this issue of Active Site. I also invite you to stay in touch with the department by viewing our website (www.cbe.iastate.edu), and by following our many activities on Facebook (www.facebook.com/IowaStateCBE) and Twitter (<https://twitter.com/IowaStateCBE>). Please send me any comments or suggestions you have for future issues of Active Site, and if you are ever on campus, please stop in and say hello. I'd be delighted to visit with you. My best wishes to all of you for a happy, healthy and productive 2017. Go Cyclones!

Andrew C. Hillier

Andrew C. Hillier
Reginald R. Baxter Endowed Department Chair

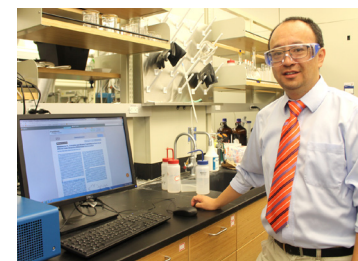
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Inaugural Mike and Jean Steffenson Chair for Professor Brent Shanks
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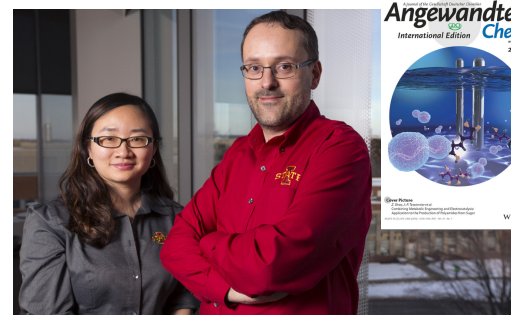
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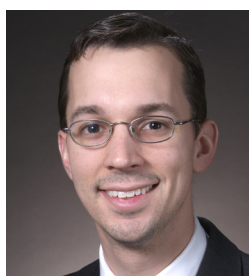
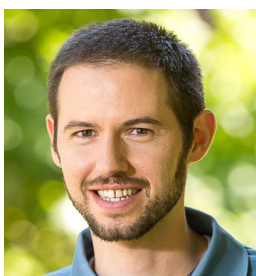
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CBE alum Kaiser to be remembered through new scholarship
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activesite staff

Andrew C. Hillier

Reginald R. Baxter Endowed Department Chair, Department of Chemical and Biological Engineering

John Burnett-Larkins

CBE Communication Specialist

Michelle Stotts
CBE Operations Manager

IOWA STATE UNIVERSITY

Department of Chemical and Biological Engineering

Enrollment (Fall 2016)

- Undergraduate: 807
- Graduate: 73

Scholastic Achievement

- Avg. ACT Score (incoming freshman CBE undergrads, fall 2016): 27.8
- Avg. GRE Scores (graduate) 2015: Verbal 150; Quantitative 162; Analytical 3.2



Facilities

Sweeney Hall/ Biorenewables Research Lab

- 35,000+ sq. ft. research space
- 9,000+ sq. ft. teaching space
- 3,976 sq. ft. computer labs
- 150 student computer work stations
- 9,000 sq ft. office space
- 1,000 sq. ft. conference space



Degrees Awarded (2016 Academic Year, Summer 2015-Spring 2016)

- B.S. 159
- M.S. & M.E. 7
- Ph.D. 7



by the numbers

Department Faculty

- 3 Distinguished Professors
- 2 University Professors
- 5 Professors
- 6 Associate Professors
- 6 Assistant Professors
- 2 Adjunct Professors
- 4 Lecturers
- 8 Courtesy Professors
- 5 Recent Emeritus Professors

Endowed Positions

- 4 Endowed Chair Holders
- 3 Endowed Professorships
- 3 Faculty Fellowships

Research

- Direct Research Expenditures: \$7.9M (FY 2015)

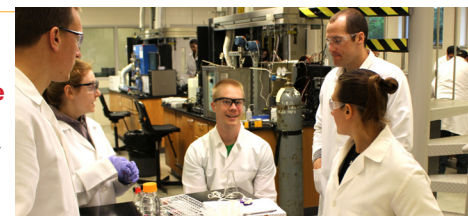
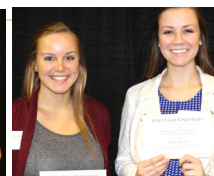
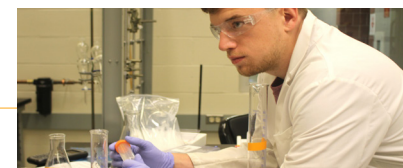
Scholarships & Fellowships

- Undergraduate scholarships awarded in 2016-17 totaling \$419,000, impacting 203 students
- 10 graduate fellowships totaling \$71,000

Rankings

(Iowa State University Chemical Engineering, U.S. News & World Report, Best College Rankings, 2015-16)

- **Undergraduate:** 20th overall, 15th nationally
- **Graduate:** 31st overall, 22nd for public universities



Department Vision: To be internationally recognized as the Chemical and Biological Engineering department that best exemplifies the dual commitment to outstanding research and excellence in student education.

Department Mission: To provide a high-quality education in chemical and biological engineering at the undergraduate and graduate levels that prepares graduates for productive careers in engineering and related fields, and for life as educated, effective citizens and leaders. Discover and disseminate new knowledge in science and engineering through creative activity in research and scholarship. Provide service to the state, nation, and world by advancing the profession of chemical engineering.

Dr. Brent Shanks is named CBE's first Mike and Jean Steffenson Chair

Dr. Brent Shanks of the Department of Chemical and Biological Engineering was named the inaugural Mike & Jean Steffenson Chair in December, 2015. Shanks, who is also Anson Marston Distinguished Professor and Director of the NSF Engineering Research Center for Biorenewable Chemicals (CBiRC), was joined in a medallion ceremony by donors Mike and Jean Steffenson, Iowa State University Senior Vice President and Provost Jonathan A. Wickert, James L. and Katherine S. Melsa Dean of the College of Engineering Sarah Rajala, representatives of the department, family members and other guests.



Dr. Brent Shanks (right) is joined by his wife, CBE Manley Hoppe Professor Jacqueline Shanks (left) and donors Mike and Jean Steffenson, whose generosity allowed the elevation of Shanks' title from Steffenson Professor to Steffenson Chair.

department and the university," remarked Provost Wickert. "He is an esteemed researcher with an international reputation in biorenewables," he said, pointing to Shanks' leadership of CBiRC, the research contributions it has made, the jobs it has created, and the opportunities it has opened for Iowa State. "And as an ISU graduate, he truly understands the values of this institution." Wickert went on to say, "The blend of professional experience he brought to the fore in leading CBiRC has been a perfect fit for management and teaching. The impact he has made through CBiRC is transformative – and it shows our university's faculty members that they can aim high." Prior to being named the director of CBiRC and coming to Iowa State, Shanks worked for the Shell Chemical Company.

Brent's wife, Dr. Jacqueline Shanks, is the Manley Hoppe Professor in the Department of Chemical and Biological Engineering, a position named for Jean Steffenson's father. She and Brent met while undergraduates in the department in the early 1980s. "Our decision to return to Iowa State (after working in the Houston, TX area) had a lot to do with this

Shanks had previously been named Mike and Jean Steffenson Professor; and through further generosity from the Steffensons, that position has now been elevated to chair. "We were honored to have been able to establish the professorship for Brent," said Mike Steffenson, but in citing Shanks' numerous honors and accomplishments since that time, said, "We decided he had outgrown that position!"

"It is appropriate to pause and reflect on Dr. Shanks' contributions to the de-

partment – how seriously it took the responsibility of teaching its students and giving them what they need to succeed in the world of chemical engineering and in clean energy," Brent said.

"The Steffensons' generosity really resonates with me," he continued, "because their spirit is what we believe shows the truly caring image of Iowa State." Shanks pointed out

that the support that comes with the Steffenson chair position will allow him to further conduct research, and in turn will also allow him to work with students.



The Department of Chemical and Biological Engineering also recognized the Steffensons in honor of their continued generosity and support. Dr. Andy Hiller presented a plaque in their honor.

Mike Steffenson graduated with a B.S. from Iowa State in chemical engineering in 1959; Jean received a B.S. in zoology from ISU in 1960. Mike joined Par Instrument Co. in Moline, IL in 1962 and has served as its chairman, president and CEO since 1974, a position that had been held by Jean's father, Manley Hoppe, prior to that.

Jean has served on the Iowa State University Research Park Board of Directors and Mike's on-campus involvement has included service on the Department of Chemical and Biological Engineering Advisory Council and the Iowa State University Research Foundation board. He has been recognized with awards that include the Alumni Association's Alumni Medal, the College of Engineering's PACE Award, the Marston Medal, and he was inducted into the Department of Chemical and Biological Engineering Hall of Fame in 2013.

Their support also extends directly to CBE students, through the Mike and Jean Steffenson Scholarship, the A. Douglas and Helen Steffenson Scholarship and the Lois and Manley Hoppe Scholarship. They were also instrumental in funding the Mike and Jean Steffenson Student Services Center located in Sweeney Hall. Mike and Jean are members of the Cyclone Club, the Order of the Knoll, and life members of the Iowa State University Alumni Association. They have also served as Iowa State University Foundation Governors.

Dr. Surya Mallapragada is named Anson Marston Distinguished Professor

Dr. Surya Mallapragada has been awarded the title of Distinguished Professor, effective August 15, 2016.

Mallapragada, who is also the Carol Vohs Johnson Chair ("Carol's Chair") in Chemical and Biological Engineering, joined Iowa State's CBE faculty in 1996. She served as program director of the Chemistry & Biomolecular Materials Program at Ames Laboratory from 2004-2008 and served as chair of the CBE department from 2009-13.

Her research interests include smart polymers for gene delivery; polymers for vaccine delivery; bioinspired nanocomposites; nanoparticles for co-localization of multiple enzymes; and a special focus on neural tissue engineering and control of stem cell differentiation, which has applications in pancreatic cancer and nanomedicines for treating brain injuries.



Dr. Mallapragada is recognized by Iowa State University President Steven Leath (left) and Senior Vice President and Provost Jonathan Wickert at the 2016 University Awards Ceremony.

Alumnus Lanny Robbins to join CBE as faculty member

Lanny Robbins, an alumnus and member of the National Academy of Engineering, has joined the Department of Chemical and Biological Engineering as distinguished faculty fellow. He will begin in the position January 1, 2017. "Iowa State is proud and excited to welcome Lanny Robbins to campus," said President Steven Leath. "Lanny is not only one of the world's most accomplished engineers, but also an alumnus who has consistently lent his expertise back to our academic programs."



Lanny Robbins

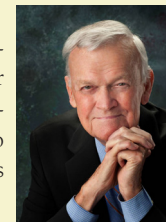
Robbins, who retired as a research fellow with Dow Chemical Co. in 2003, is an expert in fundamental engineering research and pilot plant process development, particularly separation and purification processes that reduce harmful emissions from industrial towers and remove impurities from commercial wastewater. His work has resulted in more than 200 Dow technical reports and outside publications, 18 U.S. patents, and a 2011 book, "Distillation Control, Optimization, and Tuning."

Robbins' duties at Iowa State will include advising the department on faculty advancement and industry engagement; providing expertise in undergraduate teaching labs; preparing students to work in industry; and leading seminars and workshops on professional development and leadership.

Hillier is named Reginald R. Baxter Endowed Chair

Dr. Andrew Hillier has been named Reginald R. Baxter Endowed Department Chair of the Department of Chemical and Biological Engineering.

Reginald "Barney" Baxter and his wife Jamie have been strong supporters of the department for many years and the endowed chair is just the most recent example of their generosity. Endowed professors are seen as a key component in achieving academic excellence at Iowa State for its students, their futures and the state's economy. In addition to the distinctive and prestigious title for the beneficiary, an endowed professorship brings ongoing financial support that can be used to advance scholarly work.



Reginald R. Baxter



The student computer lab in Sweeney Hall made possible by the Baxters' support for CBE.

Baxter obtained an M.S. in chemical engineering from Iowa State in 1949 and enjoyed a career in industry and entrepreneurship. He holds fond memories of his time in the department as a student, and of Sweeney Hall: "It holds a warm place in my heart," he said. "Dr. Sweeney was an enduring inspiration to me throughout my career, and I am forever grateful for having studied with him." Reginald and his wife Jamie decided that supporting renovations to Sweeney Hall, specifically a student computer and collaboration lab, was a worthwhile endeavor. The Baxters also supported the recent addition of a new research laboratory space in Sweeney Hall. Iowa State University and the Department of Chemical and Biological Engineering extend their sincere thanks for the continued support and generosity of Reginald and Jameson Baxter.



Dr. Andrew Hillier

Nigel Reuel welcomed to CBE as assistant professor

"I am very excited to teach and conduct research here at Iowa State," said Dr. Nigel Reuel, CBE's newest assistant professor. "From my first visit to campus I was impressed with the caliber and collegiality of the faculty and students. I hope to continue to develop collaborative new projects that span across departments and to train a highly creative work force of the future."

Originally from Rio Rancho, NM, he obtained a B.S. in chemical engineering from Brigham Young University, with undergraduate research projects in MEMS (microelectromechanical system) design, conducted with Sandia National Laboratories; and computation fluid dynamic software for predicting thrombus growth in medical devices. The latter he helped transfer to a company in Salt Lake City, UT upon graduation.



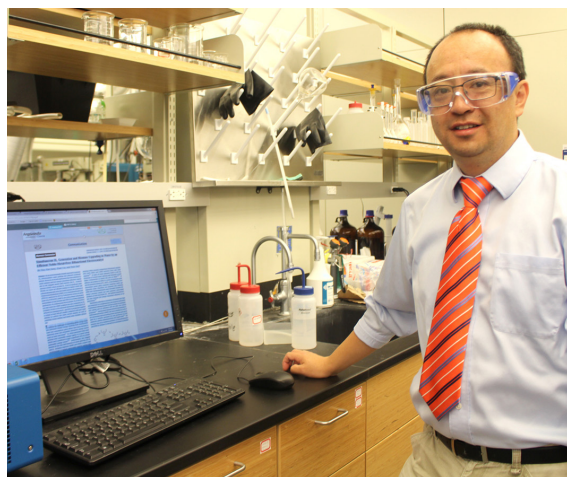
Dr. Nigel Reuel

He obtained his Ph.D. in chemical engineering from MIT, with the Strano Research Group. His research led to new tools for protein quality measurements with direct applications in antibody manufacturing. From 2014 to 2016 he conducted research at DuPont at the interface of materials and biology research. He was drafted to a new position to help identify key external technologies to help DuPont meet its growth objectives.

An eye on Mars: Li's photosynthesis research could take human benefit to new levels

Researchers in Iowa State University's Department of Chemical and Biological Engineering (CBE) are harnessing the potential of photosynthesis – one of the fundamental natural process that exists on Earth – with an eye on someday using photosynthesis to help humans live on Mars.

Richard Seagrave Associate Professor Dr. Wenzhen Li is currently leading a study to develop new electrochemical cells from biomass that can conduct solar-assisted photo electrolysis of biorenewable feedstock.



Dr. Wenzhen Li's innovative research investigates novel electrochemical cells from biomass.

Li's work begins with traditional electrochemical processes in feedstocks (raw materials used for processing or manufacturing), which produces hydrogen fuel and oxygen, but instead uses a solar-assisted technique (photoelectrolysis) that can reduce external electrical energy input and co-produce valuable and efficient chemicals instead of oxygen and hydrogen – a clean fuel, which holds promise as a replacement for gasoline in motor vehicles.

This is done using a dual layer anode. "Our unique dual-layer anode is very efficient because it has integrated a semiconductor to gather photons from sunlight and an efficient electrocatalyst to facilitate needed reactions," Li explained. "We have found that if we combine things the right way, we can greatly increase the efficiency in producing chemicals from biorenewables that we want – desirable chemicals that deliver a 95%+ product yield." He is working with Dr. Matthew Panthani, a solar cell researcher in CBE, to explore novel photoanode materials. Success of this innovative project will advance the fundamental understanding of photoelectrolysis mechanisms, and create a foundation to develop and transfer new technology toward combining renewable sunlight, electricity and carbon sources for co-production of chemicals and fuels – and will have practical applications in industry.

But Li is thinking both of applications close to home, and far, far away, perhaps on the surface of Mars. The space agency NASA plans to send people to study, work and live on the "red planet" for extended periods in the future. "NASA's long-term vision is deep



Integrated photoelectromicrobial processes Li's research team is developing could one day be used to support human life on Mars.

space exploration involving humans, on places like Mars," said Li. "Ice has been found underground there, and carbon dioxide accounts for 95% of Mars' atmosphere. So the challenge is to find ways to convert those resources for use in various ways. Our vision is to develop novel technologies for waste mass reclamation, resource utilization and manufacturing needed to enable affordable, sustainable and long-duration human space missions – things such as food, nutrients, polymers and fuels." This "artificial photosynthesis" process that could be applied to development on Mars can also be performed in a photoelectrolysis cell, and this aspect of the research has a strong future. The device can convert CO₂ into biomass, foods, fuels and polymers with a favorable order of magnitude efficiency compared to natural photosynthesis if it is appropriately integrated with synthetic biology technology.

Li's research earns prestigious Bailey Award

Dr. Wenzhen Li is the recipient of Bailey Research Career Development Award funding to support a project in solar-assisted biomass processing.

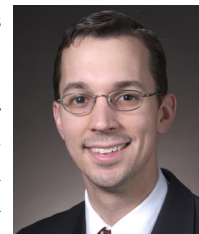
Li is investigating novel electrochemical cells from biomass that are photosensitive and that can conduct solar-assisted photo electrolysis of biorenewable feedstock. His work will advance fundamental understanding of photo electrolysis mechanisms, and create the basis transfer new technologies for directly combining sunlight, electricity, and carbon sources for the production of chemicals and fuels.

The Bailey Research Career Development Award is given annually to senior Iowa State faculty who pursue high-risk, innovative research that represents a new thread of inquiry for the investigator. It is considered one of Iowa State's most prestigious awards. It was established by a gift from Carl A. and Grace B. Bailey. This year's Bailey award was \$50,000 per year, for two or three years of support.

Dr. Ian Schneider promoted to associate professor

Dr. Ian Schneider has been promoted to Associate Professor, with his new title taking effect August 15, 2016.

Schneider joined the CBE faculty at Iowa State as an assistant professor in 2009 after graduating with his B.S. in chemical and biological engineering from Iowa State in 2000, an M.S. from North Carolina State in 2002 and Ph.D. in 2005. In 2005 he became a postdoctoral research associate at the Scripps Research Institute in La Jolla, CA, where he was named a Damon Runyon Cancer Research Foundation fellow.



Dr. Ian Schneider

Dr. Schneider's research interests include cellular and molecular mechanisms of metastasis, with a special emphasis on understanding how cancer cells sense structure in the environment around tumors, and how structure can allow cancer cells to migrate and spread the condition. His research was highlighted in the 2015 *Active Site* newsletter.



Dr. Kaitlin Bratlie (right) received the Early Career Engineering Faculty Award. It was presented by James L. and Katharine S. Melsa Dean Sarah Rajala at the College of Engineering Convocation.



Dr. Laura Jarboe received the 2015 Leadership and Mentoring Award from Iowa NSF EPSCoR, a joint sustainable energy effort by the Iowa Regent universities.



Dr. Monica Lamm was recognized as an Exemplary Peer Mentor Supervisor by Iowa State University's Learning Communities for her help with first-year CBE students.



CBE University Professor Jim Hill was recognized for his years of work with the PRISUM solar car team with a Lifetime Achievement Award from the American Solar Challenge.

Making smart phones a tool for diabetics: CBE's Rollins is working to make it happen



Derrick Rollins discusses how his research project has yielded a graphic cell phone display to help diabetics track their blood sugar levels.

For Iowa State chemical and biological engineering professor Derrick Rollins, a diagnosis of type II diabetes was a life-changing experience – but in one way you might not expect. In addition to the customary lifestyle changes, Rollins has used his personal situation to launch a major research project that he hopes will one day allow diabetes patients to better understand the “hows” and “whys” of their blood glucose levels.

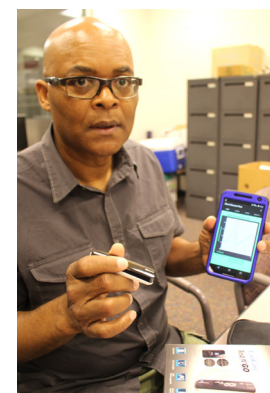
“When I was diagnosed with diabetes, I was given a glucose meter,

and lots of lessons in what to eat, how to eat, and how to use the meter. But it was all just sort of blanket advice, and I saw inconsistencies with my glucose levels and sometimes didn't know why, and thought ‘there has to be a better way of doing this where you are treated as an individual.’”

And so Rollins began the pursuit of an idea that would incorporate Bluetooth and smart phone technology to help individuals with Type II non-insulin dependent diabetes to not only simply track their blood glucose levels, but to develop a better understanding of how different things influence it. “I want to be able to introduce the ‘what if’ factor to checking your glucose,” he said. “What if I ate that big cookie? ‘What if I work out at the gym today?’ ‘What if I do this thing instead of that thing, how will it affect my blood glucose?’” These factors would wind up as a sort of graph displayed on the patient's smart phone through an app. Rollins, who is also a professor of statistics at Iowa State, based his program on a mathematical model, which would be custom tailored for different people. Rollins collected data from his own blood as a starting point for developing a baseline which could be used to develop the plan.

The idea to display inferences and changes in a person's glucose on a cell phone came about out of a need to better illustrate just what his final vision would look like, Rollins related. “People just could not grasp the concept of what I wanted to do by just presenting it on paper,” he remarked. “The phone serves as a demonstration device. I need to have something that people can hold in their hands and be able to say, ‘OK, I see how this works.’”

The ability for people to see how the idea would work is important, as Rollins will need to secure funding to develop it – and to work with diabetics who must obtain and analyze their blood four times per day – with the difference being their blood analysis would be transmitted to the cell phone app. This is where the Bluetooth technology comes in. Through a hand-held Bluetooth transmitter, the patient will insert the test strip with a blood sample in one end of the device, and it will then send an analysis to the phone app, where it can be displayed on the phone screen. All automatically. “We are wanting to make this as automated as possible to reduce human error,” said Rollins.



Bluetooth technology is used to transmit the results of a glucose test strip to a cell phone app.

All this cyber ability had to be created. And with the help of undergraduate students – both current ISU CBE students and those participating in special research opportunities – and graduate students, that is happening.

The big future step for the project would be securing the means to do a study on a large group of subjects – probably 150-200 people, according to Rollins. Data would be collected from those individuals over a four-week period and downloaded in order to build a library that can then be used to establish parameters to use for the math-based inferences.

Two awards for Dr. Rodney Fox from AIChE organizations

Anson Marston Distinguished Professor Rodney O. Fox has received two significant recognitions from organizations affiliated with the American Institute of Chemical Engineers (AIChE). He has been named recipient of both the



Dr. Fox

North American Mixing Forum (NAMF) Award for Excellence and Sustained Contributions to Mixing Research and Practice and the **Shell Thomas Baron Award in Fluid-Particle Systems**. Both will be presented as part of AIChE Annual Meeting proceedings in San Francisco in November of 2016.

The NAMF honor, sponsored by Dow Chemical Company, recognizes such accomplishments as understanding, contributions, development and practice in the area of chemical engineering mixing technology and research.

The Shell Thomas Baron Award recognizes an individual's outstanding scientific and technical accomplishment which has made a significant impact in the field of fluid particle systems or a related field, with the potential for cross fertilization with relevance to the topics of interest in the PTF community. It is sponsored by Shell Global Solutions.

Shao, Tessonnier team up, develop hybrid technology that gains worldwide attention

This story was originally published with the Iowa State News Service.



Zengyi Shao and Jean-Philippe Tessonnier have combined the work of their research groups to come up with a new process that landed on the cover of a prestigious international publication.

Feb. 12 issue of the journal *Angewandte Chemie* International Edition. “The ideal biorefinery pipelines, from biomass to the final products, are currently disrupted by a gap between biological conversion and chemical diversification. We herein report a strategy to bridge this gap with a hybrid fermentation and electrocatalytic process,” wrote lead authors Zengyi Shao and Jean-Philippe Tessonnier, Iowa State assistant professors of chemical and biological engineering who are also affiliated with the National Science Foundation Engineering Research Center for Biorenewable Chemicals (CBiRC) based at Iowa State. The process described by the engineers “opens the door to the production of a broad range of compounds not accessible from the petrochemical industry,” Shao said.

Moving forward, the engineers will work to scale up their technology by developing a continuous conversion process, said Tessonnier, who is also an associate scientist with the U.S. Department of Energy’s Ames Laboratory. The engineers’ research was supported by CBiRC, the National Science Foundation, Iowa State’s Plant Sciences Institute and the Ames Laboratory.

Here’s how it works: Shao’s research group has created genetically engineered yeast – “a microbial factory,” she said – that ferments glucose into muconic acid. By applying metabolic engi-

Iowa State University CBE professors Zengyi Shao and Jean-Philippe Tessonnier have found a way to combine a genetically engineered strain of yeast and an electrocatalyst to efficiently convert sugar into a new type of nylon.

Previous attempts to combine biocatalysis and chemical catalysis to produce biorenewable chemicals have resulted in low conversion rates. That’s usually because the biological processes leave residual impurities that harm the effectiveness of chemical catalysts.

The engineers’ successful hybrid conversion process is described online and as the cover paper of the

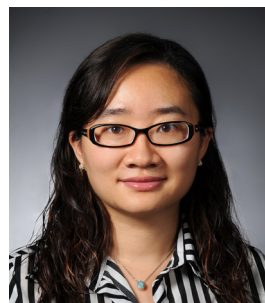


The cover of the February 12, 2016 issue of *Angewandte Chemie* International Edition, a noted chemical engineering journal, featured Shao and Tessonnier’s research.

neering strategies, the group also significantly improved the yield of the acid. Then, without any purification, Tessonnier’s group introduced a metal catalyst – lead – into the mixture and applied a small voltage to convert the acid. The resulting reaction adds hydrogen to the mix and produces 3-hexenedioic acid.

After simple separation and polymerization, the engineers produced biobased, unsaturated nylon-6,6, which has the advantage of an extra double bond in its backbone that can be used to tailor the polymer’s properties. The engineers say the hybrid conversion technology offers many advantages: The reaction is performed at room temperature, it uses a cheap and abundant metal instead of precious elements such as palladium or platinum, and the other compounds involved in the reaction are produced from water.

Iowa Energy Center Impact Award for CBE’s Zengyi Shao



Zengyi Shao

CBE Assistant Professor Zengyi Shao has received the Impact Award from the Iowa Energy Center. It was to be presented at the 2016 Iowa Energy Summit, where she was also to deliver a presentation, “Building a Highly Adaptable Microbial Consortium for Efficiency Business Utilization.”

Each year the award is presented to four leaders in the areas of bioenergy, education and outreach, energy efficiency and renewable energy. Much of Shao’s research at Iowa State is in biorenewables and synthetic biology (see related story, above).

CBE’s Hebert among trio at ISU for pipeline safety grant

The U.S. Department of Transportation’s Pipeline and Hazardous Materials Safety Administration (PHMSA) has announced that Iowa State University is one of three institutions it will provide funding to as part of its Competitive Academic Agreement Program (CAAP) for pipeline safety research. The goal is to spur the development of research projects that could prevent or mitigate pipeline corrosion.



Dr. Kurt Hebert

The Department of Chemical and Biological Engineering’s Dr. Kurt Hebert will join with fellow ISU grantees Ashraf Bastawros of the Department of Aerospace Engineering and Pranav Shrotriya of the Department of Mechanical Engineering. Their project is titled “Fundamental Mechanochemistry-based Detection of Early Stage Corrosion Degradation of Pipeline Steels.” The goal is to develop advanced detection methods to calculate the physical and mechanical changes associated with early stage stress corrosion cracking in high strength pipeline steel.

AIChE's coveted Young Investigator Award for Yue Wu



Dr. Wu

Dr. Yue Wu of Iowa State University's Department of Chemical and Biological

Engineering (CBE) has been named the recipient of the 2016 American Institute of Chemical Engineers' (AIChE) Nanoscale Science & Engineering Forum (NSEF) Young Investigator Award.

The prestigious honor recognizes outstanding interdisciplinary research in nanoscience and nanotechnology by engineers or scientists in the early stages of their professional careers. It will be officially presented at the AIChE Annual Meeting in San Francisco in November. Wu, who is the ISU CBE department's Herbert L. Stiles Associate Professor of Chemical and Biological Engineering, works primarily in the arena of novel thermoelectric materials, and has published more than 22 papers in the area. He has more than 57 total publications to his credit, many in high-impact journals.

Panthani receives Air Force grant

Department of Chemical and Biological Engineering assistant professor and Herbert L. Stiles Faculty Fellow Dr. Matthew Panthani has become one of a select group of researchers nationwide to be awarded a grant through The Air Force Office of Scientific Research (AFOSR) Young Investigator Program (YIP).



Dr. Panthani

Panthani, an assistant professor and Herbert L. Stiles Faculty Fellow, had his project, "Group IV Quantum Dots for Integrated Photonics," selected as one of 58 to receive funding, from more than 230 submissions. In addition to Panthani, professors Soumik Sarkar and Travis Sippel of Iowa State's

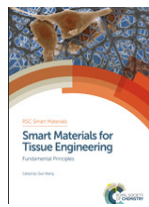
Department of Mechanical Engineering, also received the prestigious award. Iowa State is one of only a few institutions with more than one researcher receiving the award.

Panthani's proposed research aims to develop materials for a new type of telecommunications technology called integrated photonics. The technology uses light instead of electricity to transfer data on a chip, improving the speed and efficiency of telecommunications. The improved efficiency means the chips will produce less heat during operation, allowing for less thermal management and a more compact and lightweight design. It is seen as a method for improving several Air Force capabilities, such as airborne space surveillance, communication and computational capabilities.



The 58 researchers are from 41 institutions, with a total of \$20.8 million in grant funding awarded. The YIP is open to scientists and engineers at research institutions across the United States who received Ph.D. or equivalent degrees in the last five years and who show exceptional ability and promise for conducting basic research.

Professor Qun Wang is editor of tissue engineering textbook



CBE's Dr. Qun Wang is the editor of a new text and reference publication, "Smart Materials for Tissue Engineering: Fundamental Principles." The book is published by the Royal Society of Chemistry and focuses on fundamental principles underpinning recent advances in materials science developed for tissue engineering. Among other topics, it discusses

how the functions of living cells can be regulated by smart materials which respond to changes in the surrounding microenvironment. It is designed for those working in academia and in industry.

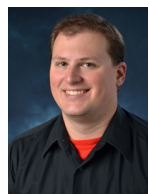
Eye on Research: Cademartiri, Jarboe, Mansell



Dr. Rebecca Cademartiri: "Detection, protection and treatment" are three key words in research by Dr. Cademartiri. Much of her current work centers on designing platforms consisting of bacteriophages, viruses that attack and bind to bacteria, with an emphasis on dealing with harmful bacteria. Her research involves working with phages placed on or in materials to make them more resistant to harmful bacteria – with potential uses in things such as seed coatings, food packaging (especially meats), bandages, cutting boards, and of special interest to Cademartiri, water supply testing materials. Her research group is also working on a grant for research with sprouts for human consumption to make them more resistant to bacteria.



Dr. Laura Jarboe: Working in the Center for Biorenewable Chemicals (CBiRC), Dr. Jarboe's research focus is on metabolic engineering for organism robustness and directed improvement in cell properties – specifically, how to make them better catalysts (substances that make a chemical reaction happen more quickly). Jarboe's research aims to use technology to remove road blocks to functions and processes, to skirt such things as biological inhibitors that exist in cells. A great deal of her work centers on fatty acids, and is part of a broad area of study in CBiRC with sugars derived from biomass and catalysis processes to come up with better products for commercial use. Fatty acids are used in foods because they inhibit microbes. But the volume needed limits the ability to produce compounds in a cost-efficient way. Through designing metabolic evolution, beneficial mutations can be made to occur.



Dr. Thomas Mansell: With a new scientific awareness of the importance of microbial communities within the human gut, Dr. Mansell's research revolves around engineering those communities to spur better human health. Research in recent years has shown many bodily systems are affected by microbial communities, especially in the gut. Two of the substances receiving attention by Mansell's research are prebiotics and probiotics (ingredients that promote the growth of beneficial microorganisms in the gut). In addition, his research also looks at antibiotics, specifically smarter "targeted" antibiotics that kill only undesirable substances in the body, as opposed to a "blanket" destruction of many things at once. He also works with E. coli Nissle 1917, a probiotic strain of bacteria that exists in the human gut, and a modified system for creating Butyric acid, a fatty acid. His research group is also looking at ways to jam "signals" that are used by cells in MRSA (Methicillin-resistant Staphylococcus aureus), a dangerous bacteria that is resistant to many antibiotics.

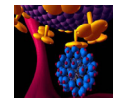
Iowa State University Department of Chemical and Biological Engineering Primary Research Areas



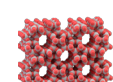
Biorenewables



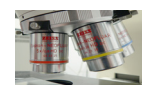
Renewable Energy



Advanced & Nanostructured Materials



Catalysis & Reaction Engineering



Health Care Technology & Biomedical Engineering



Computational Fluid Dynamics

April 2016 CBE Hall of Fame inducts department alumni W. Mark Saltzman and Terry S. King

The Department of Chemical and Biological Engineering Hall of Fame extended Hall of Fame honors to **Dr. W. Mark Saltzman**, a department alum, who is the Goizueta Foundation Professor of Biomedical Engineering, Chemical & Environmental Engineering & Physiology, Yale University School of Engineering & Applied Science; and to **Dr. Terry S. King**, a former CBE department chair, who is currently serving as Provost and Executive Vice President for Academic Affairs and Acting President of Ball State University.



Saltzman is pictured with his mother, Joyce Wiley, of Waukegan, IA at the department Awards Banquet.

Saltzman was officially inducted during the department's Awards Banquet in April of 2016; King will be recognized in person at a date to be determined.

An engineer and educator, Saltzman's research has impacted the fields of drug delivery, biomaterials, nanobiotechnology, and tissue engineering. His work is described in more than 300 research papers and patents and he is the sole author of three textbooks.

(1981) and earned admission to graduate school at the Massachusetts Institute of Technology, where he received an S.M. in chemical engineering (1984) and a Ph.D. in medical engineering (1987).

He was appointed assistant professor of chemical engineering at Johns Hopkins University in 1987 and promoted through the ranks, becoming a tenured full professor in 1995. In 1996, he joined the faculty of chemical engineering at Cornell University, where he was named the first BP Amoco/H. Laurance Fuller Chair in Chemical Engineering.

Dr. Saltzman moved to Yale University as the Goizueta Foundation Professor of Chemical and Biomedical Engineering in July of 2002, and served as the founding chair of Yale's Department of Biomedical Engineering in 2003-2015.

Dr. Saltzman has been recognized widely for his excellence in research and teaching. He has received the Camille and Henry Dreyfus Foundation Teacher-Scholar Award (1990);

the Allan C. Davis Medal as Maryland's Outstanding Young Engineer (1995); the Controlled Release Society Young Investigator Award (1996); the Professional Progress in Engineering (2000) and Professional Achievement Citation in Engineering (2013) Awards from Iowa State University (2000).

He has been honored by election as a Fellow of the American Institute for Medical and Biological Engineering (1997); a Fellow of the Biomedical Engineering Society (2010); a Member of the Connecticut Academy of Science & Engineering (2012); a Fellow of the National Academy of Inventors (2013), and an elected Member of the National Academy of Medicine (2014). He has delivered over 275 invited lectures throughout the world.

Over the past three decades, Dr. Saltzman has taught dozens of college courses including Heat & Mass Transfer, Material & Energy Balances, Introduction to Biomedical Engineering, Drug Delivery & Tissue Engineering, Physiological Systems, and Molecular Transport & Intervention in the Brain.

King received a B.S. in chemical engineering from Iowa State in 1975 and his Ph.D. from the Massachusetts Institute of Technology in chemical engineering in 1979. From 1979 to 1982 he worked at Exxon Chemical Company.

He began his professional academic career in 1982 at Iowa State University in the Department of Chemical Engineering. He was promoted to professor and then served as department chair from 1990-1997.



Dr. Terry S. King

King conducted research leading to over 150 peer reviewed publications and invited presentations, holds three patents and has received grants primarily from the Department of Energy and the National Science Foundation.

He supervised seven master's students, 12 doctoral students, seven post-doctoral associates, and two visiting scientists. Subsequent to his years as department chair at Iowa State, Dr. King served nine years as the Dean of the College of Engineering at Kansas State University.

He is now in his tenth year of employment at Ball State University as Provost and Executive Vice President for Academic Affairs. King currently serves as acting president of Ball State.

Both men have had plaques in their honor placed on the department's Hall of Fame wall in Sweeney Hall.



Saltzman receives his Hall of Fame plaque from Reginald R. Baxter Endowed Department Chair Dr. Andy Hillier.

Michael Brady, Gayle Roberts set for CBE Hall of Fame inductions in November 2016

Department of Chemical and Biological Engineering alumni Dr. Michael D. Brady and Gayle A. Roberts, P.E., were selected for entry into the department's Hall of Fame in November of 2016.



Dr. Michael D. Brady

Process and materials analysis and innovation characterizes Dr. Michael D. Brady's career at several leading corporations. He was employed at 3M for 27 years, Imation (a spinoff of 3M) for two and one-half years, and for Corning Glass for nine years, in addition to holding a consulting position for the last nine years.

Brady graduated from Iowa State in 1965 with a B.S. in chemical engineering and went on to earn a Ph.D. from Oregon State University in 1969.

At 3M he invented trade secret processes for coating water based adhesives, fused organosol coating on carpet fibers, processes for reflective highway signs, silver halide X-ray film and screens, and color proofing materials for the printing industry. At Corning Glass both trade secret processes as well as patented processes were invented in the areas of cellular ceramics for automotive catalytic converters and diesel particulate filters, print heads for high density printing for DNA analysis, coating materials for ultra-thin glass for TV and computer screens and hand held devices. He holds more than 20 patents worldwide and many of his trade secret processes are still being practiced.

While at 3M Brady continued his connection with Iowa State by arranging guest appearances by many ISU chemical engineering professors, such as Dr. Maurice Larson, Dr. Stan Burns, Professor Howard Shanks and Dr. Ken Lakin. He interviewed and helped hire many chemical engineering, electrical engineering, chemistry and physics graduates of Iowa State. He was involved with establishing the National Science Foundation Coating Center of Excellence at the University of Minnesota, as well as the Microelectronics Center at Iowa State. He was the 3M representative for the Center for Process Analysis & Control at the University of Washington, the Center for Solid State Physics at Stanford University, the Emulsion Polymerization Center at Lehigh University, and the Reaction Engineering Center at the University of Wisconsin, as well as Corning Glass' representative to Cornell University.

Gayle A. Roberts, P.E., is President and Chief Executive Officer of Stanley Consultants, a global engineering firm that provides planning, design, consulting, construction and management services to clients around the world. Founded in 1913, Stanley Consultants has a staff of 1,100 members in 31 offices and has worked in all 50 states, U.S. territories and in 110 countries around the world. The firm is ranked among the largest engineering companies in the United States.

She joined Stanley Consultants in 1981 and has more than 30 years of experience in the consulting engineering industry. In 2007 she was elected the fifth president in the company's history, its first female president, and became the first female president of a global consulting engineering firm. In 2012 she was elected chief executive officer. Ms. Roberts graduated from Iowa State University in 1981 with a B.S. in Chemical Engineering, and earned an M.B.A. from St. Ambrose University in 1991. She is a licensed professional engineer in seven states and Puerto Rico.

She is a longtime champion of women in engineering and regularly encourages young women to consider the field as a viable and exciting career choice that holds many opportunities. She has been recognized for these efforts, as well as her contributions to the engineering industry, with multiple awards including: Athena Award



Gayle A. Roberts, P.E.

from The Women's Connection; Upward Mobility Award from the Society of Women Engineers; Professional Achievement Citation in Engineering (PACE) Award from the Iowa State University College of Engineering; Woman of Influence Award from the Corridor Business Journal; Voice of the Engineer Award from the Iowa Engineering Society; 50% Solution Award from the Iowa Women's Foundation; and the Large Company Innovation and Leadership Category of the Iowa Women of Innovation Award from the Technology Association of America.

Ms. Roberts is currently a member of the Executive Committee of the American Council of Engineering Companies Design Professionals Coalition. She is past President of the American Council of Engineering Companies of Iowa and currently serves as the organization's National Director. She served from 2012 to 2015 as a Director of Engineers Without Borders – USA and as a member of the Development Committee.

Her service to Iowa State University includes three terms on the Advisory Board for the Chemical & Biological Engineering Department within the College of Engineering, including one term as president. She also served on the board of the University's Engineering Policy and Leadership Institute. At the University of Iowa she served as Director of College of Engineering Advisory Board from 2013 to 2016. Prior to that she served from 2008 to 2014 on the St. Ambrose University Board of Trustees, and was a member of the Audit Committee and Academic Affairs committees.

Alums Vaughn, Kipper chosen for PACE, PPEA honors



Denny Vaughn

Matt Kipper

Two ISU chemical and biological engineering alumni were set to receive prestigious College of Engineering awards as part of the university's 2016 homecoming ceremonies. Dennis (Denny) J. Vaughn was to be presented with the Professional Achievement Citation in Engineering award, and Matt J. Kipper was to be the recipient of the Professional Progress in Engineering Award. They were to be recognized October 28 in the university's 2016 Honors and Awards Ceremony.

Vaughn (B.S.'70) has long been a supporter of the Department of Chemical and Biological Engineering. Most recently his involvement included serving on the CBE Advisory Council. He retired from Pillsbury Company/General Mills in 2007 as vice president and corporate director of international environment, health and safety/global safety. Since then he has founded two companies: the consulting firm Vaughn Group Services and Frog Fusion, a business that designs and creates fused glass artwork.

Kipper (B.S.'00, Ph.D.'04) is as associate professor of chemical and biological engineering at Colorado State University, and is an active and accomplished scholar. His research is at the interface of materials and medicine, and his laboratory is pioneering a new class of hyper-functional biomaterials. These materials have the potential for important applications in the biotechnology and tissue engineering fields and could also have major clinical impact.

ChemE alum Lettow honored as distinguished alumnus

The Department of Chemical and Biological Engineering welcomed department alumnus the Honorable Charles F. Lettow, who was honored as an Iowa State University Distinguished Alumni Award recipient.



Judge Charles Lettow

Lettow, a native of Owasa, Iowa, who received a B.S. in chemical engineering from Iowa State in 1962, has had a distinguished law career, culminating with a presidential appointment to the United States Court of Federal Claims in 2003. There, his engineering background has been an important resource in addressing the Court's jurisdiction over technical claims, including those dealing with patent infringement and nuclear power.

As an undergraduate at Iowa State, Lettow served as president of the College of Engineering Student Council, president of the Student Chapter of the American Institute of Chemical Engineers and co-chair of the VEISHEA Open House Committee. His academic achievements included election to the honor societies Alpha Chi Sigma, the Knights of St. Patrick and Pi Tau Sigma. During his senior year, he held a highly competitive NSF undergraduate research appointment.

After receiving an LL.B. degree from Stanford University, his legal career began when he was appointed to serve as a law clerk for Judge Ben C. Duniway of the U.S. Court of Appeals for the Ninth District and later for Chief Justice Warren E. Burger of the Supreme Court of the United States. He then spent 30 years with the international law firm Cleary, Gottlieb, Steen and Hamilton, being named a partner after only three years. The United States Court of Federal Claims consists of 16 judges appointed by the President and subject to confirmation by the U.S. Senate.

In addition to many law profession activities, Judge Lettow has also been involved with higher education, including volunteering his services to Iowa State and Princeton Universities. Noteworthy at ISU was his selection in 2008 as one of four visiting scholars from government and industry to "develop graduates with leadership skills, appreciation for ethical behavior, technical and scientific expertise and an understanding of society's needs."

Judge Lettow has been active in numerous bar associations, often in positions of leadership. He has received major awards from the National State and Local Legal Center, the National Association of Attorneys General and the American Bar Association. In 2013, he was named to the inaugural class of the Alumni Hall of Fame in ISU's Department of Chemical and Biological Engineering.

He was joined in a department reception in his honor by daughter Dr. Renee Burnett Lettow Lerner, and sons Dr. John Lettow and Dr. Paul Lettow.

ChemE alum Kaiser to be remembered through new scholarship

Friends and former classmates of Iowa State University Chemical and Biological Engineering (CBE) alumnus Robert (Bob) Kaiser, who passed away in February of 2016, have initiated a scholarship in his name to celebrate his life and career as a chemical engineer. Each year the scholarship will benefit an Iowa State CBE undergraduate entering his or her junior or senior academic year. Although the scholarship was initiated by friends and family, it is open to anyone who would like to contribute.



Bob Kaiser

Bob, a native of Elmhurst, Illinois, spent his full academic career at Iowa State, receiving a B.S. in chemical engineering in 1964, an M.S. in 1969 and a Ph.D. in 1971. He played clarinet and saxophone in the ISU marching band, was a member of Tau Kappa Epsilon fraternity, and worked for the Atomic Energy Commission while doing his graduate work.

A former classmate, Thor Hanson (BSChE'64, MS'68, PhD'69), of Houston, TX, was one of a large group of graduate students, including Bob, who became good friends while at Iowa State. "We got to know each other, shared a couple of houses, and stayed in touch after graduation," said Hanson. "We started meeting for vacation trips – I guess you could call them reunions. We went on a canoe trip in '71 when we were still youngsters – but it was in

1994 we started going on these trips on a regular basis." Different locations were visited a few times, but it was the boundary waters area of Minnesota that became the routine getaway location.

Bob began his professional career in 1971 in Niagara Falls, NY with Union Carbide's Metals Division, Research and Development. In 1991, "Dr. Bob" made the corporate move with what had become Elkem Metals Company, first to the Pittsburgh, PA area, and later to Charleston, WV, where he worked at the alloy plant until his retirement in 2004. His expertise with silicon metal processes was known worldwide. Upon retirement, his title was "Director-Silicon Technology, Silicon Business Unit-North America, Elkem Metal Company, L.P."



Kaiser uses a canoe as a breakfast serving table on the Minnesota boundary waters.

While in Western New York, Bob and his wife Pauline lived in Youngstown, where they raised their family. Bob was active in the community, and always worked to support not just his own children, but all those who he came in contact with. When a local high school lacked equipment for its AP chemistry program, Bob and Pauline worked with Elkem to make sure that the necessary items were donated.

Hanson said after Bob's death contact was made with the ISU Foundation to find out how to make donations in his name. They learned that the total amount of donations to be made qualified for a scholarship, so the decision was made to go that route. "We weren't super-



Kaiser (left) and other ISU chemical engineering alumni are shown on one of their many "reunions."

Adviser Tonia Baxter earns CyTation Award

CBE academic adviser Tonia Baxter was honored with a CYtation Award from the Iowa State University Professional and Scientific Council. CYtation Award nominees have performed above and beyond the call of duty, performed a job function extraordinarily well, and have acted in a way that makes a real difference on behalf of Iowa State.



Baxter was nominated by department chair Andy Hillier for the leadership and spirit she demonstrated when she was thrust into an unforeseen situation immediately after starting her new job with Iowa State in 2015: "Her nomination is based on the outstanding work she did in the summer of 2015 that was clearly above and beyond the call of duty, when a combination of unusual circumstances

left her as the only academic adviser in the department and responsible for an advising load that included 790 current students and all of the department's freshman orientation," said Hillier. He added, "She did it so well that we heard nothing but positive feedback from the incoming students and their parents – she acted in a way that made a real difference to the department and to the university."



The CBE staff gets together for a group photo. Left to right: John Burnett-Larkins, Colin Richey, Ashley Augspurger, Allison Bowie, Adam Dane, Tonia Baxter, Michelle Stotts, Bette Maybee, Chris Gerke, Kim Ohge, Janessa Boley, Bellinda Hegelheimer.

CBE Advisory Council says hello to five, farewell to two

Five Iowa State University alums have begun terms on The Department of Chemical and Biological Engineering Advisory Council, effective April, 2016. The Advisory Council is composed of chemical engineering professionals from around the country who lend their organizational expertise to help guide the department's plans and policies, and to help shape student curriculum to offer students the best possible education in chemical engineering.



Tess Duckett is a Principal Systems Engineer for General Mills, one of the world's leading food companies. She has spent her entire career based out of one of their largest plants in Cedar Rapids, Iowa, which makes cereals, fruit snacks, and frosting. She received a B.S. in chemical engineering from Iowa State University in 2002.



Jane Newman-Ford is the Director of Estimating, Oil & Gas at Black & Veatch, a global engineering, procurement, and construction (EPC) contractor with headquarters in Overland Park, Kansas. Jane earned a B.S. in chemical engineering from Iowa State University in 1991 and a M.S. in engineering management from the University of Kansas in 2000.



W. Mark Saltzman is the Goizueta Foundation Professor of Chemical and Biomedical Engineering at Yale University and served as the founding chair of Yale's Department of Biomedical Engineering from 2003-2015. He graduated with distinction with a B.A. in chemical engineering from Iowa State in 1981, before receiving an S.M. in chemical engineering (1984) and a Ph.D. in medical engineering (1987) from MIT.



Jeff Swierczek is an associate chemical engineer with Burns & McDonnell in Kansas City, MO. His responsibilities include process simulations and modeling, equipment design, field installation and start-up support and training. He provides lead process duties on multi-million dollar expansions for petroleum refineries. He received a B.S. in chemical engineering from Iowa State University in 1994.



Meghan Watt is the Responsible Care Leader for the FilmTec Corporation in Edina, MN. FilmTec is a wholly owned subsidiary of The Dow Chemical Company which produces reverse osmosis water purification elements. She is also an employee safety and health improvement leader for Dow. She received a B.S. in chemical engineering from Iowa State in 2002.



Karen Albertson, Lean Six Sigma Director, 3M Industrial Business Group; and **Terry King**, Provost & Executive Vice President for Academic Affairs and Acting President, Ball State University, have stepped down at the end of their terms on the CBE Advisory Council. The department thanks them for their commitment to helping to make Iowa State CBE strong.



New staff members welcomed to CBE in 2016

Allison Bowie joined CBE in January of 2016 as Human Resources and Financial Program Assistant. The Marshalltown, IA native and mother of two came to Iowa State with private sector experience as an office manager and program coordinator for two Marshalltown area businesses.



Allison Bowie

Owen Reese began working with CBE in August as a fiscal assistant. An ISU alum who is originally from Colorado, his background includes working as an archaeologist and an architectural historian. He played rugby while at ISU and enjoys car shows and custom cars.



Owen Reese

DEPARTMENT NEWS

Improvements undertaken in 2015-16 convert four Sweeney Hall learning spaces



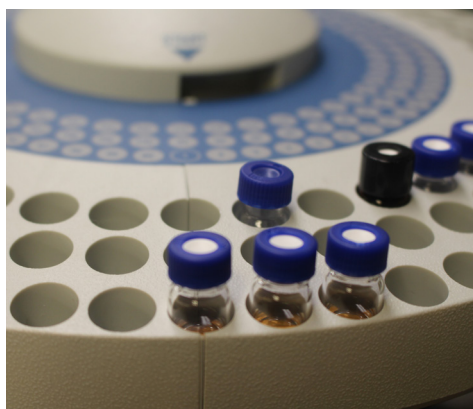
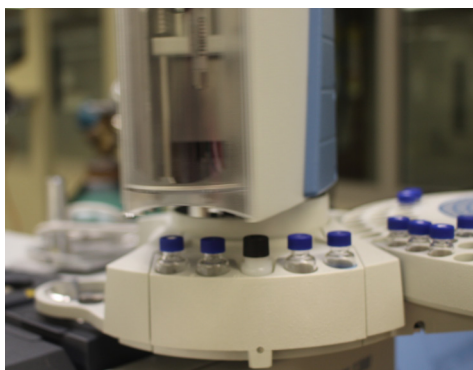
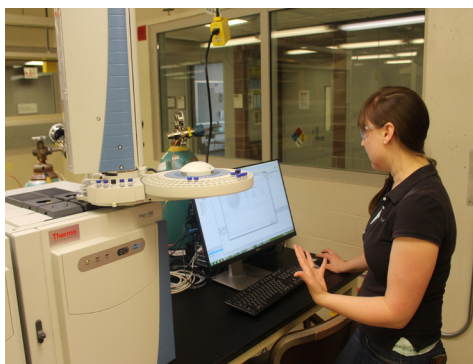
1145 Sweeney: Installation of a new research laboratory to be used by the Dr. Matthew Panthani research group was completed. The lab addition was made possible by the support of Reginald and Jameson Baxter.



2123 Sweeney: Room was converted to a multimedia student computation and collaboration center for use by undergraduate and graduate students.



1023 Sweeney: A former storage room was converted to graduate student office space.



2058 Sweeney: Important new laboratory equipment was installed in 2058 Sweeney, including a gas chromatograph mass spectrometer (GCMS), and equipment for high performance liquid chromatography (HPLC) and rheometer and gas permeation chromatography (GPC) functions.

Football, fun and fellowship at CBE Tailgate!



ISU alums and CBE supporters Mike and Jean Steffenson (center) are joined by ISU College of Engineering supporters John and Nancy Hayes. John Hayes is also an ISU engineering alum. All are Davenport, Iowa residents.



CBE prof. Nigel Reuel and his family enjoy their first CBE tailgate experience.



Members of the AIChE ISU student chapter, organizers of the event, smile for the camera (center photo). Above, chemical engineering graduate students Zhe Li, Wei Zheng and post-doc Enzheng Shi are shown. At left, CBE professor Jackie Shanks shows her Cyclone spirit with students.

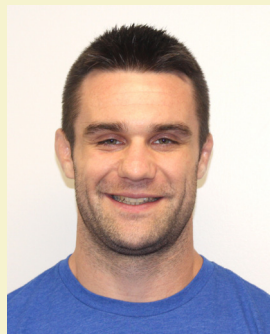
Congratulations to graduate student fellowship recipients and thank you to those who support them!



Sadaf Charkhabi
George W. Parrott
Centennial Graduate
Fellowship & Clifford A.
Shillinglaw Memorial
Scholarship in
Chemical Engineering



Moises Contreras-Ramos
Chemical Engineering
Fellowship & Sweeney
Family Memorial
Fellowship



Jared Dopp
Presidential Scholars
Fellowship



Nathaniel Kallmyer
Chemical Engineering
Fellowship



Zhe Li
James Katzer Energy
Fellowship & Loren and
Donna Luppess Graduate
Fellowship



Hsi-Hsin Lin
Reginald & Jameson
Baxter Fellowship



Elsbeth Petersen
NASA National Education
Aeronautics Scholarship
and Advanced STEM
Training and Research
Fellowship



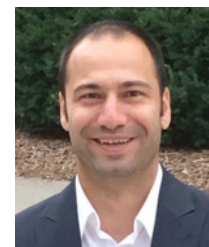
Shalini Raj
Frederick Martinson
Chemical Engineering
Scholarship Fund



Liyang Shen
George W. Parrott
Centennial Graduate
Fellowship



Alma Vela-Ramirez
Lanny A. Robbins Endowed
Graduate Fellowship



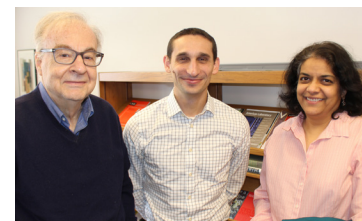
Chemical Engineering post doctoral researcher **Metin Uz** was selected as a Baxter Young Investigator. The program rewards research that can be directly used for critical care therapies and the development of medical products that save and sustain patients' lives. He works for Anson Marston Distinguished Professor Surya Mallapragada.



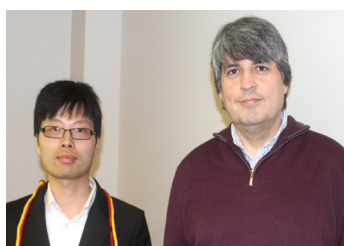
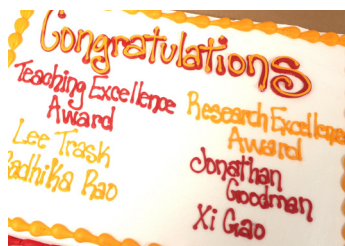
Graduate student **Rainie Nelson** was selected for the National Science Foundation's Graduate Research Fellowship Program. Her major professor is Department of Chemical and Biological Engineering assistant professor and Herbert L. Stiles Faculty Fellow Matthew Panthani.



Chemical engineering graduate students **Anup Sharma** and **Jose Miguel Suastegui** were honored with the Graduate and Professional Student Senate (GPSS) Research Award. Sharma (at left in photo), whose major professor was Dr. Surya Mallapragada, was honored for his biomedical research thesis. Suastegui's area of specialty is metabolic engineering and synthetic biology. He is studying the engineering of yeast for producing pharmaceutical and biopolymer precursors. His major professor is Dr. Zengyi Shao.



A CBE homecoming for Graduate Seminar Series speaker **Dr. Chase Beisel** (B.S. '04), center, assistant professor of chemical and biological engineering, North Carolina State University. He's shown with emeritus professor Peter Reilly and Anson Marston Distinguished Professor Surya Mallapragada. Beisel's first paper as an undergrad was for Dr. Reilly.



Graduate students **Radhika Rao** (left photo, with emeritus professor Peter Reilly) received the Teaching Excellence Award and **Xi Gao** (shown with professor R. Dennis Vigil) the Research Excellence Award in department ceremonies. Also honored, but unable to attend, were **Lee Trask** (teaching) and **Jonathan Goodman** (research).

Flytzani-Stephanopoulos of Tufts is Doraiswamy Lecturer

Iowa State University's Department of Chemical and Biological Engineering welcomed Dr. Maria Flytzani-Stephanopoulos of Tufts University as this year's L.K. Doraiswamy Honor Lectureship speaker. She presented "Heterogeneous Catalyst Design at the Single Atom Limit: A Diverse Reaction Landscape."



Dr. Maria Flytzani-Stephanopoulos

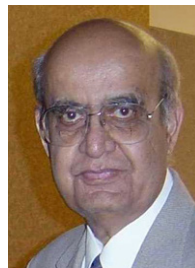
The L. K. Doraiswamy Honor Lectureship in Chemical Engineering was established in 1998. Each year an internationally renowned scientist or engineer is selected to present a lecture both at Iowa State University and the National Chemical Laboratory in Pune, India.

Her presentation discussed the subject of identifying the active catalytic site and design of catalysts with 100% atomic efficiency; and the need for high performance and stable catalysts that comprise only trace amounts of precious metals. It was presented from the viewpoint of catalytic materials that can be used to optimize fuel processing and hydrogen production, and the production of value-added chemicals from feedstocks.

Flytzani-Stephanopoulos is a Distinguished Professor and the Robert and Marcy Haber Endowed Professor in Energy Sustainability in the School of Engineering at Tufts University. She received a B.S. in chemical engineering at National Technical University of Athens, Greece; an M.S. from University of Florida; and a Ph.D. from University of Minnesota. She is a Fellow in the American Association for the Advancement of Science and the American Institute of Chemical Engineers and a member of the National Academy of Engineering. Pioneering work from her lab has demonstrated the use of single-atom catalysts for key reactions of interest to fuel and chemicals processing, aimed at the development of more efficient and sustainable processes for hydrogen and chemicals production. She has published more than 150 technical papers, and holds 10 U.S. patents. At Tufts, she directs the Nanocatalysis and Energy Laboratory.



CBE chair Dr. Andy Hillier presents a commemorative Doraiswamy Lecture plaque to Dr. Flytzani-Stephanopoulos following her presentation.



L.K. Doraiswamy

The lectureship honors L. K. Doraiswamy, a former Anson Marston Distinguished Professor in the Iowa State University chemical engineering program from 1989-2001.



The Fall 2016 Engineering Career Fair at Iowa State again allowed plenty of CBE graduates to return to campus on behalf of their employers to recruit job-seekers. Pictured here are (top row, left to right): Blake Sorenson (BS'14), 3M; Ian Jehring, BS'13, Merck (shown with fellow Merck staffer Mike Ancil, BS'08); Meghan Watt (BS'02), Dow Chemical Co./FilmTec Corp. Second row: Tess Duckett (BS'02), General Mills; Michael Stoeker (BS'14), Syngenta; Matt McGrory (BS'13), EAD. Third row: Hugh Warren (BS'12) and Adam Crim (BS'14), Feed Energy/FEC Solutions; Boniface Mkini (BS'16), Bemis; and James Graefe (BS'08), RS Stover Co. Fourth row: Mitchell Irlmeier (BS'15), Lynodell Basell.

UNDERGRADUATES

CBE students shine in AIChE competition



A large contingent of chemical and biological engineering undergraduate students represented Iowa State University in the annual American Institute of Chemical Engineers (AIChE) Midwest Regional Conference, with strong results in competitions.



Members of the Gengar Gang ChemE Car team prep the car at the regional competition (top). The car is pictured above.

More than 30 members of the Iowa State AIChE chapter took part in the conference at Kansas State University, which saw a total of 12 universities involved. The event features educational events, networking opportunities and competitions between universities. In the research poster competition Iowa State's Pratish Adhikari took first place, with Ivy Wu finishing third.

In the ChemE Car competition, which involves student teams designing, constructing and demonstrating a small vehicle powered and stopped by chemical processes, ISU's "Gengar Gang" placed second, and also finished second in the ChemE Car research poster display competition.

Students who participated in the conference were Arianna Adams, Pratish Adhikari, Gabriela Ampuero, Michelle Ampuero, Vincent Anderson, Seth Baetzold, Victoria Bertram, Nicholas Brown, Abigail Bruen, Derek Bruun, Joshua Claussen, Daniel Dagle, Joseph Dailey, Jonathan Duffy, Paul Faronbi, Elizabeth Frank, Jacqueline Galang, Brian Gates, Joseph Graves, Quinn Hanson-Pollock, Gavin Hellmich, Matthew Hendrickson, Andrew Hughes, Christopher Isely, Carolyn Jennrich, Viktoria Kriuchkovskaia, Jenna Opp, Eli Reiser, Tjamen Roark, Richard Russell, Alexander Saenski, Ellen Wick and Ivy Wu.

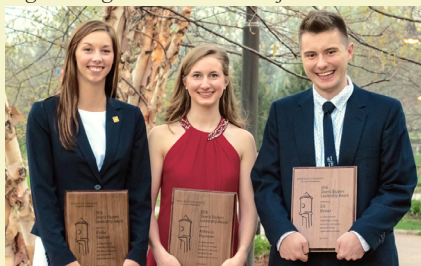


Ivy Wu and Pratish Adhikari finished first and third, respectively, in the research poster competition.

Three CBE students for Dean's leadership honor

Three of five recipients of the College of Engineering Dean's Student Leadership Award for academic year 2015-16 were students in the ISU Chemical and Biological Engineering program.

The award recognizes outstanding leadership by undergraduate engineering students in their junior or senior years.



Erika Vaassen, Rebecca Harmon, Eli Reiser (left to right).

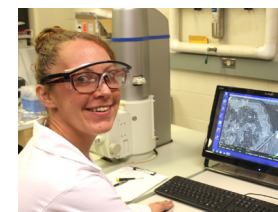
Rebecca Harmon, a CBE junior (spring 2016) from Crystal Lake, IL, worked with Engineering Student Council, serving as president of Freshman Leaders in Engineering. She then took on the role of vice president of outreach for the ESC, and more recently served as the regional conference coordinator. In the 2016-17 year, Rebecca will serve as Vice President of Conferences for the National Association of Engineering Student Councils.

Eli Reiser of Petersburg, IL, was a graduating senior (spring 2016) with an emphasis on biomedical and biochemical applications. Eli was highly involved in leadership roles in the American Institute of Chemical Engineers (AIChE), including serving as AIChE president. His nominator, Dr. Surya Mallapragada, particularly noted his important leadership during the chemical engineering department's centennial celebration in 2013. Through his recognitions of his outstanding work at the local level, he was elected to the AIChE Executive Student Committee, taking on the role of the membership chair of the International AIChE committee supporting student chapters worldwide.

Erika Vaassen, from Indianola, IA, obtained a B.S. in chemical engineering in December 2015. In her time at Iowa State Erika held a number of important leadership posts, serving as Co-President of Engineers' Week; VEISHEA Parade Co-Chair; a Peer Mentor for Leadership ISU and Women in Science and Engineering; and Secretary on the Board of Directors for the Ames YWCA. She was also involved on campus in Engineers Without Borders, where she founded the Freshmen Leadership Board.

Rebecca Harmon, a CBE junior (spring 2016) from Crystal Lake, IL, worked with Engineering Student Council, serving as president of Freshman Leaders

BioMaP REU brings 12 undergrad researchers



Michelle Thayer of Grand View University.

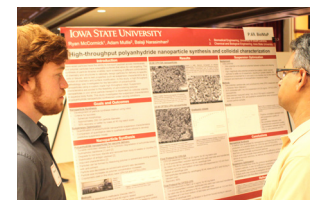
Twelve chemical engineering undergraduates from near and far spent a summer with Iowa State CBE as participants in the Biological Materials and Processes Research Experience for Undergraduates (BioMaP REU) program in the Department of Chemical and Biological Engineering (CBE).

The program brings undergraduates to the Iowa State campus to work under the mentorship of ISU chemical and biological engineering faculty to gain hands-on research experience in topics that match their educational interests and goals. This year the 12 students were selected from nearly 70 applicants. Many had high praise for their CBE experience. "The program really stimulated my mind, and has me now questioning new and different things, which is the point of an experience like this," said Michelle Thayer, a student from Grand View University.



Matthew Amroff of Northwestern (right) confers with Professor Tom Mansell.

"I was very impressed with the bond that exists among graduate students here," said Matthew Amroff, who is a student at Northwestern University. He added, "There is so much research going on here and so many directions you can go, Iowa State is very appealing."



Ryan McCormick of University of South Carolina discusses his research poster with Professor Balaji Narasimhan.

"I am feeling a lot more positive about graduate school, because I really enjoyed the work I did here this summer," said Paul Rudnicki of the University of Notre Dame. "The faculty here was very supportive and accessible. Their doors were always open," said Ryan McCormick of the University of South Carolina. The program is funded by the National Science Foundation.

UNDERGRADUATES

Oviedo, Spain summer lab continues to offer much

From “hola” to “adios,” it was another memorable experience for CBE’s Oviedo, Spain summer lab group as they spent five weeks at the north tip of the country.

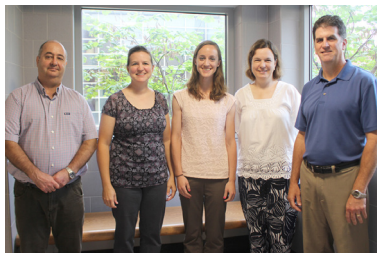


The long-running program, held in conjunction with the University of Oviedo and the University of Wisconsin, allows Iowa State University undergrads to conduct lab experiments, write and present lab findings, participate in industry visits and more. Participants earn seven academic credits in two courses, in addition to three credits with options for use. Students also get to enjoy the local culture.



There’s never a shortage of activity for Oviedo students.

Wisconsin contingents have done an excellent job of working together, and the host university, Universidad de Oviedo, has gone the extra mile to make sure students make excellent progress.” In August of 2016, two of the key faculty members from



Universidad de Oviedo met with ISU CBE department officials to discuss the 2017 program. Pictured at left are Jose Ramon Alvarez Saiz (left in photo) and Susana Luque-Rodriguez (second from right).

Research Experience for Teachers reinforces ChemE education in U.S.

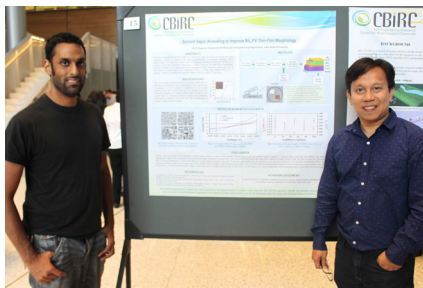


Jeremy Morrow, a science teacher at Des Moines, Iowa’s Hoover High School.

projects under the direction of university researchers, collaboration with cohorts and development of materials that can be directly employed in teaching their own students, the RET participants gain a new respect and enthusiasm for their roles as educators.

Morrow spent the summer working with CBE professor Jean-Philippe Tessonier and graduate student Radhika Rao. His research project dealt with using temperature treatments on carbon catalysts in hydrogenation reactions - using carbon nanotubes that are about the size of a human hair. The research impacts hydrogenation processes used in industry.

Darwin Daugaard, in his 37th year of teaching, conducts high school science classes in the Dell Rapids, S.D. public school system. He worked with CBE professor Eric Cochran in a research project involving citric acid as a cost-effective substitute for use in creating biorenewable chemicals that have many applications. His son, Tannon Daugaard, is a graduate student at ISU, pursuing a Ph.D. in mechanical engineering.



Gil Baguio (right), a teacher in the Baltimore, MD City Detention Center, was back for a second year with RET and CBE professor Matthew Panthani (left).

“There is a change in science teaching standards going on. It is a shift in approach from ‘teaching’ science to ‘doing’ science,” said Jeremy Morrow, a science teacher at Hoover High School in Des Moines. As a participant in this year’s Research Experience for Teachers (RET) program, that philosophy will impact how he educates his students.

Morrow, who teaches chemistry, AP chemistry and biology, was one of three high school educators taking part in the chemical and biological engineering portion of the summer’s RET program. Through conducting research



Darwin Daugaard of the Dell Rapids, SD public school system.

Back for a second consecutive year with the program was Gil Baguio, who teaches science classes to incarcerated youth in the Baltimore, MD City Detention Center. He again worked with CBE’s Dr. Matthew Panthani. “The collaboration in the professional development meetings is very helpful to us and it builds a good bond between us. This experience has helped my global understanding of science and will help me in the many different curriculums I have to employ with my many students in Baltimore,” said Baguio. “I am very privileged.”



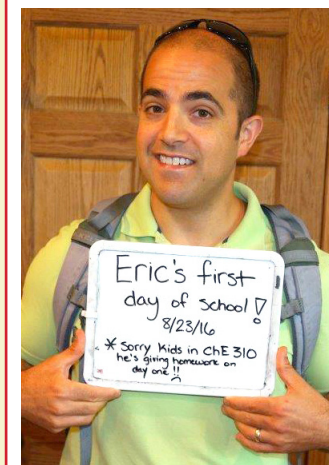
Students in the ISU College of Engineering APEXe (Academic Program for EXcellence for Engineers) spent time learning about the chemical and biological engineering major. Time in Sweeney Hall included getting to know faculty, conducting simple experiments, learning about academics and going on lab tours. APEXe exposes participating multi-cultural first-year engineering students to all College of Engineering departments and aids them in their transition to Iowa State.

Seen in CBE....



Photos in left column: Two generations of CBE graduates together at the December, 2015 pre-commencement ceremonies, with Fall 2015 graduate Jason Pals, and his mother, Carolyn, a 1991 ChemE graduate. Seniors graduating in December 2015 (top photo) and May 2016 are shown posing for the traditional pre-commencement group photos. Below left, scholarship and award recipients pose for their group photo at the spring 2016 honors and awards banquet. **Above photos:** Spring 2016 graduate Tiffany Lam receives the Lawrence E. Burkhart Outstanding Senior Award plaque from Reginald R. Baxter Endowed Department Chair Andy Hillier at the department pre-commencement ceremonies. Faculty members gather at the annual CBE faculty retreat, the meeting which reviews and plans matters relating to department academics, facilities, budgets, research and more.

Above photos: CBE siblings Jill (spring 2016 graduate) and sophomore John Schomers are shown at the spring 2016 honors and awards banquet. Members of the CEGSO graduate student organization spread holiday cheer as Salvation Army bell ringers at a local supermarket. **Right, top:** CBE senior Nolan Dickson was an honored speaker representing engineering students at the September, 2016 rededication of the College of Engineering's Marston Hall. **Middle:** CBE academic adviser Tonia Baxter (Santa) and Kim Ohge get in the spirit at the staff holiday party, December, 2016. **Bottom:** CBE professor Eric Cochran's "first day of school" photo (taken by Allison Cochran) took an even more humorous twist before he headed out for class at the beginning of the fall 2016 semester, warning his students that he would be assigning homework on the first day.





Top row photos: The CBE Office Olympics saw a series of friendly competitions between CBE staff teams. The Red Stapler Brigade of Leah Reed, Kim Ohge, John Burnett-Larkins and Adam Dane (right photo) took the gold medal. **Above photos:** The annual CBE ice cream and popcorn social the first week of fall classes was again a hit. Bette May-bee and Adrianna Kallis hand out ice cream, while a group of undergrads enjoy the treat.



Above photos: Hawaiian Shirt Day in CBE brought out many colors and designs, including Kim Ohge, Tonia Baxter and Adam Dane of the student services staff, and graduate students David Williams and Kirsten Davis. Both fun and serious moments were had as CBE staff members participated in VIRT (Violent Incident Response Training) with officers of the Iowa State University Police.

Help keep CBE strong!



Your contributions help the Department of Chemical and Biological Engineering provide quality education for undergraduate and graduate students. Increasing enrollment makes the need for the best in personnel, facilities and equipment even more important.



Many forms of support benefit from donations to Chemical and Biological Engineering, including:

- Flexible funds to support initiatives, such as the CBE Excellence Fund.
- Support of students through fellowships and scholarships.
- Support of department personnel through professorships.
- Support of facilities through such efforts as the CBE renovation fund.



Unsolicited gifts to any of the above areas are welcome; for gifts to a specific area, please contact the ISU Foundation (www.foundation.iastate.edu or 515-598-2390) or contact the CBE office at 515-294-7642.

A direct link to the ISU Foundation can be found on the CBE web site, www.cbe.iastate.edu. Look for the "Make A Gift" button on the home page.

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