

Doraiswamy & Katzer, P.10



1927-2012

1941-2012



Dear Iowa State CBE Alumni and Friends

We have had another great year with lots to celebrate and be proud of. Undergraduate enrollment has once again reached an all-time high with 629 students registered this fall, up 75 students from a record enrollment in fall 2011. Of our entire undergraduate and graduate student population, 247 students received at least one scholarship. Scholarship and fellowship monies awarded to our students this year totaled about \$390,000. Congratulations to our deserving, high-quality student base, and thank you for making it possible.

The research expenditures this year, more than \$12 million, were also a record and a 33 percent increase from last year. Much of the research funding came from federal and industrial sources. Anson Marston Distinguished Professor Rodney Fox is part of a team that received an National Science Foundation (NSF) \$1.8 million grant for high-performance computing. The NSF Engineering Research Center for Biorenewable Chemicals (CBiRC), led by Mike and Jean Steffenson Professor Brent Shanks, was renewed for another term, bringing the total commitment from the NSF to \$30 million (page 5).

Many of these research endeavors are leading to new technologies that can impact the nation's economic growth. Our undergraduate students, graduate students, faculty as well as alumni are involved in technology transfer and business ventures that we proudly feature in this year's newsletter: We are delighted by the entrepreneurial approach and successes of Professor Brent Shanks (page 5); 2007 PhD alumnus Ankit Agarwal (page 6); the team of Karen and Denny Vaughn Faculty Fellow and Assistant Professor Eric Cochran and his PhD candidate Nacu Hernandez (page 7); and chemical engineering senior William Lohry winning Iowa's Pappajohn New Venture Business Plan contest (page 7).

We completed several Sweeney Hall research laboratory renovations in the fall 2012 semester thanks to a competitive \$1.75 million NSF grant. The CBE department also re-opened the 1150 Sweeney computer lab and a new 3149 Sweeney multimedia classroom, which were redone thanks to a \$200,000 grant from the Roy Carver Charitable Trust (page 12).

Several of our faculty members received special honors. Manley Hoppe Professor Jacqueline Shanks was appointed to the U.S. Department of Energy Biological and Environmental Research Advisory Committee, a group that contains only four engineers. Professor Brent Shanks garnered both the Iowa State University Foundation Award for Outstanding Career Achievement in Research and the College of Engineering's D. R. Boylan Eminent Faculty Award for Research. Professor Derrick Rollins

was named a Tau Beta Pi-McDonald Mentor, which reflects his strong student mentorship. Vlasta Klima Balloun Professor and Associate Dean of Engineering Balaji Narasimhan was named an American Association for the Advancement of Science Fellow.

Our alumni have made us proud as well. Karen Albertson (BSChE'83) received an Iowa State University Professional Achievement Citation in Engineering (PACE) Award; Deniz Uner (PhDChE'94) also received a PACE award; Several of our other alumni have received awards that are highlighted on page 8.

While it has been a banner year for the department, we have had some huge losses as well. In June, Anson Marston Distinguished Professor Emeritus L. K. Doraiswamy passed away after undergoing heart bypass surgery. In addition, this November, Dr. James Katzer, affiliate faculty member in the department, and member of our Industrial Advisory Council, passed away suddenly in his sleep. From when Katzer became an Iowa State chemical engineering student to his death, he dedicated his work to the success of the CBE department. Both Doraiswamy and Katzer were renowned for their work in chemical reaction engineering and catalysis respectively, and both were members of the National Academy of Engineering, the highest honor for an engineer.

Looking forward, CBE celebrates 100 years in 2013. **Save the date:** festivities take place Sept. 26-28, 2013. More information about Centennial Celebration events is listed on page 19.

We are proud of what our students, faculty, alumni and friends did in 2012. And we anticipate much more great news as the department looks beyond its 100th year. Please keep in touch by writing us (see back cover). We also invite you to stay in touch with us by viewing our website, as well through social media on Facebook, Twitter and LinkedIn. Have a pleasant holiday season and a wonderful 2013.

Best Regards,

M. Suryakumar

Surya K. Mallapragada
Chair, Department of Chemical and Biological Engineering
Stanley Chair in Interdisciplinary Engineering

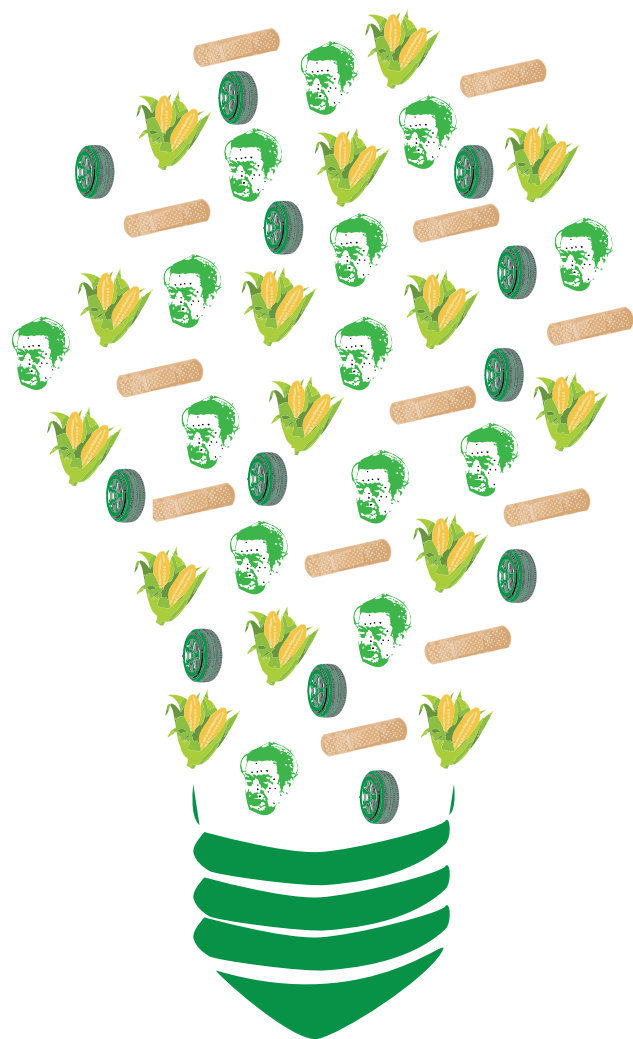


ON THE COVER



ChE senior Eric Grinde optimizes a pentablock copolymer in the new 2132 Sweeney research lab. The National Science Foundation funded \$1.75 million to renovate this space and other labs in the 1964 wing of Sweeney Hall. (See page 12 for more.)

Our faculty, students and alumni are motivated to
Be Entrepreneurial.



Mike and Jean Steffenson
Professor Brent Shanks aims to train students to apply biorenewables research to business startups. **P. 5**



Ankit Agarwal, a 2007 PhD alumnus, founds a biosciences company based on his development of a silver-based wound dressing. **P. 6**



An interdisciplinary engineering team of faculty and a PhD candidate develop a soy-based polymer for cleaner production of tires and asphalt. **P. 7**



ChE senior wins Iowa student business venture plan contest for a developing facial motion capture technology service, Structuralize. **P. 7**

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NEW Faculty & Staff

CBE welcomed four new faculty members and a staff member this year.



Jean-Philippe Tessonier is a new assistant professor and Carol & Jack Johnson Faculty Fellow.

Before joining us at Iowa State in June, Tessonier was a research associate at the University of Delaware for 18 months. Before that he was a postdoctoral research associate at the

Fritz-Haber Institute of the Max Planck Society in Berlin, Germany, for more than two and half years and a project leader also at the Fritz-Haber Institute for three years.

His research experience areas include: studying functionalized graphene sheets as catalyst and catalyst supports, carbon nanotubes functionalization for biomass conversion, and carbon nanotube synthesis. At Iowa State, Tessonier will continue his research in heterogeneous catalysis and biorenewables.

Tessonier received his education at Universite de Strasbourg in France. There he obtained his PhD in chemistry-catalysis, MS in analytical chemistry-materials science and BS in chemistry.



Rebecca Cademartiri is a new adjunct assistant professor in the chemical and biological engineering and materials science and engineering departments.

She brings six years of postdoctoral experience with her to Iowa State. Most recently, she was at Harvard

University, where she researched the electrostatic interactions of millimeter-scale objects and their self-assembly.

At Iowa State, Cademartiri will focus her research on the interaction of biological molecules and organisms, such as bacteria in cuts and infections, with materials to potentially develop adhesive bandages with anti-bacterial gauze.

Cademartiri received her undergraduate degree in chemistry from Johannes Gutenberg University in Germany and later received her PhD in physical chemistry from University of Potsdam in Germany.



Qun Wang joined Iowa State as an adjunct assistant professor in August. Dr. Wang is teaching in the Department of Chemical and Biological Engineering as well as the Department of Civil, Construction, and Environmental Engineering.

To Iowa State, Wang has brought two PhD's—one PhD in environmental science and engineering from Wuhan University in China and another in chemical and petroleum engineering from University of Kansas. He worked as Jorge Heller Postdoctoral Fellow in Professor Robert Langer's Lab at the Massachusetts Institute of Technology and Harvard Medical School.

Wang's research interests include: biomaterials, nanotechnology, drug delivery systems, regenerative medicine, environmentally friendly chemistry and wastewater treatment. At Iowa State, Wang will continue his research in functional materials for biomedical and environmental engineering.



Zengyi Shao will join us as an assistant professor beginning January 1, 2013.

She will bring three years of experience as a research assistant professor and postdoctoral research fellow at the University of Illinois, Urbana-Champaign. Shao received a

PhD and a MS in chemical and biomolecular engineering from University of Illinois, Urbana-Champaign. Before coming to the United States, Shao earned a BS in biochemistry and molecular biology from Nankai University in Tianjin, China.

Her activities at the University of Illinois included designing novel synthetic biology tools to activate cryptic pathways for drug discovery, including highly efficient methods of constructing large DNA molecules. At Iowa State she will continue her research in biorenewables and natural product biosynthesis using synthetic biology tools.



Bette Maybee joined our team in July as the new assistant to the chair.

Maybee brings four years of experience assisting in continuing education and public relations for Wartburg Theological Seminary in Dubuque. More recently, Maybee spent 13 years as a middle school

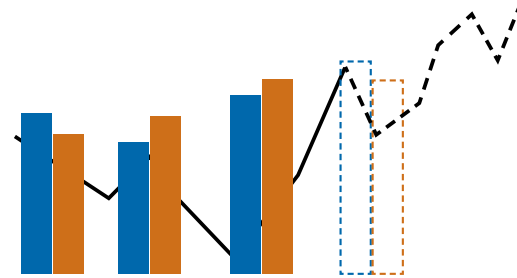
science and language arts teacher in Des Moines and Cedar Rapids. At Iowa State, she will assist the department chair, handle administrative tasks, and coordinate special events.

In her free time, Maybee enjoys writing romantic women's fiction and young adult paranormal fiction. She recently signed a contract for *Phoenix: The Rising*, a young adult paranormal suspense novel which is scheduled to be released in January 2013. Maybee's other novels include *The Tip Top Café*, a romantic women's fiction novel that is currently in submission.

Maybee acquired a BS in elementary education from Iowa State in 1982.



BRIDGING THE GAP IN BIORENEWABLES



CBiRC renewed!

The National Science Foundation renewed the NSF Engineering Research Center for Biorenewable Chemicals (CBiRC) for another three years. This brings NSF's total investment in CBiRC to \$30 million. CBiRC brings engineers and scientists together to invent catalysts that yield industrial chemicals from biorenewable sources. CBiRC also facilitates ways scientists commercialize their research—bridging the gap between education and business.

In the light of a national reinvestment in Iowa State's biorenewables research (see "CBiRC renewed!" below), the National Science Foundation Engineering Research Center for Biorenewable Chemicals (CBiRC) seeks to nurture technology startups required to commercialize such research.

The "alpha test" company, as Mike and Jean Steffenson Professor Brent Shanks calls it, is Glucan Biorenewables, LLC. He cofounded the startup this year with James Dumesic, Steenbock Professor and Michel Boudart Professor of chemical and biological engineering at University of Wisconsin; and Peter Keeling, who now serves as director of innovation for CBiRC on the Iowa State campus. Their product takes sugar from biomass into hydroxymethylfurfural (5-HMF) or furfural, chemical products from dehydration that are highly soluble. The 5-HMF can be oxidized to form furandicarboxylic acid (FDCA). From there the FDCA as a monomer is propagated into a polymer (plastic) that can replace polymers traditionally found in products like soda bottle plastic. This process technology decreases production costs of polymer products and is more environmentally friendly than traditional, petroleum-based plastic.

While the science is sound, Shanks considers how this technology can be applicable in Iowa and elsewhere. This is where the business start-up concept comes in. Glucan Biorenewables, LLC, has already received substantial start-up funding from the Grow Iowa Values Financial Assistance Program (\$100,000) and National Science Foundation Engineering Research Center commercialization funds (\$200,000). The

founding group also partners with Nidus Investment Partners (based out of St. Louis, Mo.) to bring business management and marketing expertise.

"As a start-up we want to alleviate the risk of biorenewable technology in the market," said Shanks. "So, through our partners, we reach out to companies to let them know the technology has a market and can save them money."

As the market side of the biorenewables research develops, building the entrepreneurial mindset of chemical engineering students now will make them effective innovators in the growing market, Shanks says.

"It starts with the students," said Shanks. "We must teach and train them to become entrepreneurs in addition to skillful chemical engineers." Shanks also says that the intimacy students have with their research as graduate assistants and postdoctoral researchers puts them in the best position to make research literally their business.

With this in mind, CBiRC offers a graduate student course in technology-led entrepreneurship. The 15-week course builds an understanding of what it takes to develop a technology-led idea into an early-stage entrepreneurial business proposition, according to CBiRC. The class is led by Peter Keeling, who coaches students to create a business concept with their idea. It is open to all Iowa State graduate students during spring semesters.

One such student that has taken advantage of this opportunity is Shivani Garg, a graduate assistant in the

Continued at BIORENEWABLES, page 17



Ankit Agarwal

Follow a PhD alumnus' journey from the lab through the world of a biomedical entrepreneur



Ankit Agarwal can lead chemical engineering into the lives of millions. As an Indian Institute of Technology Delhi (IIT-Delhi) undergraduate he aspired to advance medical technology, which has led to a productive Iowa State graduate career, national spotlight as a postdoc at the University of Wisconsin-Madison, and an illustrious

business venture in biosciences. The 2007 Iowa State PhD alumnus uses the “sense in his heart” to bring biomedical engineering to people.

“Being a good chemical engineer is not just performing good science,” Agarwal said. “It’s also about knowing how to commercialize tangible products.” In 2010 he co-founded Imbed Biosciences, Inc., a Wisconsin-based company that develops advanced materials for wound healing based on his patent-pending nanotechnology. He currently serves as its president and chief executive officer.

Their marquee product, which awaits Food and Drug Administration (FDA) approval for human clinical trial, is a wound dressing made of antibacterial silver nanofilms. Agarwal and a team of researchers at University of Wisconsin-Madison developed the material. When applied to severely burnt or otherwise wounded skin, the non-toxic silver is released to provide relatively long-term relief to wounds and prevent infection. While traditional wound dressing changes are very painful and can occur more than daily, silver nanofilm dressing requires days, even weeks before changing.

“Our process would be great relief for patients, especially children with large burn areas,” Agarwal said. “Also, with less trips to the hospital come lower treatment costs for patients.”

After graduating with Bachelor’s and Master’s degrees in biochemical engineering and biotechnology from IIT-Delhi by 2002, he sought an American university that would support his medical engineering research interests. “Iowa State is among the top institutions for chemical and biological engineering,” Agarwal said. “I realized the next innovations in medical biotechnology were being researched there, so I chose it.”

He chose to study under Associate Professor (now-Professor) Surya Mallapragada. Mallapragada says that from 2002 to 2007 Agarwal dedicated himself to her new gene delivery research program. He showed great initiative in starting new research collaborations, including with the Iowa Cancer Research Foundation.

“Ankit demonstrates the reach our students have of becoming entrepreneurs in the chemical engineering industry, and the impact that they can have on the U.S. economy,” says Mallapragada, who is now professor, CBE chair and Stanley Chair in Interdisciplinary Engineering.

The partnership with Iowa Cancer Research Foundation led to Agarwal’s work on novel stimuli-sensitive copolymers for non-viral gene therapy against cancer. In other words, Agarwal’s work dealt with DNA encapsulated by a polymer that is injected, ingested or implanted, to treat a disease like cancer without using a virus to deliver therapeutic proteins. The idea coincides with advances to produce less invasive cancer treatments. He was a highly productive researcher and his work resulted in more than five papers published in very good journals.

This kind of forward thinking and productive research track record attracted attention to Agarwal’s next venture – the Kauffman Entrepreneurial Postdoctoral Fellowship. He was one of 13 chosen for the prestigious fellowship, which “educates and trains scientist-founders who will create the high-growth technology companies of tomorrow,” according to the Ewing Marion Kauffman Foundation.

“The Kauffman fellowship allowed me to transfer the scientific knowledge I gained at Iowa State to business concepts required for commercializing research,”



Dr. Ankit Agarwal, a 2007 PhD alumnus, applies biomedical engineering research to his several inventions, including a silver antibacterial wound dressing.

Agarwal said. During the one-year fellowship, Agarwal was identified as one of “The Next Hot Entrepreneurs – Science PhDs” by *BusinessWeek* magazine. In 2009 he developed a business plan for what soon became Imbed Biosciences. His business plan won the 2010 Steven G. Burrill Business Plan Competition at the University of Wisconsin-Madison and the 2011 Propel business plan competition of Illinois Biotech Industry Organization (iBio). He was a finalist in other business plan competitions in Wisconsin, Boston (Mass.), and London (U.K.).

From 2007 to 2011 he worked as a postdoctoral research scientist with Professor Nicholas Abbott at the University of Wisconsin-Madison. Currently, he develops novel wound dressing prototypes at Imbed Biosciences on a Small Business Innovation Research Grant from NIH.

When Agarwal graduated from high school he decided between two passions: medicine and engineering. “I wanted to improve health care, but at the same time research ways products and systems could improve,” Agarwal said. “Now that I’ve produced something patients will be able hold in their hands, I am close to achieving both dreams.”



The evolution of soybean-based polymers



Assistant Professor and Karen & Denny Vaughn Faculty Fellow Eric Cochran

One might ask, what ingredient found in grandma's pie crust can also be found in environmentally friendly asphalt or tires? The answer is soybean oil. Graduate research assistant Nacu Hernandez and Assistant Professor and Karen & Denny Vaughn Faculty Fellow Eric Cochran have developed a bio-oil product that can replace the petroleum-based plastic found in products such as asphalt, adhesives and tires.

The process begins when raw soybean oil is obtained from a farm. The oil is then polymerized using a process called atom transfer radical polymerization (ATRP). Using ATRP Hernandez and Cochran have been able to control the polymerization of triglycerides so that it ceases at an ideal molecular weight and block composition. After thorough research and experimentation, the results provided an assortment of properties from tacky rubbers to strong elastomers at room temperature.

"There are many applications we have the potential to use these polymers for," Hernandez said. The initial application is asphalt modification. Asphalt was chosen to introduce this polymer because asphalt does not require precise components as other products that use this

polymer do. The product was first blended with asphalt by Chris Williams, a professor in the Department of Civil, Construction and Environmental Engineering at Iowa State University.

The ultimate target market for this polymer is the tire industry. The polymer can also be used in products such as adhesives, shoes, elastic, and many other applications.

This polymer is a thermoplastic, meaning if it is heated it can be melted down and reused, unlike thermosets that become permanently fixed in one shape after curing. Thermoplastics are more economical in the sense of storage and transporting. They're also beneficial to the environment because they can be reused. "It's not only going to help the company that is selling the product – it also helps the farmers because they can sell it for higher prices," Hernandez said. Farmers are able to earn higher profit on their yield if the crop is used for polymerization than if they produce ethanol.

Currently Hernandez and Cochran are trying to solve a lot of unanswered questions. For instance, "if you ask, how is it going to behave it ten years? I don't know yet. There are some tests that we have done and it shows it's going to behave similarly," Hernandez said. "Right now we're looking at how well it blends with the asphalt and its viscoelasticity." They are also in the beginning stages of building a pilot plant that will be able to produce 10 tons per week of the polymer. According to Hernandez, the construction is set to begin in May 2013. The plant will be producing in November 2013.

In fall 2010, Cochran and Williams first collaborated on the project when Kumho Petrochemicals Initiative, the largest global producer of tires based in Korea, hosted an internal proposal competition for research in the areas of green materials, carbon nanotubes, or bio-oil and biorenewable chemicals. Cochran said when he and Williams were trying to find something that would fit this competition, they started wondering why thermoplastic polymers hadn't been made out of triglycerides yet.

The team began working in the lab in summer 2011, and "everything began working very quickly, which never happens in research," Hernandez said. "Creating products that will reach the end market in a really short period of time is very exciting."



PhD candidate Nacu Hernandez (pictured above), is part of an interdisciplinary engineering team that will commercialize the process of converting soybean oil to sustainable components of polymer products, like asphalt and tires.

STUDENT BUSINESS: ChE senior William Lohry (far right) teamed with 2011 aerospace engineering graduate Sam Robinson (left) to win the 2012 Pappajohn New Venture Business Plan contest, an Iowa student entrepreneurship contest sponsored by celebrated business leader John Pappajohn (middle). The pair won \$5,000 for their business plan on Structuralize, a facial motion capture service.



ALUMNI



Deniz Uner (PhDChE'94) received a Professional Achievement Citation in Engineering (PACE) award in October from the Iowa State University Alumni Association. As professor and chair of chemical engineering at the Middle East Technical University (Turkey), Deniz Uner has made outstanding advancements in the field of catalysis in academia and industry. Uner has contributed significantly to the culture of science in the Middle East, including the founding of the Catalysis Society of Turkey and Tarik Somer Education Foundation.



The Society of Petroleum Engineers (SPE) recently honored **Paul Willhite** (BSChE'59) with the SPE/AIME Honorary Membership. Honorary Membership is the highest honor that SPE presents to an individual. Willhite is the Ross H. Forney Distinguished Professor at University of Kansas' Department of Chemical & Petroleum Engineering. Willhite received the Marston Medal, Iowa State College of Engineering's outstanding alumni award, in 2009.



Chris Ellison (BSChE'00) earned the 2012 DuPont Young Professor Award for his work in nanofibers and biorenewable fibers applied to regenerative medicine, filtration systems and protective clothing. Ellison is an assistant professor and Frank A Liddell, Jr., Centennial Fellow in the Department of Chemical Engineering at The University of Texas at Austin. He was only one of nine researchers in the world to receive the award, which funds "highly original" research early in a professor's research career.



Karen Albertson (BSChE'83) was a recipient of the Iowa State University Alumni Association PACE award. She has had an extensive career at 3M, where she is currently vice president for international business in the 3M Healthcare, Skin, and Wound Care Division. In this role she leads one of 3M's largest and most successful businesses, representing over two-thirds of 3M's global revenues. Albertson served on the CBE Industrial Advisory Council from 2001-2005 and rejoined in 2011.



Mary Jane Hagenson (MSBioMedEngr'76, PhD BioMedEngr'80) was appointed to the National Academies Board on Chemical Sciences and Technology and the National Science Foundation Directorate for Engineering Advisory Committee. Hagenson retired in April 2012 from a long, stellar career with Chevron Phillips Chemical Company, including her latest position as vice president of research and technology. She has chaired the CBE Industrial Advisory Council since 2011.

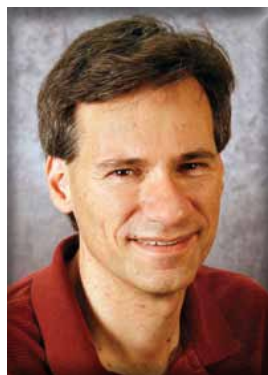
AWARDS

AND ACHIEVEMENTS

FACULTY



Derrick Rollins, professor of chemical and biological engineering and professor-in-charge of community-based recruitment and transition at Iowa State University, received the 2012 Tau Beta Pi-McDonald Mentor Award. A tireless adviser, Rollins was recognized for his outstanding success in mentoring engineering students. A particular focus of his work has been encouraging and empowering women, minorities, and youth from underrepresented groups to pursue and succeed in careers related to engineering and science.



Mike and Jean Steffenson Professor **Brent Shanks** recently garnered the Iowa State University Foundation Award for Outstanding Career Achievement in Research and the College of Engineering's D. R. Boylan Eminent Faculty Award for Research. Each award represents Shanks' pioneering vision and profound impact on biorenewables catalysis research. The university-level award recognizes faculty members for outstanding research and/or creative activity. College of Engineering's D. R. Boylan Eminent Faculty Award for Research recognizes Shanks' national and international acclaim for dedication to academic and research excellence.



The American Association for the Advancement of Science (AAAS) honors **Balaji Narasimhan** as Fellow. He is the associate dean for research in the College of Engineering, Vlasta Klima Balloun professor of engineering and an associate of Ames Laboratory. The award recognizes Narasimhan for "distinguished contributions that bridge materials science, immunology, and bioengineering, particularly for the science of degradable biomaterials for vaccine development and drug delivery." The AAAS is the world's largest general scientific society and publisher of the journal *Science*.



Manley R. Hoppe Professor **Jacqueline Shanks** was appointed to the U.S. Department of Energy's (DOE) Biological and Environmental Research Advisory Committee (BERAC), effective through December 2014. As one of four engineers on this 25-member national committee, Shanks lends her expertise in biorenewable and environmental engineering research to recommend solutions to national biological and environmental issues.



Robert Brown, an Anson Marston distinguished professor, was voted No. 59 on *Biofuel Digest's* Top 100 People in Bioenergy. The publication notes Brown's "impressive array of research on both first- and second-generation biofuels." The worldwide ranking is decided by readers of *Biofuels Digest* (a daily circulation of 33,000 subscribers plus a monthly online audience of 67,000) and the publication's editorial board.



University Professor **James Hill** advised Iowa State's Team PrISum on their way to an all-time-best second place finish in the 2012 American Solar Challenge. The engineering student team built a solar electric car, which they raced in stages across all eight states that touch the Great Lakes. Ten other university teams competed. Hill started Team PrISum at Iowa State as the "Solar Car Project" in 1989 and has served as faculty adviser since.

L. K. Doraiswamy

1927 – 2012



L. K. Doraiswamy, an Anson Marston distinguished professor emeritus in the CBE Department and an international pioneer in the field of chemical reaction engineering, died June 2 in Danville, Pa., while recovering from bypass surgery. He was 85.

Doraiswamy was known for his outstanding research and leadership and his global network of academic and industrial collaborations in chemical reaction engineering. Top accomplishments include election to the National Academy of Engineering in 2010, five top chemical reaction engineering books, and more than 170 critically acclaimed articles in international journals, to name a few.

Doraiswamy came to Iowa State in 1989 through a collaboration at the National Chemical Laboratory (NCL) in Pune, India, where he was pending retirement as NCL's director. Through his leadership, he transformed NCL into a research powerhouse in India. The collaboration was with then-Professor (now Anson Marston Distinguished Professor) Peter Reilly, who convinced Doraiswamy to join the Department of Chemical Engineering at Iowa State as the Glenn Murphy visiting professor of engineering. Doraiswamy joined the faculty permanently in 1992.

"He was the ultimate gentleman," Reilly said. "I consider Doraiswamy the most accomplished faculty member Iowa State chemical engineering has ever seen."

And for good reason. During his Iowa State tenure alone Doraiswamy gathered 11 national and international

awards, presented five symposia, taught through a visiting professorship, and served on a journal editorial board. He lectured at 78 universities throughout the U.S. and internationally. In 1992, he was awarded the Herbert Stiles Professorship. Four years later he was named an Anson Marston distinguished professor – the highest honor an Iowa State engineering professor can receive.

CBE Associate Professor R. Dennis Vigil looked up to Doraiswamy as a mentor and good friend. "He built a research program here pretty much from scratch," Vigil said, speaking of the chemical reaction engineering research thrust that now exists as catalysis and reaction engineering. "With this he was a generous, multi-dimensional man."

Leigh Thompson, nee Hagenson, was one such graduate student from 1993 to 1997. As a CBE undergraduate, she first learned of Doraiswamy while taking his graduate level reaction engineering course. This led to

an undergraduate research experience with him. After receiving her Bachelor's degree in 1993 she chose to pursue a PhD in chemical engineering, specializing in reaction engineering because of Doraiswamy.

"I learned a tremendous amount of technical knowledge from L.K.," Thompson said. "I also strive to emulate his dedication, openness, and unbounded love for his work, family and colleagues."

She earned her PhD in 1997. She is now Dow Chemical Company's corporate R&D associate director for strategic implementation. Thompson also serves on the CBE Industrial Advisory Council.

In 1998, Iowa State University established the dual, international L. K. Doraiswamy Lecture Series. Every year a distinguished chemical engineering speaker, a "Doraiswamy Lecturer," presents a lecture at both Iowa State University and at NCL in India.

Doraiswamy continued to inspire students and colleagues after his CBE retirement in 2001. Even up to the day before his fateful bypass surgery, he was working on a book (dedicated to the students at Iowa State University) and had submitted a successful Iowa State alumni award nomination for one of his former students, Dr. Deniz Uner. "If only we could all have that much passion about our life's work until our last days," Thompson said.

Doraiswamy was quoted saying, "excellence is a state of mind." Many vouch excellence in all aspects of Doraiswamy's life: personal integrity, ethics and responsibility; penchant for excellence tempered by realism; natural talent for developing people; warmth and sensitivity; and a knack for developing broad interests. He surely will be missed.



Professor Emeritus L. K. Doraiswamy was inducted into the National Academy of Engineering in 2010.

James R. Katzer

1941 – 2012



Dr. James Katzer (BSChE'64), an affiliate professor and longtime friend of the Department of Chemical and Biological Engineering, died of a heart attack in his sleep November 2 in Marshalltown, Iowa. He was 71.

Katzer began his Iowa State career as a chemical engineering undergraduate in fall 1961. In May 1964 he graduated with a

perfect 4.0 GPA – the top cumulative mark for a 1964 Iowa State engineering graduate. He soon pursued a PhD in chemical engineering at Massachusetts Institute of Technology (MIT), which he earned in 1969.

In his professional life, Katzer accumulated a rich mix of academia and industry experiences within his catalysis and reaction engineering repertoire. He began his academic life's work as an assistant professor of chemical engineering in 1969 at the University of Delaware.

By 1978 he progressed to full professor after a brief visiting professorship at Stanford University. During his promotion to professor he founded the university's Center for Catalytic Science & Technology. By 1981 Katzer established a career in industry, where he first became manager of the Catalyst Section at the Mobil Oil Corporation's Central Research Laboratory in Princeton, N.J. Various research and administrative positions led him to become vice president of technology in 1997.

Katzer's diverse experience in catalysis and reaction engineering research and commercialization piqued national interest in 1998. In that year he was elected to the National Academy of Engineering – considered the highest achievement for an American engineer. With the

merger of Exxon and Mobil Oil Corporation in late 1999, Katzer became manager of planning and performance analysis. He retired from ExxonMobil Research and Engineering Company in 2003.

In 2001 several colleagues nominated Katzer for the Marston Medal, which he won. The Marston Medal is the highest honor given to an alumnus/alumna of Iowa State University engineering. In 1983 he earned a Professional Achievement Citation in Engineering from Iowa State, which honored his professional competence and creativity in engineering research, development, administration and education.

Katzer continued to stay heavily involved in the profession after retiring. At the time of his death he was a member of the Technical Advisory Council for Rive Technology, a member of the Technical Advisory Board for China National Institute for Clean and Low-Carbon

Fuels, as well as affiliate professor and a member of the Industrial Advisory Council for the Iowa State University Department of Chemical and Biological Engineering. In addition, from 2006 to 2009 he was a panel member of the National Research Council of the National Academies. He also was, from 2004 to 2007, a visiting scientist for the Laboratory for Energy and The Environment at MIT.

In 2008 Katzer and his wife, Isabelle, established an endowed James Katzer Energy Graduate Fellowship at Iowa State, which recognizes the importance of chemical engineers and their development of solutions to national energy crises. So far, three CBE PhD candidates have been named James Katzer Energy Fellows – Yongsuck Choi in 2010, Catie Brewer in 2011, and Alex Liu in 2012. Choi and Liu continue to pursue their PhD. Brewer graduated in May 2012 and is now a postdoctoral researcher at Rice University, and starting a position in academia very soon.

Mike and Jean Steffenson Professor Brent Shanks notes Katzer's commitment to the success of Iowa State chemical engineering. "The CBE department lost a great friend and colleague who worked diligently on its behalf," said Shanks. "I will miss him on both a professional and personal level."

"Jim Katzer was a brilliant individual and a wonderful, caring person," said Surya Mallapragada, professor, CBE chair and Stanley Chair in Interdisciplinary Engineering. "He worked tirelessly for the department and we will really miss him."

A funeral service was held November 5 in Marshalltown, Iowa. In lieu of flowers, memorial contributions may be directed to the James Katzer Energy Fellowship at Iowa State University. Checks should be payable to the Iowa State University Foundation, 2505 University Boulevard, Ames, IA 50010.



James Katzer speaks at The World Coal-to-Liquids Conference in 2009. Photo courtesy of World CTL 2009

Sweeney Hall increases technology, capacity

With assistance from a competitive \$1.75 million National Science Foundation grant, Sweeney Hall completed improvements of laboratory spaces. The second and third floor labs in the 1964 wing of Sweeney Hall have expanded from what were two or three smaller labs. New fume hoods, instruments and cabinetry have been installed, along with electrical upgrades.

The Roy J. Carver Charitable Trust invested \$200,000 this year to renovate computer labs in Sweeney Hall. The 1150 computer lab now has a projector and 40 computers installed with the latest chemical engineering computing software. Room 3149 is now a multipurpose classroom equipped with twin 37-inch LCD screens at four group-study tables and 30 laptops, allowing interactive multimedia learning for up to 28 students.

Undergraduates in the Iowa State chemical engineering program will soon benefit from lab enhancements, thanks to a \$183,000 grant award from the College of Engineering's continuous improvement initiative for undergraduate education. The team of University Professor Charles Glatz, Professor Emeritus Ken Jolls and Senior Lecturer Stephanie Loveland use funds for new and replicate equipment for experiments, modernizing of some existing experiments, and for a part-time lab technician. A record enrollment trend in ChE 325, ChE 426, and ChE 427 lab courses has inspired the need for such enhancements in Sweeney Hall.

As our Centennial approaches (see page 19), we have other planned renovations, especially in the 1964 wing of Sweeney Hall. We have several in the works already through the generosity of our alumni such as Dean (BSChE'68) and Sharon Vance, Craig (BSChE'83) and Nancy Wheatley, Robert Gerwig (BSChE'52) in honor of his father O. J. Gerwig, and Gerald (BSChE'55) and Barbara Montgomery. These will be named spaces in the 1964 wing of Sweeney Hall. If you would like to learn more about this project, please contact Aimee Wesley in the College of Engineering Development Office at 515 294-6055 or at awesley@iastate.edu.



2 named Symbi Fellows, teach



Michael Nolan

Michael Nolan and Ryan Swanson, both chemical engineering PhD candidates, were recently named 2012-13 Symbi Fellows.

Symbi is Iowa's first graduate/K-12 program partnering Iowa State University, Des Moines Public Schools and the National Science Foundation. Symbi comes from the term "symbiosis" to represent the mutually beneficial relationship between graduate fellows, like Nolan and Swanson, and the middle school students they teach.



Ryan Swanson

Through the fellowship, Nolan works with science teacher Mrs. Jacqueline Stewart from Des Moines Public Schools' Hoyt Middle School to

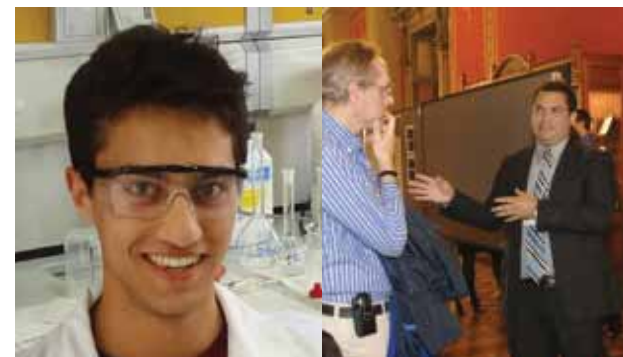
develop innovative and engaging science activities for middle school students. "I plan to use a card game and other activities to teach students about energy resources, renewable energy and value chains," Nolan said.

Swanson works with Mr. Tim Weida's eighth grade science class at Des Moines' Meredith Middle School. He implements an experiment with coffee filters, salt water and food coloring to demonstrate capillary action in paper chromatography.

These activities help young students gain interest in chemical and biological engineering, an interest that might entice them to do research as they get older. Nolan and Swanson spend one day per week with their middle school class for the entire 2012-13 school year.

Each Fellow receives a \$2,500 per-month stipend, \$1,000 travel allowance (including a trip to the GK12 awardees conference in Washington, D.C.), \$1,000 classroom supplies allowance, and cost-of-education allowance for fringe benefits and half of their tuition for the 2012-13 academic year.

Their Symbi Fellowships are effective June 1, 2012, through May 31, 2013. Nolan and Swanson were two of 10 Iowa State graduate students chosen for the fellowship. Both expect to complete their Iowa State chemical engineering PhD programs in May 2013.



CAPITOL RESEARCH: ChE senior Nikhil Shah (left) and 2012 graduate Christian Tormos presented their undergraduate research at the Iowa Capitol Building April 4. Shah discussed nanovaccines for an influenza pathogen, while Tormos talked about a photopolymerized nanocomposite hydrogel that treats acute cartilage damage. The students were two of 60 from Iowa's regent universities to showcase research at Iowa's 7th Annual "Research at the Capitol."

ISU Oviedo program featured in Spanish press

On June 29, 2012, the Iowa State University summer course in chemical engineering, held in Oviedo, Spain, captured the attention of national Spanish press. *La Nueva España* published "Acaba el experimento americano (The American experiment finishes)," which talks about the academic partnership among Iowa State, the University of Wisconsin-Madison and University of Oviedo to offer students an intense, international chemical engineering unit operations course. In addition to a demanding schedule, students talk about their experiences visiting Oviedo hotspots, like the Cathedral of San Salvador. Professor Emeritus Ken Jolls has directed the Iowa State portion of the Oviedo program since 2002.



ChE senior Abby Jensen studies in the Oviedo lab.



EXCELLENT GRADS: 2012 ChE PhD graduates Catie Brewer (left) and Seung Ha Kim received graduate excellence awards from Iowa State University: Brewer received the Teaching Excellence Award, while Kim received the Research Excellence Award. Kim began a postdoctoral research appointment at University of California, Santa Barbara in August 2012. Brewer is now a postdoc at Rice University and will begin her career as assistant professor in fall 2013 at New Mexico State University.

SCHOLARSHIPS

FRESHMEN

Sumaita Azam

Engineering Undergraduate Scholarship

Andrew Berg

Engineering Undergraduate Scholarship

Shane Blair

Engineering Undergraduate Scholarship

Mitchell Boge

Engineering Undergraduate Scholarship

Emily Bowen

L. C. "Doc" & Lina Allen Scholarship

Erin Boysen

Engineering Undergraduate Scholarship

Philip Bui

Engineering Undergraduate Scholarship

Kelsey Burt

Engineering Undergraduate Scholarship

Deanna Clark

Engineering Undergraduate Scholarship

Logan Clark

Engineering Undergraduate Scholarship

Joshua Claussen

Engineering Undergraduate Scholarship

Elaine Crawford

Engineering Undergraduate Scholarship

Jonathan Ellis

Marion & Andrew Pontius Scholarship

Paul Faronbi

Harvey Louis Dunker Scholarship

Chelsea Fleitman

Ross White Engineering Scholarship

David Gardner

Engineering Undergraduate Scholarship

Adrienne Gent

Engineering Undergraduate Scholarship

Jacob Gentile

Engineering Undergraduate Scholarship

Cody Hancock

Engineering Undergraduate Scholarship

Timothy Hargreaves

Engineering Undergraduate Scholarship

Andrew Hughes

Engineering Undergraduate Scholarship

Grady Hugunin

Engineering Undergraduate Scholarship

Jacob Imming

Engineering Undergraduate Scholarship

Cassandra Jenn

Wickert Family Scholarship in Engineering

Garret Johnson

Engineering Undergraduate Scholarship

Kaitlin Jongewaard

Engineering Undergraduate Scholarship, Engineering Talent in Every County Scholarship

Jacob Kaczinski

Roderick Seward, Flossie Ratcliffe & Helen M. Galloway Scholarship

Beth Kalal

Stephen E. Simon Scholarship

William Klenk

Engineering Undergraduate Scholarship

Tiffany Lam

Ross White Engineering Scholarship

Adam Lichty

Engineering Undergraduate Scholarship

Joseph Lineback

Engineering Undergraduate Scholarship

Zoe Linn

Engineering Undergraduate Scholarship

Christopher Mathy

Engineering Undergraduate Scholarship

Samantha Mattingly

Mary & Axel Peterson Scholarship

Katelyn McDermott

Engineering Undergraduate Scholarship

Kai McNeely

Engineering Undergraduate Scholarship

Amelia Medici

Engineering Undergraduate Scholarship, Engineering Talent in Every County Scholarship

Hannah Miller

Marion & Andrew Pontius Scholarship, Engineering Talent in Every County Scholarship

Nicolas Miranda-Bartlett

Engineering Undergraduate Scholarship

Kyle Murphy

Roderick Seward, Flossie Ratcliffe & Helen M. Galloway Scholarship

Justine Myers

Engineering Undergraduate Scholarship

Joel Naberhaus

Engineering Undergraduate Scholarship, Engineering Talent in Every County Scholarship

Emily Nelsen

Engineering Undergraduate Scholarship

Robert Nichols

Engineering Undergraduate Scholarship

Blake Nichting

Engineering Undergraduate Scholarship

Camille Perk

Paul Emerson Morgan Scholarship

Christian Pinnell

Engineering Undergraduate Scholarship

Deon Ploessl

Engineering Undergraduate Scholarship, Engineering Talent in Every County Scholarship

Sam Podobinski

Engineering Undergraduate Scholarship

William Reed

Engineering Undergraduate Scholarship

Brian Regan

Engineering Undergraduate Scholarship

Erin Robinson

Engineering Undergraduate Scholarship

Kendall Ryan

Mary & Axel Peterson Scholarship

Grant Schipper

Ross White Engineering Scholarship

Jill Schoborg

Engineering Undergraduate Scholarship

Jill Schomers

Stephen E. Simon Scholarship

Alexandria Schroeder

Ross White Engineering Scholarship

Sadie Schultz

Engineering Undergraduate Scholarship

Thasanaphone Sirisack

Engineering Talent in Every County Scholarship

Robert Sorenson

Engineering Undergraduate Scholarship

Samuel Sparland

Roderick Seward, Flossie Ratcliffe & Helen M. Galloway Scholarship

Jeffrey Spellmire

Engineering Undergraduate Scholarship

Ryan Stoner

Mary & Axel Peterson Scholarship

James Strobel

Engineering Undergraduate Scholarship

Jordan Suby

Roderick Seward, Flossie Ratcliffe & Helen M. Galloway Scholarship

Jordan Swedberg

Don P. Shafer Scholarship

Isaac Taylor

Johnson Transfer Scholarship

McKenzie Veith

Engineering Undergraduate Scholarship

Augustine Villa

Ralph S. Millhone Scholarship, Engineer's Week Senior Visitation Scholarship, National Merit Scholarship

Matthew Weaver

Mary & Axel Peterson Scholarship

Tyler Wolf

Engineering Undergraduate Scholarship

Peyton Zapzalka

Engineering Undergraduate Scholarship

UPPERCLASSMEN

Tina Akinyi

Engineering Undergraduate Scholarship, Frederick Martinson Scholarship

Rafael Alameda

Mike and Jean Steffenson Scholarship

Todd Anderson-Calderon

Manley R. Hoppe Scholarship

Joseph Arentson

Frederick Martinson Scholarship

Jessica Bangen

Frederick Martinson Scholarship

Jordan Barr

Frederick Martinson Scholarship

Cody Berra

Nicholas L. Reding/Monsanto Scholarship in Engineering

Mason Bieker

Cargill Oviedo Scholarship, Chadwick Morris Memorial Scholarship, Maurice & Ruth Larson Scholarship

William Black

Frederick Martinson Scholarship

Kimberly Booe

Ralph S. Millhone Scholarship, National Merit Scholarship

Nicholas Bormann

Donald H. Beisner in Honor of Dr. Morton Smutz Scholarship

Pavel Brodskiy

Ralph S. Millhone Scholarship, National Merit Scholarship

Dylan Camp

Mary & Axel Peterson Scholarship

Joseph Cicchese

Engineering Undergraduate Scholarship, Frederick Martinson Scholarship

Erin Claeys

Cargill Oviedo Scholarship, Chadwick Morris Memorial Scholarship, Maurice & Ruth Larson Scholarship

Alison Clark

Roderick Seward, Flossie Ratcliffe & Helen M. Galloway Scholarship

Patrick Conness

Harry Oakley Price Scholarship

Collin Coon

Engineering Undergraduate Scholarship

Sydney Copley

Engineering Undergraduate Scholarship

Amanda Cosgrove

Engineering Undergraduate Scholarship

Katelyn Dahlke

Jerrold S. & Mary R. Feroe Scholarship, Shepard Family Scholarship in Chemical Engineering

Darwin Darlin

Tau Beta Pi Scholars Program

Karen Dau

Roderick Seward, Flossie Ratcliffe & Helen M. Galloway Scholarship, Mike & Jean Steffenson Scholarship

Lindsey Debruin

Caterpillar Foundation Scholarship

Priya Desai

Rockwell Collins-Engineering Scholarship

Courtney Dewell

Lois & Manley Hoppe Scholarship

Jordan Donner

Manley R. Hoppe Scholarship

Daniel Ducharme

Nicholas L. Reding/Monsanto Scholarship in Engineering

Nicholas Eddy

Rockwell Collins-Engineering Scholarship

Matthew Ellis

Vander Linden Scholarship Fund, Cargill Oviedo Scholarship, Chadwick Morris Memorial Scholarship, Maurice & Ruth Larson Scholarship, National Merit Scholarship

Ethan Erickson

Lawrence E. Burkhart Scholarship, Engineering Undergraduate Scholarship



Devin Shepard (BSChE'97) was the keynote speaker at the 2012 Awards Banquet. CBE honored 247 students with about \$390,000 in scholarships.

Deziraé Fontes

Engineering Undergraduate
Scholarship

Casey Frank

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Jennifer Freeland

Eugene Devere Travis
Scholarship, National Merit
Scholarship

Margaret Gannon

Engineering Undergraduate
Scholarship

Meredith Gibson

Rockwell Collins-Engineering
Scholarship, Dow Chemical
Company, Cargill Oviedo
Scholarship, Chadwick Morris
Memorial Scholarship,
Maurice & Ruth Larson
Scholarship

Christina Goeddel

Frederick Martinson
Scholarship, National Merit
Scholarship

Adrian Gordon

E2020 Scholarship

Korey Gramenz

Clifford A. Shillinglaw
Scholarship

Paul Gregory

Lyle J. & Marcia L. Higgins
Scholarship

Eric Grinde

Cargill Oviedo Scholarship,
Chadwick Morris Memorial
Scholarship, Maurice & Ruth
Larson Scholarship

Daniel Grisard

Frederick Martinson
Scholarship, Engineering
Undergraduate Scholarship

Mitchel Grundmeier

Cargill Oviedo Scholarship,
Chadwick Morris Memorial
Scholarship, Maurice & Ruth
Larson Scholarship

Ryan Gunckel

Barbara L. Feroe Scholarship

Joseph Harper

Frederick Martinson
Scholarship

Christopher Heitkamp

Frederick Martinson
Scholarship, Mary & Axel
Peterson Scholarship

Andrew Hemken

Eugene Devere Travis
Scholarship, Engineering
Undergraduate Scholarship

Caitlyn Herndon

Eugene Devere Travis
Scholarship

Eric Hessing

Skogen-Hagenson
Scholarship, Engineering
Undergraduate Scholarship

Amber Hilderbrand

Mary & Axel Peterson
Scholarship, Mike and Jean
Steffenson Scholarship,
Cargill Oviedo Scholarship,
Chadwick Morris Memorial
Scholarship, Maurice & Ruth
Larson Scholarship

Megan Hingtgen

Ralph S. Millhone
Scholarship, Griffen Family
Scholarship, National Merit
Scholarship

Parker Hoyer

Ralph S. Millhone
Scholarship, Manley R. Hoppe
Scholarship, National Merit
Scholarship

Angelica Iacobucci

Tau Beta Pi Scholars
Program, Skogen-Hagenson
Scholarship

Carlie Iehl

Lyle J. & Marcia L. Higgins
Scholarship, A. Douglas &
Helen Steffenson Scholarship

Mitchell Irlmeier

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Christopher Isely

Lyle J. & Marcia L. Higgins
Scholarship

Christopher Jacobs

Rockwell Collins-Engineering
Scholarship, Engineering
Undergraduate Scholarship

Tanner Jaeger

Manley R. Hoppe Scholarship,
Engineering Undergraduate
Scholarship

Nicholas Jaegers

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

John Janiga

Engineering Undergraduate
Scholarship

Abby Jensen

Mike and Jean Steffenson
Scholarship, Cargill Oviedo
Scholarship, Chadwick Morris
Memorial Scholarship,
Maurice & Ruth Larson
Scholarship

Bradley Jimenez

Donald H. Beisner in Honor of
Dr. Morton Smutz Scholarship

Lizette Jimenez

E2020 Scholarship

Peter Joers

Lyle J. & Marcia L. Higgins
Scholarship

Tyler Johnson

Engineering Undergraduate
Scholarship, Frederick
Martinson Scholarship

Courtney Johnson

E2020 Scholarship

Brent Keller

Alpha Chi Sigma Scholarship

Christopher Killingsworth

Eugene Devere Travis
Scholarship

Megan Kleckler

Jack and Dilla Cosgrove
Scholarship

Jared Koliha

Mike and Jean Steffenson
Scholarship

Marissa Kruse

Mike and Jean Steffenson
Scholarship

Jessica Kuyper

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Austin Lange

Engineering Student
Leadership Development
Scholarship

August LaRenzie

Frederick Martinson
Scholarship

Cassidy LeClaire

Edwin John Hull Scholarship

Christine Leise

Nicholas L. Reding/
Monsanto Scholarship in
Engineering, Skogen-
Hagenson Scholarship, E2020
Scholarship

Rachel Lieser

Donald D. Kaser Scholarship,
Skogen-Hagenson
Scholarship,
E2020 Scholarship

Kaylyn Ludwig

Caterpillar Foundation
Scholarship

Joseph Malicki

Frederick Martinson
Scholarship

Kelly Markham

Manley R. Hoppe Scholarship

Alma Marquez

Stuart M. Totty Scholarship

Sarah Maslo

Rockwell Collins-Engineering
Scholarship, Roderick
Seward, Flossie Ratcliffe
& Helen M. Galloway
Scholarship

Reeto Mathew

Mike & Jean Steffenson
Scholarship

Paige Mattes

**Nelson Brothers
Scholarship**

Shana Matthews

National Merit Scholarship,
Ralph S. Millhone
Scholarship, Frederick
Martinson Scholarship

Sydney McKechnie

**Manley R. Hoppe
Scholarship**,
Engineering Undergraduate
Scholarship

William McNamara

Lois & Manley Hoppe
Scholarship

Renee Megchelsen

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Adam Michniak

Engineering Undergraduate
Scholarship

Steven Miller

Engineering Undergraduate
Scholarship, Nicholas L.
Reding/Monsanto Scholarship
in Engineering

Justin Miller

Nicholas L. Reding/Monsanto
Scholarship in Engineering

Rachel Morris

David C. Lovell Scholarship,
Frederick Martinson
Scholarship

Brandon Morris

Edward W. & Joyce C.
Backhaus Scholarship in
Chemical & Biological
Engineering

Tara Naber

National Merit Scholarship,
Ralph S. Millhone Scholarship

Lauren Nelson

E2020 Scholarship

Brandi Newman

National Merit Scholarship,
Ralph S. Millhone Scholarship

Brent Novey

Frederick Martinson
Scholarship

Moska Ommaid

Lois & Manley Hoppe
Scholarship

Molly Parsons

Frederick Martinson
Scholarship, National
Merit Scholarship, Ralph S.
Millhone Scholarship

Sara Parupsky

Mary & Axel Peterson
Scholarship, Skogen-
Hagenson Scholarship

Mario Peralta

Cargill Oviedo Scholarship,
Chadwick Morris Memorial
Scholarship, Maurice & Ruth
Larson Scholarship

Luke Petersen

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Cara Petrie

Nicholas L. Reding/Monsanto
Scholarship in Engineering

Alex Pettit

E2020 Scholarship

Hannah Pinnt

Engineering Undergraduate
Scholarship, Manley R. Hoppe
Scholarship

Jordan Platte

Lyle J. & Marcia L. Higgins
Scholarship, Cargill Oviedo
Scholarship, Chadwick
Morris Memorial Scholarship,
Maurice & Ruth Larson
Scholarship

Daniel Potter

Frederick Martinson
Scholarship

Andrew Radencich

Engineering Undergraduate
Scholarship

Janani Ragothaman

Engineering Undergraduate
Scholarship, Nicholas L.
Reding/Monsanto Scholarship
in Engineering

Tobias Rains

Engineering Undergraduate
Scholarship

Sarah Randall

Engineering Undergraduate
Scholarship

Zachary Reuschel

Engineering Undergraduate
Scholarship

Sabdiel Reyes

Robert O. & Marie E. Dierks
Scholarship

Emily Rickenbach

Frederick Martinson
Scholarship, Edward Henry
Ohlsen Scholarship

Grace Ricker

Frederick Martinson
Scholarship, Engineering
Undergraduate Scholarship

Amy Roggendorf

Ralph S. Millhone
Scholarship, National Merit
Scholarship

Eric Rowe

Ralph S. Millhone
Scholarship, National Merit
Scholarship

Paige Ruggle

Donald H. Beisner in Honor of
Dr. Morton Smutz Scholarship

Samantha Sauerbrei

E2020 Scholarship

Callie Schultes

National Merit Scholarship

Emily Schauer

Engineering Undergraduate
Scholarship

Kelsey Schieltz

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Michael Schneider

Frederick Martinson
Scholarship

Nikhil Shah

Ralph S. Millhone
Scholarship, Cargill Oviedo
Scholarship, Chadwick
Morris Memorial Scholarship,
Maurice & Ruth Larson
Scholarship, National Merit
Scholarship

John Skubic

Hans Buehler Scholarship

Tyler Smith

Tau Beta Pi Scholars
Program, Kenneth L. Garrett
Scholarship in Chemical &
Biological Engineering

Ryan Spellerberg

Erwin DeLoris Whitney
Scholarship

Timothy Sprick

Rockwell Collins-Engineering
Scholarship

Ian Storey

Nicholas L. Reding/Monsanto
Scholarship in Engineering

Sarah Sutter

Ralph S. Millhone
Scholarship, Gretchen L.
Bruffy Scholarship, National
Merit Scholarship

Thomas Teav

Lois & Manley Hoppe
Scholarship

Erin Theros

Robert Fields Scholarship,
Skogen-Hagenson
Scholarship

Taylor Tomlinson

Rockwell Collins-Engineering
Scholarship, Engineering
Undergraduate Scholarship

Erika Vaassen

Lyle J. & Marcia L. Higgins
Scholarship

Rylie Van Marel

Lois & Manley Hoppe
Scholarship

Hannah VanEvery

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Maria Wahl

Frederick Martinson
Scholarship, Roderick
Seward, Flossie Ratcliffe
& Helen M. Galloway
Scholarship

Ashley Waller

Dr. Owen A. Heng Chemical
and Biological Engineering
Scholarship

Andrew Walsh

Engineering Undergraduate
Scholarship

Joseph Wandrei

Frederick Martinson
Scholarship, Engineering
Undergraduate Scholarship

Erika Weimer

E2020 Scholarship

Sara White

Engineering Undergraduate
Scholarship

Daniel Wiegel

P. Fred Petersen Scholarship

Olivia Wilwert

Roderick Seward, Flossie
Ratcliffe & Helen M.
Galloway Scholarship

Abdikadir Yussuf

Kenneth & Mary Heilman
Scholarship

**GRADUATE STUDENTS
(FELLOWSHIPS)****Mark Brown**

PSI Fellowship

Jonathan Goodman

Miller Fellowship

Chi "Alex" Liu

James Katzer Energy
Fellowship

John Matthiesen

Sweeney Family Memorial
Scholarship Award,
Engineering Deans Fellowship

Michael Nolan

Symbi Fellowship

Ryan Swanson

Symbi Fellowship

Lee Trask

Chevron Phillips Fellowship

MARK DEATON

Traveler, fitness-enthusiast, role model, leader, researcher, chemical engineer. Chemical engineering senior Mark Deaton is not only a well-rounded student but also an outstanding mentor of fellow undergraduates and avid biorenewables researcher. His passion will facilitate the industry in reaching new heights.

He wishes to silence the ongoing petroleum debate, eliminate the dependence on foreign oils and restore the natural environmental balance. Deaton believes his research will help accomplish these goals. Working under Assistant Professor Laura Jarboe, Deaton has been able to study the effects of ethanologenic *E. coli* strain on bio-oil produced from organic materials such as starch, corn, and switch grass. Over the past year, Deaton has been aiming to evolve the *E. coli* by inserting genes that show resistance to certain contaminants found in the bio-oil into the bacteria to make it more sustainable and competitive with ethanol. Deaton has been involved with *E. coli* research since 2010.

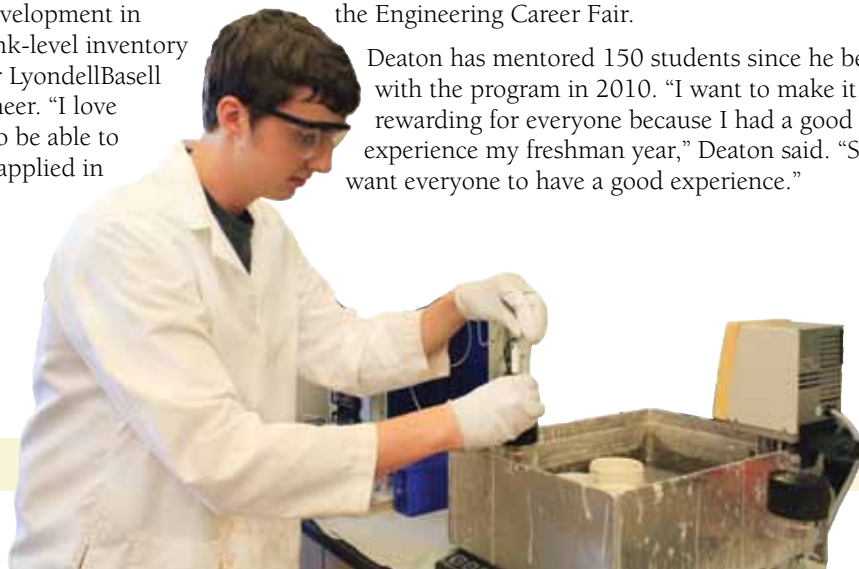
In addition to researching in the labs at Iowa State University, Deaton also is familiar with the industry aspect of research. Most recently Deaton interned for Chevron Phillips Chemical (Pasadena, Texas), where he was involved in an ongoing development in producing resin and creating a tank-level inventory database. He also has interned for LyondellBasell (Clinton, Iowa) as a process engineer. "I love working in the lab, but it's great to be able to see what we've learned in school applied in the industry," Deaton said.

In 2011, Deaton presented his research in the NSF Engineering Center for Biorenewable Chemicals (CBiRC) elevator pitch competition. He won first place

among all the undergraduates. The contestants had 90 seconds to present their research, business proposals, or anything else they could potentially want someone to invest in. The contestants were then judged by a panel and awarded according to the success of their pitch.

In addition, Deaton is a peer mentor for the Iowa State University Chemical Engineering Learning Community. He won an Exemplary Peer Mentor award for the 2011-2012 academic year — one of only 24 students across Iowa State to receive it. Deaton said he won this award because of his extra effort asserted and evident level of enthusiasm for the program and the students. Through learning communities, students are able to interact with other students with similar academic goals, learn about university resources, explore future career opportunities, and connect with faculty. The aspect Deaton enjoys the most is helping the students prepare for interviews and the Engineering Career Fair.

Deaton has mentored 150 students since he began with the program in 2010. "I want to make it rewarding for everyone because I had a good experience my freshman year," Deaton said. "So I want everyone to have a good experience."



Above: Deaton with first place CBiRC elevator pitch competition poster. Below: Deaton and fellow interns on their last day at Chevron Phillips Pasadena (California) plant in summer 2012.



It is evident Deaton loves meeting and interacting with a variety of different people. He says his dream job would involve working with various departments and coordinating efforts to produce a cohesive project.

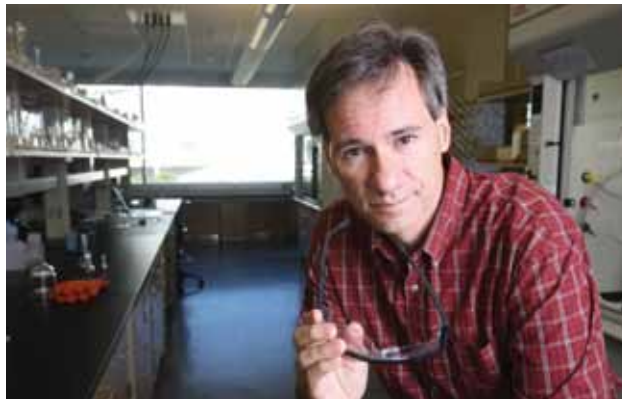
Deaton plans to graduate in May 2013. He will travel to Spain for the International Summer Course in Chemical Engineering at the University of Oviedo, Spain. Deaton has already accepted a position with Chevron Phillips Chemical, where he'll start in August 2013.



"We want to bridge the gap between traditional academic study and the entrepreneurship required to commercialize."

Brent Shanks

Mike and Jean Steffenson Professor
Director, CBiRC



BIORENEWABLES, from page 5

Department of Molecular, Cellular and Developmental Biology. Mentorship by Keeling and her major professor, Dr. Basil Nikolau of CBiRC, after taking the entrepreneurship course inspired her to apply for the \$50,000 National Science Foundation Innovation Corps Program grant. She won it.

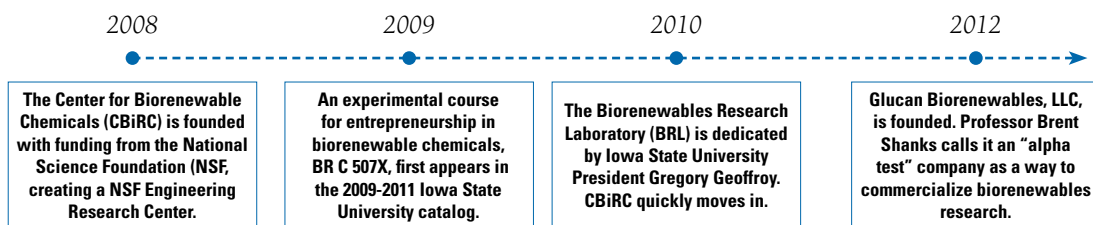
"I was asked to further develop my business idea for the grant," said Garg. "It not only helped me better define my business model; but it also acquainted me with real-world challenges."

She will use the grant to fund her work in novel biocatalysts applied to production of value-added bio-based chemicals. Garg said that the project is "one of the core research projects for CBiRC," which has "a lot of industrial and real-world application" that business models like hers can utilize.

Through CBiRC, Shanks hopes that a student's traditional academic path can include one that inspires technology-based startups to increase prevalence of biorenewable technologies.

"We as researchers and innovators want to bridge the gap between traditional academic study and the entrepreneurship required to commercialize academic knowledge, particularly in biorenewables," said Shanks.

A glimpse of CBiRC/Glucan Biorenewables, LLC, history



Allen Jacobson (BSChE'47) passed away November 1, 2012. He was 86. Upon his earning a Bachelor's degree in 1947, Jacobson started working in 3M's Scotch tape laboratory. From there he progressed through several positions as vice president for 3M's Industrial Tape Division, head of 3M Canadian operations, head of 3M

European operations, group vice president and executive vice president. In 1986 he became 3M's chairman of the board and chief executive officer. In 1991 he retired after increasing the company's revenue by 50 percent (\$13 billion in 1991) and income by 67 percent (\$1.3 billion in 1991) in his five-year tenure. He dedicated \$800 million to research and development, which represented 6.5 percent of company sales. In March 1998 he was featured on the cover of *Fortune* magazine for these accomplishments, saluting 3M's commitment to innovation. Back at Iowa State University the 3M Innovations/Allen F. Jacobson Chemical Engineering Research Laboratories on third floor of Sweeney Hall, dedicated in 1994, are named after him. In 2011 Jacobson garnered the Iowa State University Distinguished Alumni Award.

Karen Ann (Foster) Gray (BSChE'60) passed away July 25, 2012, in Midland, Mich. She was 73. Gray was one of two women in her class to earn a Bachelor's degree in chemical engineering. Later in life she periodically worked at Delta College (University Center, Mich.) in the admissions department, taught Bullock Creek Adult Ed Chemistry, and led various choirs and youth groups.

Charles Eugene Walker (BSChE'59) passed away April 26, 2012, in Manhattan, Kan. He was 75. After graduating he pursued a PhD in cereal science at North Dakota State University, which he earned in 1965. During his career, Walker developed a repertoire of both industry and academic excellence. He retired in 2005 after a 40-year career teaching and doing research in food science and technology.

DONORS

INDIVIDUALS

Russell & Sally Abarr
Elizabeth Abbott-Sirrine
Michael Addison
Christine Aikens
Raymond Albert
Richard Allen
Paul Allphin
Michael Anctil
Brian Anderson & Yanhui Hu
Ronald & Keitha Anderson
William & Priscilla Armstrong
Janardhana Baliga
George Barac
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1913 TO 2013 AND BEYOND 100 YEARS OF ISU ChE

As you may have noticed, the CBE department is poised to celebrate 100 years in fall 2013. We culminate a century of high-profile research and nationally recognized teaching excellence as the Centennial Celebration. Join us. Please save the dates of Centennial Celebration events (at right) in your calendar.

As part of the Centennial Celebration, we want to capture your experiences as an Iowa State chemical engineering student. Submit your story to cneary@iastate.edu or write us to the following address: **Department of Chemical and Biological Engineering; Iowa State University; 2114 Sweeney Hall; Ames, IA 50011.** We're happy to accept appropriate, print quality photos that accompany your experiences i.e. research, student clubs, learning communities, sporting events, etc. You are what made the past 100 years of Iowa State chemical engineering successful.

Keep track of Centennial Celebration announcements at www.cbe.iastate.edu/centennial. At this website, we're compiling a list of alumni who plan to attend. Email Bette Maybee at bjmaybee@iastate.edu or return the Save the Date card if you plan to attend.

September 26-27, 2013

2-Day Research Symposium

More than a dozen distinguished speakers, including alumni who are leaders in industry and academia, will present seminars in lecture rooms on the Iowa State campus. Tours of Sweeney Hall will follow.

September 27, 2013

Lunch Reunions

We'll provide food and drink. You reminisce your Iowa State adventures with fellow alumni of your graduation decade.

Centennial Dinner Banquet

The highlight of the Centennial Celebration is at Memorial Union, featuring keynote speaker Richard Seagrave (MSChE'59, PhDChE'61). Also, the inaugural CBE Alumni Hall of Fame members will be honored.

September 28, 2013

Tentative 2013 ISU Family Weekend/Cyclone Football Game

Dear Alma Mater ... Hearts allegiant to the Bells of Iowa State.

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