

DIMENSIONS

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June 2017



IOWA STATE UNIVERSITY
Department of Mechanical Engineering

Message from the Chair



Dear alumni and friends,

We are proud to share the achievements of not just the mechanical engineering department but also faculty, staff, and students, past and present. We became the largest mechanical engineering department in the country in fall 2016, and we are still growing!

To serve the growing number of students, the department has made many changes since our last issue of Dimensions. We have hired three new faculty members who will start in fall 2017: Carmen Gomes, Jonghyun Lee, and Beiwen Li.

Our facilities too are growing and improving. The department has opened a new space known as "The Mine," which consists of five classrooms and teaching labs in the basement of Black Engineering Building. Among those work spaces is the new 2,541-square foot senior capstone classroom which includes eight teaming stations with the latest CAD software for 3D modeling, project storage, a mechatronics/data acquisition workstation, walls that double as dry erase boards, and a shop space with tools. While in "The Mine," students are encouraged to "Leave Your Limits at the Door." The Nuclear Engineering Building was torn down in May but the nuclear engineering minor is still going strong. The Nuclear Engineering Lab has been moved to the Applied Science Center and the new Student Innovation Center will be built on the site of the old Nuclear Engineering Building.

Among our faculty accomplishments, professor Robert C. Brown has moved up in the Top 100 Bioeconomy Listing; assistant professor Ganesh Balasubramanian was named the 2017 McNair Faculty Mentor of the Year; and ME researchers Sourabh Bhattacharya, Baskar Ganapathysubramanian, and Soumik Sarkar have teamed up with the agronomy department to study the use of robotics in agriculture.

Our graduate and undergraduate students kept busy with their classes, research, teaching, and other responsibilities. Read about Mouhamad Diallo, an undergraduate student who recently received a Goldwater Scholarship; ME student Alexander Doppenberg who was part of a winning team at the Disney Imagineering design contest in Orlando; and an effort by Engineers Without Borders to ease water procurement in a West African village.

Our alumni continue to achieve success and excellence in their careers and endeavors. This issue features stories about an alumna who is using her ME knowledge, coupled with her communications skills, in her new role as Director of Strategic Procurement for MidAmerican Energy; an alum who started a company focused on sustainability and is helping people in Nicaragua; and an alum who was recently awarded a National Science Foundation Graduate Research Fellowship as he pursues his PhD in mechanical engineering at the University of California-Berkeley.

Lastly, in commemoration with the 150th anniversary of the first class of students entering Iowa State in 1869, we are putting together a book that will tell the story of our department's history. Mechanical Engineering (then called "Mechanic Arts") was one of the original fields of study offered to students. If you have stories, pictures, or anything else to share about our department's proud history, please send them to communications specialist Nick Fetty at nrfetty@iastate.edu or 515-294-5065.

Our alumni are vital to the growth and success of mechanical engineering and industry in the U.S. and abroad. We enjoy hearing about your accomplishments. Please feel free to reach out and share your story. You can contact us at mealumni@iastate.edu.

Sincerely,

Caroline Hayes
Department Chair
Lynn Gleason Professor of Interdisciplinary Engineering

Volume No. 24 | Issue No. 2

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Prepared by Nick Fetty, ME Communications Specialist, nrfetty@iastate.edu

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On the cover

Mechanical Engineering graduate student Julie Bothell practices welding as teaching lab coordinator Jim Shelledy provides instruction in Black Engineering Building on March 31, 2017. Photo by Nick Fetty.

Mechanical engineering has largest undergrad enrollment on campus



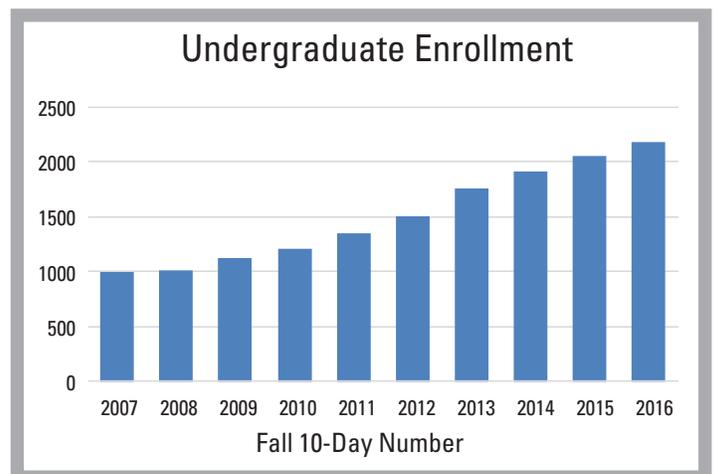
ME lecturer Paola Pittoni teaches Heat Transfer (ME 436) in Marston Hall on Sept. 23, 2016. Photo by Nick Fetty.

Enrollment in the mechanical engineering undergraduate program at Iowa State for the spring 2017 semester is nearly twice the size of the next biggest major, according to data from the Office of the Registrar.

ME's spring 2017 enrollment comes in at 2,054, ahead of second-place kinesiology and health with 1,119 students. Though not a degree-granting program, there are 1,750 undergraduates this spring on the "pre-business" track. Roughly one-third of this spring's undergraduate student body are concentrated in 10 majors: mechanical engineering, kinesiology and health, animal science, elementary education, aerospace engineering, chemical engineering, psychology, computer engineering, biology (AGLS and LAS), and civil engineering.

"I am honored that all these students and their parents have chosen to entrust us with their education," said ME Department Chair Caroline Hayes. "It is my aim to give the best educational experience possible. Mechanical Engineers make the world a better place."

In the fall, Iowa State surpassed Georgia Tech University to become the nation's largest undergraduate ME program.



Data from the 2016-17 ME Annual Report.

Do you have story ideas for the next issue of *Dimensions*?

Send them to mealumni@iastate.edu

In memoriam

Clyde Anderson (BSME'46): Dec. 19, 2015
Keith Ankeney (BSME'50): October 16, 2015
Alfred Ashby (BSME'50): Sept. 14, 2016
William Belt (BSME'46): June 24, 2015
Harlan Bentzinger (BSME'44): Oct. 21, 2015
Richard Bergeson (BSME'56): Aug. 18, 2016
Warren Berkley (BSME'41): July 19, 2015
Ray Berry (BSME'60): Nov. 27, 2016
William Bestmann (BSME'48): May 23, 2016
Kenneth Brooker (BSME'42): June 20, 2015
Richard Broschat (MSME'50): April 16, 2016
L. Edward Brungraber (BSME'48): July 16, 2016
Donald Buckingham (BSME'54): Jan. 28, 2016
Robert Burgan (BSME'48): May 15, 2015
Hubert Burken (BSME'50): April 13, 2016
Roger Burnham (BSME'60): Nov. 13, 2016
Kenneth Carlson (BSME'42): Feb. 17, 2016
William Challas (BSME'41): April 18, 2016
John Champion (BSME'61): Jan. 15, 2016
Edward Chapman (BSME'47): May 25, 2015
Robert Christenson (BSME'56): March 6, 2017
David Christoffersen (BSME'78): Jan. 16, 2017
David Clizbe (BSME'47): March 16, 2016
James Condra (BSME'59): Feb. 28, 2016
Douglas Corlette (BSME'48): Jan. 10, 2017
Richard Croell (BSME'55): Sept. 9, 2016
Larry Curtis (BSME'68): Jan. 21, 2016
Gareth Davis (BSME'55): April 1, 2016
John Farmer (BSME'50): May 29, 2016
Gregory Gerdes (BSME'91): Oct. 27, 2015
Ralph Graham (BSME'49): May 23, 2015
Charles Gregory (BSME'64): April 24, 2016
Henry Haegg (BSME'45): Feb. 25, 2017
John Hagge (BSME'66, MSME'74): Oct. 19, 2015
Charles Harderson (BSME'55): Aug. 29, 2016
Richard Heath (BSME'59): June 10, 2015
James Herring (BSME'47): May 15, 2016
Aruthur Heuermann (BSME'50): June 15, 2016
Robert Heusel (BSME'46): Nov. 14, 2015
Benny Hillberry (BSME'61, MSME'64, PhDME'67): April 4, 2016
Myron Hunzeker (BSME'53): Aug. 11, 2016
Donald James (BSME'77): Dec. 18, 2016
Robert Jensen (BSME'47): Oct. 8, 2015
Wendell Johnson (BSME'58): March 29, 2017
Frank Jones (BSME'59): Oct. 18, 2016
Wayne Keith (BSME'44): June 28, 2015
Jeffrey Kloster (BSME'05): Jan. 13, 2016
David Knapp (BSME'57): Jan. 17, 2017
Bernard Lieb (BSME'48): July 19, 2016
John Liggett (BSME'42): May 2, 2015
Donald Lorenz (BSME'48): Dec. 8, 2016
Donald Lowery (BSME'53): Feb. 7, 2016
Warren Lueder (BSME'43): Oct. 18, 2015
William Marks (BSME'66): April 5, 2016
Linn McIntyre (BSME'42): July 12, 2015
Michael Merfeld (BSME'48): March 5, 2017
Frank Mertes (MSME'59, MSNucE'59, PhDNucE'62): July 19, 2015
Richard Miller (BSME'51): March 16, 2017
Matthew Moore (BSME'93): March 1, 2016
John Mossberg (BSME'59): Nov. 22, 2016
Wayne Muth (MSME'60, PhDME'63): Oct. 6, 2016
Leo Nady (BSME'42): Aug. 10, 2016
William Nanninga (BSME'49): Nov. 11, 2016
Robert Nechanicky (BSME'53): April 8, 2016
Edgar Nelson (BSME'52): Sept. 15, 2016
Douglas Olson (BSME'71): Oct. 18, 2015
Donald Otto (BSME'59): Sept. 5, 2015
Richard Ottsen (BSME'75): Jan. 21, 2017
Robert Parker (BSME'62): July 25, 2015
Samuel Parks (BSME'60): Aug. 3, 2015
Darwin Petersen (BSME'52): Oct. 25, 2015
Donald Pfau (BSME'51): March 1, 2016
Ronald Pratt (BSME'66): Dec. 21, 2016
Merton Purvis (BSME'44, MSME'49): June 10, 2015
Ardeshir Rostami (BSME'67): July 4, 2016
Richard Ryer (BSME'47): Dec. 9, 2016
Robert Sauer (BSME'45): June 24, 2016
Neil Schilmoeller (BSME'59, MSME'62, PhDME'65): Dec. 28, 2015
Larry Schlenker (BSME'55, PhDME'66): Aug. 12, 2016
Daniel Schwartz (BSME'58): Nov. 17, 2016
Clayton Shepard (BSME'51): Oct. 4, 2015
Thomas Shupe (BSME'59): April 6, 2016
James Steffen (BSME'59): Dec. 11, 2015
James Taylor (BSME'54): Nov. 2, 2015
Gary Titus (BSME'63): Feb. 22, 2017
Kamal Toma (MSME'62): April 21, 2016
Leon Tracy (BSME'51): Oct. 8, 2015
Donald Turkington (BSME'44, MSME'47): March 10, 2016
Rudy Van Hemert (BSME'57): May 29, 2015
Donald Vry (BSME'49): March 6, 2017
Herold Whitmire (BSME'49): Dec. 18, 2015
Taylor Williams (BSME'15): Dec. 9, 2016
Richard Williams (BSME'38): Nov. 15, 2016
Orville Winter (BSME'50): Feb. 6, 2016
James Woodworth (BSME'48): Jan. 7, 2017
Robert Woolard (BSME'49): July 9, 2015
Gerald Zahradnik (BSME'62): May 19, 2015

Graduate student honors

Stuart Barkley was named a fellow for the Iowa Space Grant Consortium.

Fall 2016 Research Excellence Awards

Jing Liu
Zhenping Liu
Kin Gwn Lore

Spring 2017 Research Excellence Awards

Daniel Stoecklein
Yangsui Xie
Yuan Xue

Fall 2016 Teaching Excellence Awards

Denis Bbosa
Eshan Madadi-Kandjani
George Theng Ching Ooi

Spring 2017 Teaching Excellence Awards

Juan Proano Aviles
Jiazhong Zhou
Rui Zou

Undergraduate student honors

Olivia Carrasco, WiSE (Women in Science and Engineering) Undergraduate STEM Award recipient.

Mouhamad Diallo, 2017 Goldwater Scholarship recipient.

Julia Eckhoff, WiSE (Women in Science and Engineering) Undergraduate STEM Award recipient.

Sydney Good, 2017 ME 324L Undergraduate Teaching Assistant CYtation Award recipient.

Denny Kramer, named Outstanding Senior for Fall 2016 commencement.

Did you know?

The original ten bells on Iowa State's iconic campanile were donated by Edgar Stanton, an ME alum who was part of the Iowa State's first graduating class in 1872. Stanton spent more than half a century on the Iowa State campus, including four terms as acting president. The bells were donated in memory of Stanton's first wife, Margaret McDonald Stanton, the university's first dean of women.

Student design team updates

Baja Team



Following two overall 6th place finishes and one overall 9th place finish last season, the best in the team's 30 year history, SAE Baja spent the past fall and spring engineering their new off-road vehicle. The team is confident their hard work will pay off this May at competitions in California, Kansas, and Illinois.

Clean Snowmobile Challenge Team



The SAE Clean Snowmobile Challenge team has been competing in an annual competition each Winter since starting up in 2014. In the 2016 competition, the team placed 6th in their class and had the 3rd cleanest snowmobile in the competition. In the most recent competition in March of 2017, the team placed 10th after having a thermal event that ended the competition early for them.

Team PRISUM



After a year and a half of design and fabrication, 120 Iowa State University students are about to unveil the world's first Solar Utility Vehicle. Penumbra is a four-seat solar-electric car with many of the creature comforts found in regular automobiles. Coming standard with Bluetooth connectivity and wireless charging, Penumbra has been built to show the world that solar electric vehicles are feasible and stylish. Penumbra will be unveiled on June 2nd at the Iowa State University Alumni center, followed by a 99 county tour of the state of Iowa.

Faculty and staff honors

Ganesh Balasubramanian, Assistant Professor
2017 McNair Faculty Mentor of the Year

Timothy Bigelow, Associate Professor
2017 AIUM (American Institute of Ultrasound Medicine) Fellow

Robert Brown, Professor
Patent for "Bio-oil Formulation as an Asphalt Substitute"

Atul Kelkar, Professor
Patent for "Active Noise Control System"

Meng Lu, Assistant Professor
National Science Foundation's (NSF) CAREER Award

Paola Pittoni, Lecturer
2017 ME Professor of the Year

Rafael Radkowski, Assistant Professor
2017 Miller Faculty Fellow

Sriram Sundararajan, Associate Dean
WiSE (Women in Science and Engineering) Champion

Judy Vance, Professor
WiSE (Women in Science and Engineering) Champion

Jessica Van Winkle, Academic Adviser
2016-17 Outstanding Engineering Adviser



ME worked with Des Moines-based PUSH Branding to open The Mine in January of 2017. The Mine is a 6,317 square foot area in the basement of Black Engineering Building which includes ME335 Fluids Lab in 0076, ME370 Instrumentation Lab in 0069, ME421 Controls Lab 0083, ME436 Heat Transfer Lab in 0087 and ME415/466 Capstone Design Lab and classroom in 0095. Among these classrooms is 0095 which is a workspace for students in the senior capstone design course

(ME 415 and ME 466). This 2,541-square foot classroom includes eight teaming stations with the latest CAD software for 3D modeling, project storage, mechatronics/data acquisition workstation and a shop space with tools. Students in The Mine are encouraged to "Leave Your Limits at the Door" while they let their imaginations and creativity soar with the floor to ceiling dry-erase walls.



ISU students take 1st place at Disney Imagineering design contest finals

Three Iowa State University design and engineering students took first place competing in the 26th Walt Disney Imagineering Imaginations Design Competition last month in Glendale, California.

Cristina Diaz, Aurora, Illinois, senior in interior design; Alexander Doppenberg, Spencer, senior in mechanical engineering; and Joshua Kurnia, originally from Jakarta, Indonesia, and now of Ames, senior in architecture, are among six teams of students from seven universities selected as finalists in the competition, sponsored by Walt Disney Imagineering to find and nurture the next generation of "Imagineers."



Iowa State's Disney team is composed of Alexander Doppenberg, Spencer; Cristina Diaz, Aurora, Illinois; and Joshua Kurnia, originally from Jakarta, Indonesia (now of Ames).

In addition to Iowa State, the top teams represent Carnegie Mellon University, Howard University, Miami University, Savannah College of Art and Design, the University of California, San Diego; and University of Notre Dame. Twenty-one finalist students were awarded a five-day, all-expense-paid trip to Imagineering's headquarters in Glendale, where they are presenting their projects to Imagineering executives and competing for monetary awards.

This year's competition challenged students to apply the same design principles used in creating Disney's theme parks, resorts and other attractions to develop new outdoor spaces within their own colleges or universities that could address the diverse needs of students, faculty and visitors while providing a respite from daily stress.

'Hourglass'

The Iowa State team's "Hourglass" design is shaped like an hourglass turned on its side. The space features individual, geothermal "pods" below ground for a more private experience and an aboveground sitting area with heated benches where visitors can socialize in comfort year-round.

"Because time — or the perceived lack of it — is a major stressor, especially for college students, we wanted to play with the idea of stopping time," Kurnia said. "An hourglass represents the constant ticking of time, but if you tip it on its side, the sand stands still; you've symbolically stopped time."

The team chose a site in front of MacKay Hall on central campus for the project

because "it's an area most of us at the university pass through," Diaz said. "We wanted to provide a space where guests could relax and enjoy the beauty of the seasons."

The portion aboveground consists of ETFE film, a durable, transparent membrane that's reflective on one side, stretched over aluminum tubing. People viewing it from the outside see themselves and the landscape reflected, while people inside can see through to the landscape.

"ETFE is a relatively new material used in buildings like the Beijing Water Cube (the 2008 Olympics swimming facility) and the U.S. Bank Stadium in Minneapolis," Doppenberg said. "We used it in part to incorporate the idea of Iowa State researching new technologies."

The team designed both daytime and evening experiences with special effects corresponding to the carillon bells ringing in the Campanile, Diaz said. "During the day, sand in the handrails moves every 15 minutes to subtly encourage people to resume their day (after pausing at the Hourglass). At night, the structure is lit up and every 15 minutes there's a light effect that ties back into the hourglass and the idea of time on campus."

Teamwork + Ingenuity = Success

Disney did not require teams to be multidisciplinary, but Kurnia, who entered the competition last year with a team composed of peers in architecture, thought

working with other disciplines could make the project more successful. The three students capitalized on their complementary skill sets, including proficiency in different software packages, to create a cohesive design, he said.

"For Josh and me it was really interesting to bounce ideas off of each other," Diaz said. "We have related backgrounds but different perspectives on things. And it was great to work with an engineer like Alex who could help us determine if it was actually possible to do what we were proposing."

"We each took what we knew and collaborated really well," Doppenberg said. "Usually in our engineering projects, we can speak on a really high level about componentry but have a low level of understanding of how the product will look. The design students can speak on a higher level about the look and feel of the project but have less understanding of the technologies. A big thing for me has been learning to work with people outside my own field and utilizing all of our skills to create a good presentation."

All three students hope to work in the entertainment industry after graduation.

"We didn't know each other before, but we have a lot of the same goals," Diaz said. She has visited Disney parks with her family and "I want to be on the team that provides those kinds of experiences to other people and help other visitors feel the way I do when I go to the park."

Doppenberg interned at Walt Disney World in Orlando, Florida, in the summer of 2015, and Kurnia is doing an internship there from January through June.

"During the internship I went on rides and started to think about 'how do you make these?' To be able to go to Glendale and interact with the Imagineers is a chance of a lifetime and the next step forward," Doppenberg said.

"I've always wanted to work for Walt Disney Imagineering, and it's so difficult and competitive, so this opportunity to see behind the scenes and potentially interview for a position is what I'm most excited about," Kurnia said.

Contributed by ISU News Service

ME alum's company focuses on sustainability, helping people

One Iowa State alum has turned his passions for mechanical engineering and helping people into a career. Wesley Meier (BSME'08) took his degree and went on to be the co-founder and CEO of Emerging Opportunities for Sustainability, or EOS International.

Along with fellow ME classmates Chris Deal, Greg McGrath and Lee Beck, Meier set off to use his engineering skills to give back to communities around the world.

"EOS International was founded with a simple mission: bring life-changing technology to the developing world, improving health, generating income, and preserving the environment," says Meier.

During the fall of 2008, Meier set off on a Peace Corps mission to a rural town in Nicaragua. During his time there, he realized that his engineering skills could make a significant impact on homes and agriculture in villages throughout the country. "With support from the EOS engineers back home, I started redesigning and installing technologies such as drip irrigation systems for smallholder farmers," says Meier.

This passion began long before college. Since childhood, Meier has been interested in mechanical engineering. However, during his sophomore year of college, a mechanical engineering class sparked his interest for working in developing countries. "The purpose of the class was to design an energy source to power a laptop, which would be used in Africa—all for under \$100. This was my introduction into designing for the developing world. What really excited me about the whole project was the opportunity to use my limited engineering skills to potentially have a larger impact."

After this class, Meier went on to study emerging market-focused classes, such as Sustainable Engineering. In one class, he even



Meier

designed a water valve for a rural community in Mali, Africa—a design that was actually put into place upon his graduation.

"I was fortunate enough to travel to Nana Kenieba, Mali with EOS co-founder Greg McGrath to implement our design. Traveling to Mali was very exciting, but we were quickly humbled by the experience," remarks Meier. "We realized the unexpected complexities within the rural village such as our inability to communicate efficiently, limited tools and resources, and the practicality of taking a technology designed in a lab and installing it halfway across the world. This trip sparked

an interest and passion to continue this work, and has carried with us throughout the creation and growth of EOS."

Today, current engineering students can participate in this mission. "Four years ago, EOS started hosting ISU engineering students in Nicaragua and facilitating their skills to have a broader impact as well as provide an educational, cultural experience," says Meier. "This quickly grew into an accredited class led by Dr. Gloria Starns. With Dr. Starns' leadership, the class grew to a month-long experience where students designed products in collaboration with Nicaraguans. This summer will mark the fifth year of engineering students in Nicaragua."

Meier encourages today's engineering students to find their niche and discover what they're passionate about. "I am fortunate to be able to use my engineering degree in a unique way to have an impact abroad," says Meier. "There is nothing more satisfying than finding or creating that dream job that matches your passion. It is worth the wait and you would be surprised how, with persistence, your work in various industries will eventually yield well-rounded career experiences."

Contributed by Emily Boyd/
Engineering College Relations

Brown Moves Up to 44th in Top 100 in Bioeconomy Listing

Robert C. Brown, BEI director and an Anson Marston Distinguished Professor in Engineering and the Gary and Donna Hoover Chair in Mechanical Engineering at Iowa State University, is tied for number 44 in the "Top 100 People in the Advanced Bioeconomy" for 2017, as nominated and voted by the readers of The Biofuels Digest and the publication's editorial board.

Contributed by Robert Mills/
Bioeconomy Institute

Iowa State's Robert C. Brown, left, explains new pyrolysis technology to Karen Fletcher, leader of the RAPID Institute for manufacturing; and Mark Gaalswyk, leader of Easy Energy Systems in Emmetsburg; during a recent tour of the BioCentury Research Farm. Photo by Christopher Gannon.





Janice Marquardt poses with her degree after the spring 2007 commencement ceremony in Hilton Coliseum. She is flanked by her grandfather John E. Guastafson to the left and father John L. Gustafson (PhD, Applied Mathematics, '82). Photo courtesy of Janice Marquardt.

Alum combines her studies in mechanical engineering, communications, and business

Iowa State alum Janice Marquardt knew that she wanted to study mechanical engineering in college but she didn't think that it would lead her to the career path she's taken.

Marquardt was born in Portland, Ore. but moved to Ames at the age of five when her father, John Gustafson, took a job at the Ames Laboratory where he studied high-performance computing. Marquardt said that from a young age her family provided a strong support system that not only encouraged her to pursue higher education but that also pushed her to specifically pursue studies in the STEM (Science, Technology, Engineering, and Mathematics) field.

Attending Iowa State was an easy choice for Marquardt since not only was the campus right in her backyard but also because her parents were ISU alumni. Her father earned his PhD in applied mathematics in 1982 and that same year her mother, Denise, earned a B.S. in ceramic engineering. Marquardt said that her mother was particularly supportive in encouraging her to pursue studies in engineering.

"She used to tell me when I was a very small girl, she'd say 'You can do whatever you want in your life. You can get whatever degree you want as long as you also have an engineering degree,'" Janice Marquardt said.

Janice Marquardt wanted to be an interior designer and her mother encouraged her but also said she should get an engineering degree as her primary major but by the time Janice got to college she was genuinely interested in studying engineering.

"When you have role models like that in your life it's not a stretch to think of yourself as a female going into engineering. It's not an issue. It just felt natural," she said.

Marquardt came into college as an undeclared major but ending up selecting mechanical engineering because she liked to work with both "microscopes and big machines." She also went with mechanical because of her dislike of chemistry at the time, which she said was ironic since biochemistry was a large part of her emphasis in graduate school. During her master's studies she worked under ME professor Pranav Shrotriya and Marit Nilsen-Hamilton, a professor in the Roy J. Carver Department of Biochemistry, Biophysics and Molecular



Phi Beta Kappa induction ceremony. From left, Janice Marquardt, her husband Ryan Marquardt (B.S., Community and Regional Planning, '05, M.S., Sustainable Agriculture, '08), her stepfather Dr. Michael Carter (PhD, Computer Engineering, '93), her mother Denise Hayward (B.S. Ceramic Engineering, '82), and her grandparents Betty and Richard Hayward. Photo courtesy of Janice Marquardt.

Biology. Her thesis was entitled "Force interaction characterization between thrombin and DNA aptamers" and it focused on atomic force microscopy and RNA strands.

When she was still an undergraduate, Marquardt was looking for a minor to accompany her ME degree. After talking to recruiters at an engineering career fair she found that there was demand for effective communicators within the engineering field, so she decided to pursue a minor in communication studies. She eventually declared communication studies as a second major since budget cuts her sophomore year forced the department to restrict many of its introductory-level courses to majors-only.

She said that while her communication studies classes weren't quite as challenging as her engineering courses, she learned a lot about people from her communication studies coursework. She has applied many of these communication skills when dealing with not only engineers but also human relations (HR), marketing, and other non-engineers.

"Being in the double major really taught me how to speak both languages," she said.

Marquardt graduated with her B.S. in mechanical engineering and B.S. in communication studies (both Summa Cum Laude and with Honors) in 2007 and her M.S. in ME in 2008. She started her job as a design engineer with Vermeer the Monday after her commencement ceremony and spent about five years there before joining MidAmerican Energy as a senior buyer in July 2013.

"I found that I was a decent design engineer but I was never a very good design engineer, at least by Vermeer's standards. But I'm great at procurement. I like to negotiate with people. I learned great negotiation skills through my MBA and a little bit through my communication studies as well," she said, adding that conflict management was another skill that she learned in her studies and still uses today.

In addition to her bachelor's and master's degrees, she earned a master's of business administration (MBA) from the University of Northern Iowa in 2014.

Marquardt said that she feels that having these advanced degrees helped to raise her career ceiling. She also thinks that these advanced degrees helped her land an inline promotion to Procurement Manager in August 2016. Then earlier this month she was promoted to Director of Strategic Procurement at MidAmerican Energy.

"Procurement's job is to bridge the gap between supplier and an engineer so you have to be able to speak both languages and that really started with my double major," she said.

While Marquardt's skill set ranges from engineering to communications to business, she said she thinks that an engineering degree is especially important for those in managerial positions because of the pragmatic mindset that many engineers have.

"There's a very high value placed on an engineering degree at the senior level at many companies," she said, adding that it helps to establish a base level of technical competence.

"What engineering teaches you is a very structured way to restate the problem and lay out what your assumptions are, which is the step that people usually miss."

"Let me layout how I'm going to solve the problem, then I'll solve the problem. Then I look at my answer and ask 'Is this a reasonable answer given this question?' I think that's really what engineering teaches and why engineers are so valuable," she said.

In graduate school, Marquardt worked as an academic adviser and part of the advice she'd have for her students, particularly females, was for them to just be themselves. She said she would echo this advice to any young women considering STEM fields today.

"Be you," she said. "Don't be afraid to be the girl. Don't feel like you have to be one of the guys. I didn't really start growing in my career and in my life until I stopped trying to be one of the guys, and trying to be something I wasn't. My career really took off when I stopped doing that."

In addition to her day job, Marquardt and her husband own and operate Wild Rose Pastures, a chemical-free and antibiotic-free livestock farm near Van Meter. Photo courtesy of Janice Marquardt.





Daniela Faas, second from left, poses with her Bucknell Alumni Achievement Award on Feb. 25, 2017. Photo courtesy of Bucknell Athletics.

ME PhD alum receives Bucknell Alumni Achievement Award

Dr. Daniela Faas – a 2010 PhD alumna in mechanical engineering and human-computer interaction at Iowa State University – recently received the Bucknell Alumni Achievement Award.

Faas holds an M.S. and B.S. in mechanical engineering and a B.A. in International Relations from Bucknell University in Lewisburg, Pennsylvania. The Ludwigshafen, Germany-native also competed on the water polo and swimming

and diving teams for the Bison. She was a three-year letter winner in each sport, an academic All-American in swimming, and set school records in the 500-yard (4:56.93), 1000-yard (10:18.78) and 1650-yard (17:02.07) freestyle events.

Faas currently serves a senior lecturer in mechanical engineering and director of design and fabrication operations at the Olin College of Engineering in Needham, Massachusetts. Prior to that she served

as senior preceptor in design-based instruction at the John A. Paulson School of Engineering and Applied Science at Harvard University and as a postdoctoral associate and research associate at the Massachusetts Institute of Technology (MIT).

Faas's PhD advisor was Dr. Judy Vance and her dissertation was entitled "A Hybrid Method of Haptic Feedback to Support Virtual Product Assembly."



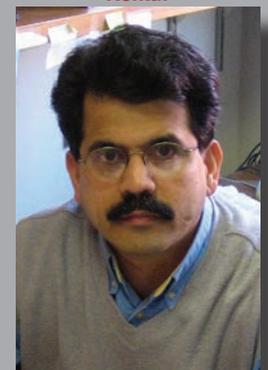
Brown

Two ME professors awarded patents

Mechanical Engineering professors Robert C. Brown and Atul Kelkar were recently each awarded patents.

Brown was co-inventor with R. Christopher Williams, a professor in Civil, Construction, and Environmental Engineering at Iowa State, and Mohamed Abdel Raouf Mohamed Metwally of Cairo, Egypt on U.S. Patent No. 9,546,276 entitled "Bio-oil Formulation as an Asphalt Substitute." The patent was issued on January 17, 2017.

Kelkar was co-inventor with Thomas C. Waite of Des Moines on U.S. Patent No. 9,558,732 entitled "Active Noise Control System." The patent was issued on January 31, 2017.



Kelkar



Soybean field near Seymour, Illinois. Photo by Kevin Dooley/Flickr

ME, agronomy researchers team up to study robotics in agriculture

A team of Iowa State researchers has been awarded funding to study the use of robotics in agriculture.

The project is led by mechanical engineering assistant professor Sourabh Bhattacharya, with co-PIs Baskar Ganapathysubramanian (associate professor, ME), Soumik Sarkar (assistant professor, ME), Asheesh Singh (assistant professor, Agronomy), and Arti Singh (adjunct assistant professor, Agronomy). The project is entitled “National Robotics Initiative: Saliency driven Robotic Network for Spatio-temporal Plant Phenotyping” and funding is provided by the U.S. Department of Agriculture’s National Institute of Food and Agriculture and the National Robotics Initiative.

Bhattacharya said the project aims to assist farmers by utilizing robotic components in the field.

“The project involves developing a holistic framework for communication, control and motion planning for robotic swarms deployed in agricultural fields for gathering data,” said Bhattacharya. “Guided by advanced learning and inference techniques, the robots will compete with each other in the field to acquire the most salient data relevant to plant phenotyping. In the long run, this data will help breeders to identify the characteristic traits of several diseases in soybean plants.”



Bhattacharya



Ganapathysubramanian



Sarkar



Arti Singh



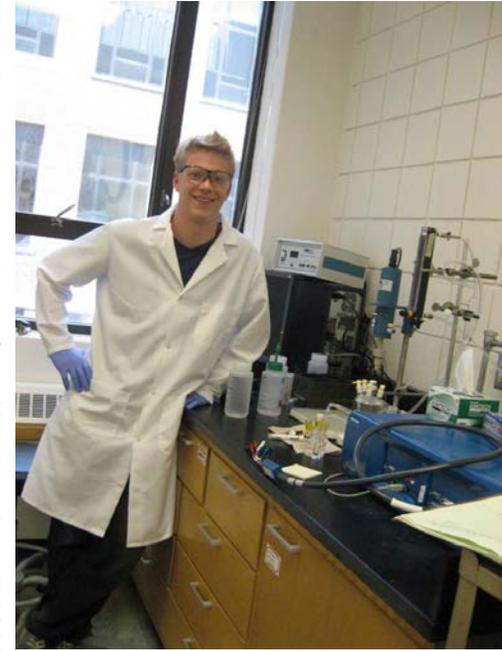
Asheesh Singh



ME alum awarded National Science Foundation Graduate Research Fellowship

Mechanical engineering alumnus Payton Goodrich was among four Iowa State students or alumni recently awarded graduate research fellowships from the National Science Foundation.

Goodrich (BSME'15) studied microbial fuel cells and microfluidics in the lab of ME assistant professor Nastaran Hashemi as an undergraduate at Iowa State. He also participated in the Ames Laboratory's Science Undergraduate Laboratory Internship program, working under Wenyu Huang, an assistant professor in chemistry at ISU. The Minneapolis-native is currently pursuing a PhD in mechanical engineering from the University of California-Berkeley and he attributes his undergraduate research experience as helping him to get where he is today.



Goodrich

"One-hundred percent of where I am now isn't because of doing what was required to get a B.S. at Iowa State, but rather from what I did that was extra," said Goodrich. "If you are interested in graduate school, get started as early as possible in a research group that delves into areas that interest you. Take advantage of the opportunities that you have at ISU – there are millions of people around the world that will never have these same opportunities just because of who they are or where they live."

Goodrich was among 2,000 students and researchers nationwide selected for the Graduate Research Fellowship Program (GRFP) from a pool of more than 13,000 applicants. GRFP provides three years of financial support within a five-year fellowship period: \$34,000 annual stipend and \$12,000 cost-of-education allowance to the graduate institution. This award will "fund research in developing wireless sensor nodes for monitoring the electric grid and preparing for the forecasted flux of distributed energy resources," according to Goodrich. He said he was excited when he found out he was receiving this funding.

"I found out the news Friday morning right before heading to volunteer at the local high school, where we're doing a battery experiment. The immediate reaction was about five seconds of fist pumping as though I were trying to start a lawn mower. This was especially good news for me, because the funding that I was using for my studies were going to run out at the end of this semester and I still hadn't found alternative funding," he said.

Other ISU students and alumni to receive this honor include Deon Ploessl (Chemical and Biological Engineering) and Jacob Sporrer (Electrical and Computer Engineering). A researcher from ISU's biology program was also recognized.



Harvey pole vaulting during the spring 1970 track and field season. Photo from The Bomb (ISU Yearbook).

ME alum Rex Harvey elected chair of USA Masters Track & Field

ISU mechanical engineering alum and former Cyclone pole vaulter Rex Harvey has been elected chair of USA Masters Track & Field.

The Redfield, Iowa-native will head the division of USA Track & Field for athletes 35 years and older. He holds a BS in mechanical engineering from Iowa State and an MS in systems management from the University of Southern California. As a graduate student he also served in the U.S. Air Force during the Vietnam War. Following his service, Harvey worked in the engineering field for nearly three decades and developed 15 patents, mostly for commercial aircraft and supercomputers.

As a prep at Dexfield High School he was a 17-time individual champion and four-time team state champion. He was a Big 8 Conference runner-up six times in the pole vault and went on to compete for six USA international track and field teams. He was a finalist on the 1976 Olympic trials team and broke the World Record in the M45 Decathlon in 1991.

"I grew up in a very small town. My introduction to the great wide world beyond that town was through Track & Field. It has shaped and directed my life in a wonderfully positive way. I would like to pass the opportunity to expand their horizons, and honorably distinguish themselves on the track, and on the field, to as many people as possible," Harvey said in a press release.



Q&A with Goldwater Scholarship recipient Mouhamad Diallo

Mouhamad Diallo, a junior double-majoring in mechanical engineering and materials engineering, is one of four Iowa State University students who recently received a Goldwater Scholarship. The scholarship provides up to \$7,500 per year and encourages students to pursue careers in STEM research. He recently sat down with us to talk about his upbringing, his current studies, and his career aspirations.

Some quotes have been lightly edited for length and clarity

Tell me a bit about yourself. Where are you from? Why did you choose to attend Iowa State University? Why did you choose to study mechanical engineering?

I'm from Senegal which is in West Africa. I came to the United States three years ago as a permanent resident. I first started at DMACC [Des Moines Area Community College] and graduated with a liberal arts degree and after that I transferred to Iowa State University. I decided to pursue a mechanical engineering degree because prior to coming to Iowa State I was working with Dr. Ganesh in his lab during the 2015 MoSAlc REU and the exceptional experience I gained from that helped me to decide to attend Iowa State and study mechanical engineering.

What are some of your specific research interests and how have opportunities such as MoSAlc REU contributed to your academic/professional development?

When I was exposed to research, I started with Dr. Ganesh looking at nanoparticles and their heat transfer properties. While doing that research, I always knew from back when I lived in Senegal that I wanted to do something with energy because Senegal is one of the West African countries where electricity goes out. We have blackouts. So living there I knew that having energy is something important. It can improve education because people need lights to study with, and also to use computers. All the infrastructure that you make will also depend on energy. So if we start improving our energy we can improve our state, so I wanted to look at that. With Dr. Ganesh I started looking at nanoparticles and now I'm doing research in high entropy alloys which eventually will lead me to go to renewable energy because I can then make better wind turbine blades or solar

panels. So my field of research is broad but I'm more interested in sustainable energy and biorenewable energy.

What are your plans for after finishing your undergraduate degree? What would you like to do in your career?

Since I'm a junior here at Iowa State I'm also a member of the McNair Program which is a two-year program that helps underrepresented minorities go to graduate school. So after earning my bachelor's degree in mechanical engineering and materials science engineering I plan on going into a PhD program in order to go more into the sustainable energy and biorenewable energy.

I ultimately want to work in academia and be a professor. The reason I want to do that is first I want to do research and develop newer and better technologies. But I also want to be the Dr. Ganesh for somebody else because Dr. Ganesh has helped me to get to where I am now. I also have other faculty members helping me so I want to be able to give back to the community like that.

Why did you decide to add materials engineering as a compliment to your mechanical engineering major?

Because of relevancy for sure but last semester I was taking MatE 273 Principles of Materials Science and Engineering. The professor who was teaching it, Dr. Cullinan, was very good at explaining all of the concepts and I found that it was very related to what I was doing with high entropy alloys. I'm looking at atomic structures of materials so most of my work is about identifying the structures. So I felt that materials engineering has a lot of relevance to my work and I wanted to go more in-depth with that side of it.

Is there anything else you want to add?

Winning this scholarship is a big deal for sure but it's not just one person's work. There is a whole team behind it with the faculty, the honors department, and others. So for any ME or MatE or engineering students who wants to pursue these scholarships I would advise them to develop strong relationships with their faculty members and others so that they can have these opportunities because it is possible.

ME student attends presidential inauguration in Washington D.C.

One Iowa State University student was part of history last month when he witnessed Donald Trump being sworn in as the 45th president of the United States.

Cole Ignaszewski – a sophomore studying mechanical engineering – was among a select group of Minnesota 4-H members invited for a leadership conference in Washington D.C. in January. Part of that conference includes attending today's presidential inauguration.

Ignaszewski – who participates in Steele County 4-H but is from the town of New Richland in Waseca County, just west of Steele County – said that the outcome of November's election did not affect his decision to attend the event. He was interviewed by Minnesota 4-H officials in June and in July he was informed that he had been selected for the trip to the nation's capital.

"[During the interview] they asked 'Whoever wins, do you still want to go on this trip?' And I answered 'It's not really about that. It's not about who wins or loses in the November election. It's about being a part of history and being there. It's about that

peaceful transition of power and being able to take that all in.'"

Ignaszewski has been in Washington D.C. since Tuesday. He and 4-H members from 24 other states have participated in events related to the 4-H leadership conference and have also been taking in the sights and sounds of D.C. Ignaszewski said he has enjoyed meeting with other 4-H members from across the country.

"It was really cool to see how good of leaders are out there besides the ones you know of everyday, besides the ones you grew up with. This isn't just a Minnesota thing. It's not just a Midwest thing. It's all over the country and it's all because of 4-H so I think it's very important that people are involved with 4-H. It's more than just taking part in a fun activity, it's about growing yourself as a person and as leader."

Ignaszewski first got involved with 4-H's Clover Bud's program when he was in kindergarten and became officially involved with 4-H in third grade. He said he thinks his participation in 4-H has helped to shape the person that he is today.

"The whole time they're just trying to get us to be better people and be a better leader. 4-H is just growing leaders and I've really noticed that out here in Washington at this leadership conference. I've noticed how good of leaders [4-H participants] are and not just from Minnesota that I've met but from around the country."

Donald Trump was officially sworn in as president on January 20 around noon eastern time. Ignaszewski said that he hopes the incoming president will consider the importance of agriculture and rural America when drafting policies and negotiating deals during his tenure.

"I just hope that he keeps the family farm in mind. He comes from a big company and obviously he's a millionaire and I just hope he [thinks about] the small town family farm and does what's best for them. Because really agriculture and family farms are the backbone of America and it's really important to keep them prosperous and keep them operating and that will in turn make America prosperous."

Photo courtesy of Cole Ignaszewski





Photo courtesy of Chloe McPherson

ME graduate student completes internship with Obama White House

Chloe McPherson – a master’s student in mechanical engineering – recently finished up her stint with the White House Internship Program under President Barack Obama for the fall 2016 semester.

The Omaha, Nebraska-native was among 165 students nationwide to be selected for this opportunity. Dakota Olson, a junior majoring in Global Resource Systems at Iowa State, was the only other student from the state of Iowa to be selected.

McPherson worked in the Domestic Policy Council within the Office of Energy and Climate Change. She said that her studies in mechanical engineering helped to prepare her for the work she did.

“At first thought it may seem unconventional for an engineer to work on public policy, but it is actually vital that the White House and government agencies have people with education and expertise in technical areas such as engineering working on energy and other issues. A background in engineering provides us with a unique technical understanding and perspective when analyzing policies and determining how best to solve some of our nation’s most complex issues,” she said.

She added that her time with the White House Internship Program was both rewarding and memorable.

“Working at the White House has definitely been the best work experience of my life thus far. The Obama White House is an amazing place full of brilliant, dedicated people who truly care about the future of our nation. Interns at the White House are fully integrated members

of the team, and are given responsibilities on par to those of full-time staffers. You’d be hard pressed to find another work environment as incredibly fast-paced as the White House, especially in the last six months of an Administration. Each day was truly an adventure, and the many opportunities and challenges that presented themselves along the way have allowed me to grow as a person and as a leader. This has been a very humbling, fulfilling experience, and I am grateful for the chance to contribute to the legacy of a President whom I so fully trust and believe in.”

On campus, McPherson worked in the Virtual Reality Application Center (VRAC) where she researched ways to implement “digital information into the real world.” She, who holds her BS in mechanical engineering from ISU, also served as national publications chairperson for the National Society of Black Engineers during the 2015-16 school year.

[More information about the White House Internship Program](#)

The White House Internship Program provides a unique opportunity to gain valuable professional experience and build leadership skills. This hands-on program is designed to mentor and cultivate today’s young leaders, strengthen their understanding of the Executive Office and prepare them for future public service opportunities.

The White House Internship Program’s mission is to make the “People’s House” accessible to future leaders from around the nation.

ME alum finds success as both an engineer and writer

Even though he studied and pursued a career in mechanical engineering, one Iowa State alum said that his alma mater was also the place that sparked his interest in writing.

Gary Casey (BSME'66) grew up on a 160-acre farm near the northwest Iowa town of Peterson. He developed an interest in mechanical engineering at an early age, disassembling and reassembling lawnmower engines and being, according to him, "the official family bike repairman" at the age of 10.

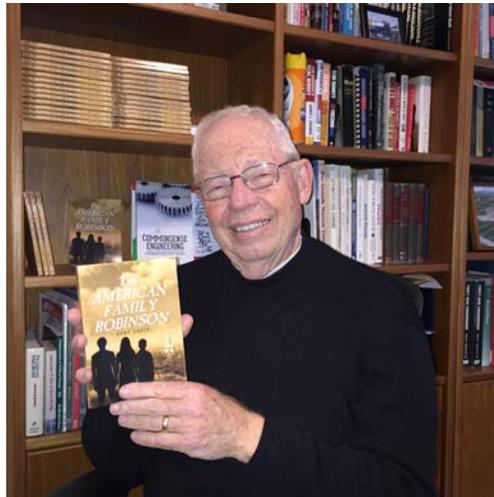
Not only did Casey like working with his hands but he also enjoyed reading and learning about why things work the way they do. Around the age of 12 he remembers reading old mechanical engineering textbooks, which were his uncle's when he attended ISU and studied mechanical engineering. Casey also remembers reading the World Book Encyclopedia and said that the "A" volume was his favorite because it included Aircraft and Automobile.

Toward the end of high school Casey began developing interests in other engineering fields from architectural to aerospace to civil. He wanted to work on airplanes but decided to study mechanical after doing some research and discovering that many of people who work for airplane companies actually have backgrounds in mechanical engineering.

One of Casey's memories from his time on campus was his thermodynamics course. He said he failed the course the first time and was forced to retake it, acing the class the second time around.

"It's not how much you know, it's what you need to know," said Casey. "I got to a point where I understood tests. The idea was to get into the head of the instructor to find out what he was asking for and do that." It was at Iowa State that he also first became interested in writing.

"I remember taking a course when I was in engineering school about presentations," he said. "I still remember some of the ideas about how to create a presentation and make it fit what the [audience] wants. The whole idea was to figure who your reader or watcher is and where they come from, and figure where you want them to be at the end and how to lead them to where you want them to be. That's also kind of how you write a book."

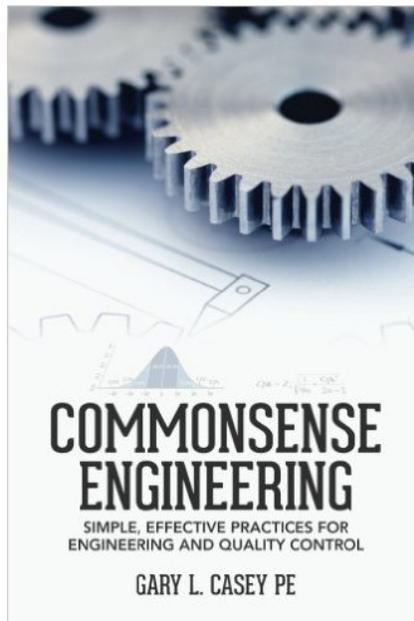


Mechanical engineering alumnus Gary Casey poses with his book *The American Family Robinson* which was published June 2016.

Photo courtesy Gary Casey.

throughout his professional career. With 37 patents to his name, Casey has been averaging roughly one patent for each year since he's entered the workforce. Since retiring and working independently he has been granted two patents and is currently pursuing a third for a stovetop popcorn popper.

Casey gained some teaching experience as an instructor at Wayne State University in Detroit where he served as an industry representative and taught a senior-level design course. He said colleagues suggested he write a book based on the things he taught people throughout his career so he took that to heart and in 2013 published his first book, *Commonsense Engineering*.



Gary Casey's first book, *Commonsense Engineering*, was published in 2013.

"It was a mishmash of subjects that I worked on over the years and it was sort of a short, irreverent book about what technology can do, and what it doesn't do, and what's a waste of money. Just a whole bunch of short subjects," he said.

After publishing the book, he gave topic-specific presentations for a few engineering companies and other "practicing professionals."

However, for his next writing endeavor Casey deviated from the non-fiction, informative style of writing in *Commonsense Engineering*. Casey published his first novel, *The American Family Robinson*, in June 2016. Despite the different genres of these two books, Casey said his writing style was similar in both.

"I tried to make it half written style and half conversational. You don't want to make it all conversational because that doesn't read well as a book but I also didn't want it to read like a textbook," he said. "The writing style [between the two books] was not much different."

Casey first started writing the novel as a way to pass time while frequently traveling for work. After writing a few thousand words his wife Sarah read it and encouraged him to finish.

Even though his granddaughter is the inspiration for the book's main character, Rose, Casey decided to make the setting roughly a century before she was born.

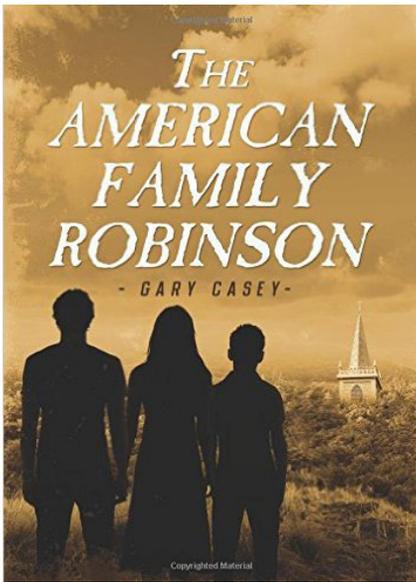
"I made it far enough away in time [early 20th century] that I could make observations without sounding too critical," he said. "In modern times there'd be more focus on scandals and hyperbole and everything that goes on nowadays so I thought a simpler time would be easier to write."

The book follows Rose and her two brothers who were orphaned at an early age and who find that they must stick together to get through the tough times.

"The core of the book is how in my opinion the glue that has held civilization together for thousands of years is really the core family unit. The book is really about how these three kids tried to keep their family together in difficult times," said Casey.

Another thing Casey focused on while writing the book was being as factually accurate as possible.

"My pet peeve in all books and movies is to see something they could have gotten right but screwed up because they didn't



Gary Casey's first novel, *The American Family Robinson*, was published in 2016.

do just five minutes of research to make it accurate," he said.

One example of this factual accuracy came during a part in the book when Rose rides in a Ford Model-T car. Casey writes that Rose struggles to find the door handle to get into the car, not realizing that the handle is actually on the inside of the car, which is how that model of Model-T was actually designed.

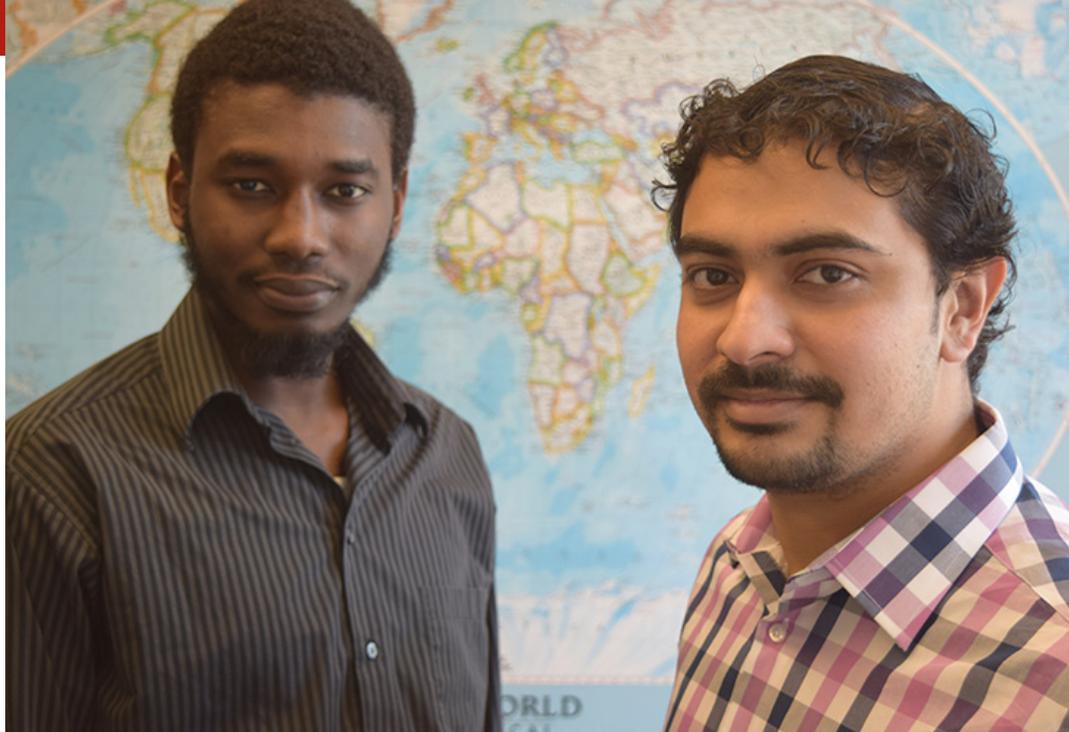
Another example Casey pointed to was that he was accurate during a scene in a science classroom where the students learn about ice density. In addition to being accurate, Casey felt that these were things that a young character might observe anyway which worked for the book since it was written from Rose's perspective.

Though he's an engineer by trade, Casey said he thinks it's critical for engineers to be able to write and communicate effectively. He said that nowadays engineers need to be both the engineer and the salesperson.

"You're not necessarily selling to a customer but you're selling to your boss, you're always selling," he said. "Too many people try to sell themselves. That's not what you're trying to do. You're trying to sell the idea, not yourself."

He added that he thinks it would be good to teach effective writing and communication skills and strategies as part of the engineering curriculum.

"The whole idea of strong writing and communication skills is critical for an engineer."



Mechanical engineering assistant professor Ganesh Balasubramanian (right) poses with Mouhamad Diallo, a junior double-majoring in mechanical engineering and materials engineering, inside Black Engineering Building on April 24, 2017. Photo by Nick Fetty.

ME's Balasubramanian named 2017 McNair Faculty Mentor of the Year

A Mechanical Engineering faculty member was recently recognized for the strong mentoring relationship he has developed with one of his students.

Assistant professor Ganesh Balasubramanian has been named the 2017 McNair Faculty Mentor of the Year. Balasubramanian was nominated for the award by Mouhamad Diallo, a junior double-majoring in mechanical engineering and materials engineering.

"I was truly humbled since I was not aware that I had been nominated," said Balasubramanian. "I thank the McNair Program members and Thelma Harding for this honor."

Diallo, who recently received a Goldwater Scholarship, is part of ISU's McNair Program which aims to "increase the attainment of PhD degrees by first-generation and underrepresented college students." The Senegal-native first got exposed to research after participating in the 2015 MoSAIC REU (Multiscale Sensing Actuation and Imaging Research Experience for Undergraduates) program. Balasubramanian said he has enjoyed watching his pupil grow over the past two years.

"Mouhamad is becoming an independent and interdisciplinary researcher, and the growth in his maturity is the most notable aspect of his development," Balasubramanian said.

Diallo said that Balasubramanian has helped to mentor him not just academically but also professionally.

"Academically, Dr. Ganesh is a teacher and an adviser at the same time. He is constantly suggesting interesting classes I should consider taking. Professionally, he always pushes me to be active, and encourages me to think about publishing papers, which is a valuable asset when planning to pursue a PhD," Diallo said.

Balasubramanian holds a BS in mechanical engineering from Jadavpur University in Kolkata, India and a PhD in engineering mechanics from Virginia Tech University. He joined the ISU faculty in the fall of 2012.

ISU's Engineers Without Borders aims to ease water procurement in West African village



By easing access to clean water, Ulló villagers will need to spend less time pumping and transporting water. Photo courtesy of Engineers Without Borders-Iowa State University

One Iowa State University student group aims to use its engineering expertise to provide a safe and reliable source of water for a drought-stricken, agriculture-dependent region in West Africa.

The ISU chapter of Engineers Without Borders (EWB) has worked with officials in the village of Ulló – in northwest Ghana – to provide its roughly 1100 permanent residents with easy access to water. Current practices can require more than three hours of labor to procure water which is problematic in a village that relies on agriculture and where the daily average income per person is about 75 cents.

Climate conditions in the region make it so that villagers experience about eight months of drought, while the other four months are considered the wet season. This is where EWB comes in.

“We have partnered with their village to help extend their storage of water during the dry season,” said Will Parr, a member of EWB. “They

Ulló villagers utilize wells such as this one to access groundwater. Photo courtesy of Engineers Without Borders-Iowa State University



have asked us to come up with a plan that will help them have water throughout their dry season. Upon our assessment trip in December of 2016, we decided that a small town water supply project is going to be the best option for this community.”

EWB plans to drill a borehole in the village which will provide inhabitants with access to well water and which will save them time and labor when compared to the current techniques for procuring water. These current techniques often involve using hand pumps, storing the water in containers, and transporting it back to the village. Villagers also have access to some wells but those sources dry up quickly.

ISU's chapter of EWB is working with its parent organization, EWB-USA, on this project. The ISU chapter has an ambitious goal of raising \$40,000 for the project and EWB-USA requires that 5 percent of the total cost of the project comes from the village of Ulló.

In addition to funding, EWB has relied on officials in Ulló provide local expertise.

“They can help find people to help us with getting things done such as bacteria testing or procuring construction materials,” Parr said.

EWB also organized an on-campus soccer tournament fundraiser in early March and hosts weekly pizza sales (every Thursday at the south entrance of Black Engineering Building from 11 a.m. to 1 p.m.) to help support the project. The group also raises funds through off-campus initiatives by reaching out to companies, rotaries, and other groups. Small individual donations also provide a “great amount” of funding, according to Parr.

Parr, a junior studying software engineering, said that while “Engineers” is in the group's title, it's actually open to students of all disciplines.



estimate water volumes as well to see if we lose any water while pumping. If you have not taken any engineering classes, or only basics, there is definitely a role for you as well."

EWB first visited Ullo in the summer of 2014 and then made a return trip in December 2016. Parr said the group aims to raise its money and begin rolling out the project over the next two years.

"December of 2017, we will start the first half of our implementation trip and depending on the wet season, we may implement the second half over the summer of 2018. We are also looking to open another project soon as well."

One key to the success of this project is EWB's active engagement with the Ullo community, according to Levi Nauman, a senior studying mechanical engineering.

"We are working with Ullo to find an appropriate solution that they will take ownership in and continue to maintain for many years," said Nauman. "Through this committed partnership we believe that Engineers Without Borders will empower the people of Ullo to a more sustainable lifestyle, and create a lasting impact on the community."

Nauman also credits Iowa State University for providing the resources to make projects like this possible.

Pumps such as this one allow Ullo villagers easy access to clean water. Photo courtesy of Engineers Without Borders-Iowa State University

"We have anything from designing water pumps to managing social media for marketing to reaching out to companies," he said.

He added that the engineers in the group are often able to take what they learn in the classroom and apply it to real-world situations.

"We apply physics, optimization, and a lot of design to the project," he said. "For example, we will need to know the best way to distribute the water to key areas through piping, so we apply optimization and

"We're a group of students that see a need in the world for improved infrastructure and we want to address that with our engineering education. Iowa State offers us the training and networks necessary to positively impact the quality of life for entire villages. This impact is rooted in the long-term partnerships that EWB creates with developing communities."

To learn more about EWB and to donate to their cause, visit www.ewb.stuorg.iastate.edu/

Members of the Iowa State chapter of EWB pose with Ullo villagers during their winter 2016 assessment trip. Photo courtesy of Engineers Without Borders-Iowa State University



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