IOWA STATE UNIVERSITY
College of Engineering

IMSE*news*

2018 | Issue Number 1

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING SYSTEMS ENGINEERING

IN THIS ISSUE

Letter from the Chair

Warmest greetings from Ames,

2017-18 marked another year of accomplishments for IMSE students, faculty, staff, and alumni.

Our students continue to deliver amazing results both in the classroom and beyond. In this issue of our alumni magazine, you will meet an IMSE student who spent her spring break learning about engineering in the Netherlands, read about a group of IMSE students who traveled to the statehouse in Des Moines this spring to present their research to lawmakers, and how IE 271 students applied engineering techniques to improve rescue operations.

Our faculty continue to represent the department well in the classroom, lab, and beyond. The awards our students, staff, and faculty received in the past year are testaments to their productivity as scholars and impact on the profession. This issue will summarize how IMSE assistant professor Cameron MacKenzie is using hurricane simulation software to help a U.S. Marine base in New Orleans as well as research by IMSE associate professor Guiping Hu and her colleagues that aims to improve factory operations through a data-driven software program called "FactBoard."

Our staff contributes toward the success of our students and the department in various ways. In this magazine you will see how Deb McDonough and Devna Popejoy-Sheriff in student services guide our students towards successful paths at Iowa State while long-term employees Krista Briley and Mike Renze continue their loyal service to ISU and IMSE.

Our alumni continue to achieve success well after their time on campus. Read about industrial engineering's first female graduate, first female PhD graduate, and a family with a four-generation connection to our department. Among the highlights also are: our department's newest endowed professorship, which was awarded to associate professor Frank Peters, and made possible by generosity of Iowa State class of 1959 graduates C.G. "Turk" Therkildsen (industrial engineering) and Joyce Arlene McEwen Therkildsen (zoology and physical education); and some of IMSE's newest teaching labs which were made possible because of contributions from Patrick Weiler and his family. We are indeed grateful to all our contributors who pay it forward by helping us maintain and even further improve the quality of our graduates and their impact.

As I reflect on our initiatives in the past 21 months, connectedness, positive energy and optimism come to mind. Our faculty are more connected to surrounding industrial companies in research, and our students are sought after employees and interns with consistently very high placement rates thanks in part to our very successful capstone design program. Our department as a whole is more connected to scholars, students around the world; and in achieving this connectedness, alumni and faculty are hand-in-hand.

Looking ahead to the 2018-2019 academic year, two main topics are on our agenda: 1) accreditation review of our undergraduate program (ABET review), and 2) mini centennial celebrations of the industrial engineering curriculum at Iowa State. As Dr. Min describes, the success in ABET review is a blank sheet of paper on which no weaknesses or deficiencies are cited; that is indeed what we are aiming. All our alumni can help with our ABET planning; please follow this link for this purpose: *www.imse.iastate.edu/alumni-abet-input/*

No, I am not mistaken… Next year is our department's 90th year, but the industrial engineering program has been at Iowa State for 100 years. And, this is worth celebrating. We are planning several alumni events on and off-campus; please stay tuned for updates at this link: *www.imse.iastate.edu/100-years-of-ie/*

Allow me to close with a standing invitation for phone calls, emails, visits, or invitations to us; it is time to connect to share our positive energy and optimism.

To our alumni I say: feel stronger with us, you have the Cyclone power behind you.

To my colleagues: you are the hearts and minds of IMSE, you are the architects of bright futures. I will remain forever proud to be your colleague.

To the world we serve: expect more, we will not fail.

May the Cyclone power be with you!

Kremer (third from left) with Bernard Ho (BS IE '82 – second from left) and Associate Professor C.K. Kwong (third from right) and his students outside of The Hong Kong Polytechnic University during Kremer's visit in November 2017.

Gül E. Kremer

Professor and C.G. "Turk" and
Joyce A. Therkildsen Department Chair

Scan me

On the cover

An undergraduate student inside The Slater Laboratories for Advanced Manufacturing uses the laser scanner on an articulated arm to measure the dimensions of a mug.

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Frank Peters named C. G. "Turk" and Joyce A. Therkildsen Professor in Industrial and Manufacturing Systems Engineering

An Industrial and Manufacturing Systems Engineering (IMSE) faculty member has been named to Iowa State's newest endowed professorship.

Frank Peters, an associate professor in IMSE, was named to the C. G. "Turk" and Joyce A. Therkildsen Professorship in Industrial and Manufacturing Systems Engineering during a medallion ceremony on March 21. The professorship was made possible by class of 1959 graduates Charles George "Turk" Therkildsen, an industrial engineering alumnus, and Joyce Arlene McEwen Therkildsen, who graduated with majors in zoology and physical education. Both were also active and proud members of Greek life as collegians with Turk pledging Sigma Phi Epsilon while Joyce was in Delta Delta Delta. Turk Therkildsen currently serves as president and CEO of Industrial Hard Chrome based in Geneva, Illinois.

Left to right: Gül Kremer (C.G. "Turk" & Joyce A. Therkildsen Department Chair and professor of IMSE), Sarah Rajala (James L. and Katherine S. Melsa Dean of Engineering), Frank Peters (C. G. "Turk" and Joyce A. Therkildsen Professor of Industrial and Manufacturing Systems Engineering and associate professor of IMSE), Charles George "Turk" Therkildsen (Class of 1959), Joyce Arlene (McEwen) Therkildsen (Class of 1959), and Wendy Wintersteen (Iowa State University President). *Photo by Bob Elbert*

The medallion ceremony included brief addresses from Iowa State President Wendy Wintersteen, Iowa State College of Engineering Dean Sarah Rajala, IMSE Department Chair Gül Kremer, Peters, and Turk. Peters said he was grateful for the Therkildsens' generosity and honored by the recognition.

"It is great to be recognized for doing all of the little things that have an impact on the education our students receive and the research that I have been a part of," Peters said.

He has won a handful of prestigious awards during his time at Iowa State, including the Don Grant Faculty Award for Excellence in Undergraduate Education (2009, 2013, 2017), the ISU College of Engineering Superior Engineering Teacher Award (2012), the Institute of Industrial Engineers' Innovations in Curriculum Award (2010), and the American Foundry Society's Westover Award in Industrial Engineering (2009).

"I love when the research supports the teaching and the teaching supports the research" said Peters. "I think the biggest impact we can have is on the students. The influence we have on them and the influence they then have on our community, our state, our country, and the world is tremendous."

This is the second endowed position that support from the Therkildsen family has helped to create. The C. G. "Turk" and Joyce A. Therkildsen Department Chair in Industrial and Manufacturing Systems Engineering was established in 2015 and Gül Kremer was hired as chair in 2016. Kremer said that these endowed positions help the department to continue to teach its core values.

"Core values are important. They bring us together and are what make us stay," said Kremer. "For IMSE, among our vital core values are our dedication to our students, to each other and to the institution and its mission."

Peters' research focus is advanced manufacturing. He has worked with a variety of industries to develop solutions to improve product quality and deliverability. Specifically his research falls within the field of metal casting and focuses on heat treatment control and optimization, rapid patternmaking, decreasing product variability, and reducing the measurement error associated with visual inspection.

IMSE students had the opportunity to visit with Turk and Joyce Therkildsen when they were on campus for the medallion ceremony March 21. From left: Frank Peters, Samantha Koberg, Abby Melcher, Turk Therkildsen, Joyce Therkildsen, Sarah Longmire, and Tanner Spies.

Kremer added that Frank Peters exhibits these core values through both of his teaching and research efforts.

"Each of us in IMSE reflect these core values in different ways. One of us, and perhaps a tiny bit more than any of us, speaks to, acts and interacts carrying these core values in his heart and his words: Frank Peters. On this momentous day, I declare him the face of IMSE's core values," Kremer said.

IMSE fall 2017 graduates celebrate together

The IMSE graduates for the Fall 2017 semester gather in Troxel Hall.

Graduating industrial and manufacturing systems engineering students and their families gathered together in Troxel Hall on December 16 to honor the fall 2017 graduates. The students enjoyed breakfast with their families and professors prior to a pre-commencement ceremony.

Forty-eight students graduated with a bachelor of science, eight students with a masters in Systems Engineering, eight students with a masters in Engineering Management, and one student will be conferred with a PhD in industrial engineering. These graduates join a group of more than 4,200 alumni of the department.

"Our graduates have been our priority for some time," Therkildsen Chair of IMSE Gül Kremer said while addressing the audience. "We teach them, we engage them, we laugh and learn, and we grow together. Our mission is sacred, your loan to us is precious, our commitment is real."

Jakob Croghan, a graduating senior in IMSE, was the College of Engineering's student marshal during the fall 2017 undergraduate commencement ceremony. He was accompanied by K. Jo Min, associate professor of industrial engineering, to lead the engineering class into the ceremony held in the afternoon.

Each student was recognized and shared their future plans, as well as memorable moments from their time at Iowa State. After the pre-commencement ceremony, the students received their diplomas with the rest of the graduating class at the Undergraduate Commencement Ceremony in Hilton Coliseum.

IE's Croghan named marshal for fall 2017

Jakob Croghan, fall 2017 graduate of industrial engineering, was the College of Engineering's student marshal during the fall 2017 undergraduate commencement ceremony. He was accompanied by K. Jo Min, associate professor of industrial engineering, to lead the engineering class into the ceremony held on Dec 16.

Croghan poses with College of Engineering Dean Sarah Rajala.

The Manning, Iowa-native graduated with honors and a 3.86 GPA. During his time at Iowa State, he served in many leadership roles on and off campus. Whether he was studying abroad in Limerick, Ireland or completing internships at Altec Industries and Textron Aviation, Croghan has demonstrated leadership in many ways.

Croghan is a former ACACIA Fraternity president, has served as Student Government senator for the College of Engineering, and as an AirISU build team lead. Croghan also served as a departmental teaching assistant for undergraduate students in Industrial Engineering 248: Engineering System Design, Manufacturing Processes and Specifications.

Additionally, Croghan co-authored and presented a peer-reviewed proceedings paper at the Annual Conference for Institute of Industrial and Systems Engineers (IISE) in May 2017 with Min and John Jackman, an associate professor of industrial and manufacturing systems engineering. Croghan's integrative work on the effective measurement of Geometric Brownian Motion of theory and practice was noted by a team of conference referees.

Davarnia joins IMSE faculty for 2018-19

Danial Davarnia

PhD, Industrial and Systems Engineering, University of Florida
MS, Industrial Engineering, Sharif University of Technology (Iran)
BS, Industrial Engineering, Sharif University of Technology (Iran)

Research interests: mixed-integer nonlinear programming and stochastic programming, with applications in transportation and network interdiction.

Davarnia

"I have chosen ISU due to its great reputation in science and engineering. In particular, IMSE has historically established its leading role in diverse areas of research and practice from energy to healthcare to data science. For new faculty, these facilities grant a unique opportunity to embrace, explore and contribute. My goal is to add another dimension to the IMSE's multi-faceted research and teaching portfolio by bringing a new perspective to study complex models that arise in optimization."

~Danial Davarnia

IMSE graduates 123 students at spring 2018 commencement

Undergraduate industrial engineering students pose during the pre-commencement ceremony at Troxel Hall on May 5.

The Department of Industrial and Manufacturing Systems Engineering (IMSE) graduated 123 students during the spring 2018 semester.

The spring's graduating class included 81 bachelor of science in industrial engineering (IE) degrees, six from the masters of engineering (MEng) in Systems Engineering, 14 from the MEng in Engineering Management, six with MEng in IE, four with masters of science in IE, and five with PhDs in IE. The graduates join a worldwide alumni base of more than 4,200.

The department hosted its undergraduate pre-commencement ceremony at Troxel Hall on Saturday, May 5. The event featured refreshments as well as an address from Gül Kremer, C.G. "Turk" & Joyce A. Therkildsen Department Chair and professor of IMSE. After Kremer's address, each student was recognized and had the chance to take the podium to share their future plans as well as some of their favorite memories from their adventure at Iowa State.

Kremer expressed IMSE's core values – dedication to its students, to each other and to the institution and its mission – as she addressed the graduates and their families and friends.

"Our mission is sacred, your loan to us is sacred, our commitment is real…to you all, to the state of Iowa and the nation," Kremer said.

The graduate commencement ceremony took place on May 3. As each of the graduates prepares to take the next step in their lives, Kremer said she was proud Iowa State and the IMSE department were able to play a role in their professional development.

"I am proud of the consistently high placement rate of our graduates," said Kremer. "This not only speaks to our well-crafted curriculum that responds to industrial needs but also the work ethic our students come with that is further nurtured. Variety of the employers shows the versatility of industrial engineering as a career path for our students, and the impact our graduates will make across industries."

After the morning's festivities, undergraduates were granted their diplomas at the afternoon's university-wide commencement ceremony at Hilton Coliseum which included students from the Colleges of Engineering, Design, and Human Sciences. Graduating senior Ashley Swift served as IMSE's "Outstanding Senior" at the ceremony.

Li joins IMSE faculty for 2018-19

Qing Li

PhD, Statistics, Virginia Tech University
MS, Electrical Engineering, University of Rochester
BE, Information and Electronics Engineering, Tsinghua University

Research interests: Bayesian hierarchical modeling, recurrent-event change-point analysis, clustering, data analytics and spatial analysis.

Li

"There are many things I like about ISU. People keep telling me the good things about ISU and Ames, such as awesome engineering and agriculture programs, good public schools, and nice people. The position which involves interdisciplinary research between engineering and statistics matches my background and interest perfectly. I hope to be fruitful in collaborative research, successful in applying for grants, able to fulfill my obligations to the IMSE Department and take care of my family."

~Qing Li

Student honors

Undergraduate awards

Audrey Fyock - *Received the **Best Track Paper Award** for Engineering Education presented by IISE. The paper was co-authored by IMSE senior lecturer Leslie Potter, IMSE associate professor Rick Stone, and IMSE student services specialist Devna Popejoy-Sheriff.*

Jared Hall - *Received the **Best Poster** award at the 6th annual IMSE Undergraduate and Graduate Research Symposium.*

Andrina Helgerson and **Quinn Monaghan** - *Received the **Best Overall** award at the 6th annual IMSE Undergraduate and Graduate Research Symposium.*

Christopher Hernandez - *Received the **David J. Henry All-University Leadership and Academic Excellence Award**. He also received the **UPS Scholarship for Minority Students** from IISE.*

Kevin Lin and **Eric Spahr** - *Received the **Best Overall** award at the 6th annual IMSE Undergraduate and Graduate Research Symposium.*

Erin Mitchell - *Received the **2018 Dean's Student Leadership Award**.*

Jenna Oftedal - *Elected **National President** of the National Association of Engineering Student Councils (NAESC). She was also awarded the **Vinod and Gail Sahney Scholarship** from IISE.*

Ashley Swift - *Named **Outstanding Senior** by Iowa State's College of Engineering for spring 2018. She also received the **People's Choice Award** at the 6th annual IMSE Undergraduate and Graduate Research Symposium.*

Graduate awards

Enrique Alameda - *Awarded the **Gilbreth Memorial Fellowship** for 2018-19 by IISE.*

Shiyang Huang - *Received the **Research Excellence Award** from Iowa State University for fall 2017.*

Fikri Kucuksayacigil - *Received the **Research Excellence Award** from Iowa State University for spring 2018.*

Ahmad Mumani - *Received the **Research Excellence Award** from Iowa State University for fall 2017.*

Hieu Pham - *Received the **Teaching Excellence Award** from Iowa State University for fall 2017 and the **Research Excellence Award** from Iowa State University for spring 2018.*

Hieu Pham and **John Reisner** - *Received the **People's Choice Award** at the 6th annual IMSE Undergraduate and Graduate Reserach Symposium.*

Srikanthan Ramesh - *Awarded the **Gilbreth Memorial Fellowship** for 2018-19 by IISE; named a **Wakonse Fellow**; received the **Research Excellence Award** from Iowa State University for fall 2017; and received the **Best Overall** award in the graduate category at the 6th annual IMSE Undergraduate and Graduate Reserach Symposium.*

Vrishtee Rane - *Received the **Teaching Excellence Award** from Iowa State University for spring 2018*

Emmanuel Tetteh - *Received the **Best Overall** award in the graduate category at the 6th annual IMSE Undergraduate and Graduate Reserach Symposium.*

Atousa Zarindast - *Received the **Best Student Paper** award in the Sustainable Development Division presented by IISE. The paper was co-authored by IMSE postdoc Elcin Günay and IMSE professor and chair Gül E. Kremer.*

Faculty and staff honors

Faculty

Michael Dorneich
Associate Professor

Dorneich was promoted from Associate Professor to Associate Professor with tenure.

Stephen Gilbert
Associate Professor

Gilbert was promoted from Assistant Professor to Associate Professor with tenure.

Gül Kremer
C.G. "Turk" & Joyce A. Therkildsen Department Chair, Professor

Kremer received the Ruth and Joel Spira Outstanding Educator Award from the ASME.

John Jackman
Associate Professor

Jackman received the John L. Imhoff Global Excellence Award for Industrial Engineering Education from ASEE.

Cameron MacKenzie
Assistant Professor

MacKenzie received the Black & Veatch Fellowship from Iowa State's College of Engineering.

Leslie Potter
Senior Lecturer

Potter received the Don Grant Faculty Award for Excellence in Undergraduate Education from the IMSE department.

Sarah Ryan
Joseph Walkup Professor

Ryan received the D.R. Boylan Eminent Faculty Award for Research from Iowa State's College of Engineering. She was also elected the Engineering Caucus Chair for Iowa State's Faculty Senate.

Lizhi Wang
Associate Professor

Wang received the 2018 Annual Award for Excellence in Teaching in the Operations Research Division IISE.

Staff

Krista Briley
Administrative Specialist and Assistant to the Department Chair

Mike Renze
Information Technology (IT) Systems Support Specialist

Briley and Renze were both recipients of Iowa State University's 25-year service award.

Devna Popejoy-Sheriff
Student Success and Services Program Director

Popejoy-Sheriff received the Iowa State University Learning Communities Outstanding Service Award for 15 years of service.

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IE student competes in ISU Innovation Prize contest

An industrial engineering student learned about the importance of teamwork and collaboration through her participation in Iowa State's Innovation Prize contest.

Andrina Helgerson, a senior in IE, was part of one of 10 teams to compete in the 2nd annual Innovation Prize contest which took place on March 30 and 31. The event consisted of teams of four who conceived an idea, developed it through collaboration, and then presented the final pitch to a panel of four judges. Teams were given 24 hours to create pitches focused on one of three categories: Ag Tech, Ed Tech, and Global Impact. Helgerson's team competed against two other teams in the Ed Tech category.

A screenshot from The Bias Game.

The team developed an app-based program – called The Bias Game – in which people can learn more about potential biases they might have and try to counteract those biases through learning more about the cultures of different people. The game presents the user with a photo of an individual who has experienced bias treatment and prompts the user to answer a yes or no question pertaining to the bias treatment the individual experienced. Depending on the user's answer, they may be promoted to watch a short video of the person explaining the bias treatment they've experienced and attempting to dispel any incorrect notations, or stereotypes, that may lead to biased treatment.

Even though Helgerson and her team did not win the contest, she said she learned a lot about effective presentation and networking skills. She also said it taught her about the importance of teamwork.

"I think the biggest takeaway, for me, was understanding the importance of collaboration, as sappy as that sounds. If you were to ask me to think of an innovative idea when first entering this competition, I would have likely given you a blank stare," said Helgerson. "However, after intermingling and discussing with others, I soon found my brain had plenty of ideas. The energy from those in attendance paired with the support from my team led to huge strides toward new and creative ideas."

As an IE student, Helgerson was able to take skills and concepts that she's learned in the curriculum and apply them to the contest. She said that IE 222: Design & Analysis Methods for System Improvements, was especially relevant.

"We learned about the eight wastes in manufacturing and that the most frequently overlooked waste was underutilization of operators' skills and or knowledge. With only twenty-four hours to develop a pitch and having just met each of my teammates for the first time, we began by addressing our strengths and weaknesses," said Helgerson. "This allowed the team to see where each member excelled and allow them to use their strengths to best meet our goal."

IE class applies engineering techniques to rescue operations

Students taking IE 271: Applied Ergonomics and Work Design last spring had the opportunity to learn first-hand about ways they can apply their engineering skills to real world situations.

On March 5, industrial and manufacturing systems engineering (IMSE) associate professor Rick Stone's IE 271 course spent a day at the Gilbert-Franklin Township Fire Station, just north of Ames, to learn about how they can take concepts from the curriculum and apply it to rescue operations.

"We're here with the dive team today and the students are gathering real world information to actually apply good engineering techniques and design to actual problems and applications," said Stone, who also serves as a Reserve Deputy for the Story County Sheriff's Office and is part of the sheriff's dive team.

Story County Sheriff's Dive Team member Rick Deitz (left) presents to IE 271 students during a visit to the Gilbert-Franklin Township Fire Station on March 5, 2018.

Students asked questions and took notes about the logistics of performing rescue operations, especially when the dive team is called upon. Students were also encouraged to use their smartphones and other tools readily available to them to document – through photos and videos – the demonstrations throughout the day.

Stone, who also has a courtesy appointment in mechanical engineering, said that the trip to the fire station helps to contribute to Iowa State's mission as a land grant university.

"Especially at a land grant institution like Iowa State, a big part of our mission is to give back to Iowa and I think that we're helping to do that," Stone said. "So today we're looking at how long it actually takes to get a response to people out in the water. We are looking at how do we shave time off of these techniques? How do we do it more efficiently? How can we take engineering techniques into this world of rescue?"

Time study, micro analysis, ergonomic analysis, tool selection, and design analysis were some of the techniques that the students learned about throughout the semester and applied to this project. Stone said he thinks it's beneficial to his students to be able to see the practical applications of the content they cover in the classroom.

"The students learn to apply these concepts to real-world problems and that's just what this trip to the fire station illustrates. It's a real-world problem that goes beyond just let's make a profit to let's potentially help to save a life."

Thank you!

Individual donors to IMSE from June 28, 2017 through May 15, 2018

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We look forward to observing IMSE's mini-centennial with events in Ames, Philly (HFES), Phoenix (INFORMS), and Orlando (IISE).

Follow news and updates regarding IMSE's mini-centennial here…
www.imse.iastate.edu/100-years-of-ie/

Cardinal and gold runs in the blood for the Weilers

Being a Cyclone runs in the blood for the Weiler family.

Patrick Weiler graduated with a BS in agricultural engineering in 1980 and established Weiler in Knoxville, Iowa in 2000. He has not only been supportive of his alma mater since leaving campus but has also encouraged his children to attend the university he knows and loves.

Members of the Weiler family pose in front of the entrance to the Weiler Laboratory in Black Engineering Building during a dedication ceremony on Sept. 2, 2017.

"Because of my desire to pursue engineering and to stay somewhat close to home, Iowa State was a natural fit for me when choosing where to pursue my undergraduate degree," said Weiler's youngest daughter Katelyn (Weiler) Freeseman ('12 civil engr). "My favorite Iowa State memories involve tailgating. As the youngest of my siblings, I remember coming up for football games when Megan and Joel were students at Iowa State. That tradition continued during my years at Iowa State and we have kept up the tradition long after we all graduated."

Weiler's eldest daughter Megan (Weiler) Green ('06 finance) echoed her sister's sentiment.

"My favorite memories from my time at Iowa State all center around tailgating," said Green. "When I attended Iowa State, it was the perfect excuse to catch up with the rest of the family and now that I've graduated, it's the perfect excuse to come back to Ames. When I was looking at schools, I truly leaned against attending Iowa State because of the family connection, but I couldn't look past the incredible opportunities the school provided and it was certainly the right decision for me."

Brother Joel was in line with his siblings in agreeing that some of the greatest memories of his time at Iowa State centered around Cyclone athletics.

"My favorite memories from Iowa State are in Hilton and Jack Trice. The ups and downs of Iowa State athletics have given me a lot of opportunities to make memories with friends and family over the years. I also met some life-long friends and my wife while attending Iowa State, so thanks for that," said Joel Weiler ('10 nutritional science). "My father attending Iowa State, a scholarship opportunity, and strong human science programs were all influential in my decision to attend Iowa State."

Megan, Joel, Katelyn, and the rest of the Weiler family were on campus for the Cyclones' season opener against the University of Northern Iowa on Sept. 2. During this time, they toured the Weiler Laboratory and other facilities in Black Engineering Building. The Weiler Laboratory was named after the family in 2016. The 596-square-foot teaching lab includes computers and Haas CNC simulators for manufacturing classes.

The Weiler family said they liked what they saw during their visit back to campus.

"The engineering labs were quite impressive," said Green who works as Counsel and Procurement Manager for Weiler. "You can tell that the faculty are motivated to provide space where students can flourish and get the most out of their time at Iowa State. Companies are increasingly focused on collaborative work environments, so these areas will prepare students well for the future."

Freeseman, who is an adjunct assistant professor of civil, construction and environmental engineering and also serves as a research engineer with the Institute for Transportation, was also impressed by the facilities.

"While I have used lab spaces in other buildings on campus, I had never been in Black Engineering prior to our visit. I am continuously impressed by the improvements that are being made to campus to keep Iowa State's reputation as a top science and technology university."

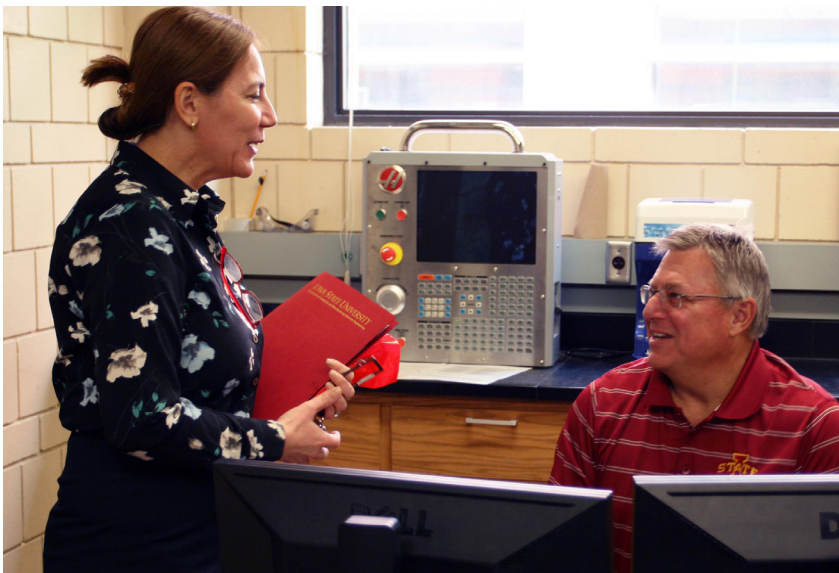
Joel Weiler, a dentist for Recker Dental Care in Pella, said he thinks that students will enjoy the renovations.

"Comparing the existing lab space with the renovated labs was very impressive. The project clearly has a vision and is resulting in a much more inviting and modern place to learn. Being in the old lab was a little nostalgic though – reminded me of some of my old classrooms in other buildings on campus," he said.

Gül Kremer, C.G. "Turk" & Joyce A. Therkildsen Chair of the Department of Industrial and Manufacturing Systems Engineering housed in Black Engineering Building, said that contributions such as those from the Weilers help to elevate the value of an Iowa State education.

"We are grateful to the Weiler family for their generous donation to the Black Engineering Building ME-IMSE joint learning laboratories. It's contributions like theirs that allow our students to pursue their passions in outstanding facilities, surrounded by world-class faculty. The role alumni and donors play is crucial in helping our students succeed," Kremer said.

IMSE department chair Gül Kremer talks with Patrick Weiler inside the Weiler Laboratory.



IE student experiences engineering from a Dutch perspective

Jaclyn Stiller poses outside of the Vermeer facility in Goes, Netherlands.

While some students spent their spring break relaxing on the beach, one industrial engineering undergraduate spent hers learning about engineering in the Netherlands.

Jaclyn Stiller, a sophomore in industrial engineering, recently participated in the Vermeer International Leadership Program which is a collaborative effort between the Pella, Iowa-based Vermeer Corporation and Iowa State's Leadership Studies Program. The program consists of two leadership courses, one in the fall and one in the spring, where participants work with Vermeer professionals to learn about global leadership.

"We interview executives at Vermeer, visit their headquarters in Pella, Iowa, and met with Vermeer professionals at their regional office in the Netherlands over spring break," Stiller said.

The main focus of the spring leadership course was on how to use adaptive leadership to solve global challenges. Participants also completed a project which involved working with Vermeer employees from an international regional office to address the adaptive challenges for their assigned country. Stiller and her team focused on Singapore.

"From this experience, the biggest thing I've learned about engineering is the importance of understanding cultural differences when interacting in international markets," said Stiller. "Doing business globally requires real mindfulness of the attitudes and perceptions that differ between the U.S. and other countries."

One example of this is how Vermeer modified its European product line to better align with the cultural expectations of a smaller and quieter work environment. Stiller said that the program also helped to give her a different perspective for how to approach challenges.

"Another thing I've learned is how to identify and solve adaptive challenges, which are challenges that require more than just technical solutions. They require a change of heart from people, and the solution comes slowly through creativity, collaboration, and skills such as emotional intelligence and cultural competence," she said.

For Stiller, the Vermeer program served as an opportunity for her to take the skills and concepts that she learned in the classroom and apply them to real world situations. She said the things she's learned in Leslie Potter's IE 222: Process Improvement course have been especially applicable.

"It surprised me how many leadership concepts from the Vermeer Program showed up in The Toyota Way in the way it emphasizes the importance of people in an organization," said Stiller. "I was also able to geek out any time we toured a Vermeer facility in Pella or the Netherlands that was practicing Lean principles like 5S, Kaizen, and other continuous improvement strategies."

Another aspect of the program that was memorable for Stiller was the opportunity for her and her colleagues to truly embed themselves in the Dutch culture. Stiller had the opportunity to visit Europe during a vacation with her family about eight years ago but she said things were much different this time.

"In our free time, we were encouraged to have conversations with the local Dutch people to learn about their lives, and we rarely saw the typical tourist attractions. I felt like I was seeing the real Holland, and not just the postcard version," she said.

Stiller grew up in Rochester, Minnesota and developed an interest in engineering at an early age because of her parents who are both electrical engineers.

"Iowa State was an easy choice for me once I saw the reputation of its engineering program and the warm community of faculty and staff ready to support its students," said Stiller. "I chose industrial engineering because I enjoy working with complex systems and making them perform at their best. I also love that industrial engineers are needed in practically every industry."

Stiller plans to graduate in the spring of 2020. After graduation she said she hopes to work for a medical device company where she can design safer and more effective medical technology. She said she was very grateful to the Vermeer Corporation for this opportunity and encourages other students to study abroad.

"My advice to anyone thinking of studying abroad is to do it. I know that's much easier said than done, but if you keep your eyes open for opportunities and plan ahead, even week-long study abroad programs can have a huge impact on your world view."

IMSE's MacKenzie creates Hurricane Decision Simulator to assist Marines with decision making

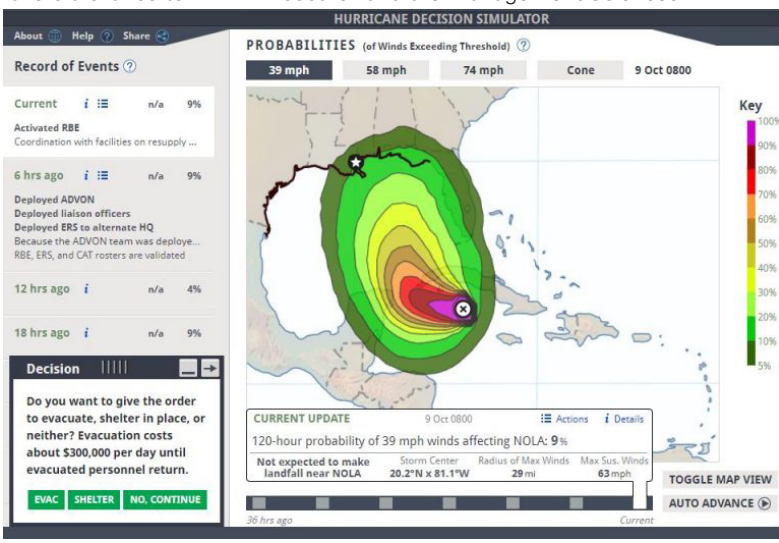
MacKenzie

The U.S. Marine Forces Reserve (MFR) is headquartered in New Orleans, Louisiana, which is an area prone to hurricanes. During the event of a hurricane warning, the commander must make timely decisions to protect the safety of the personnel and set up alternate headquarters in order to facilitate an orderly evacuation.

An assistant professor from Iowa State University, Cameron MacKenzie, and Eva Regnier, associate professor at the Naval Postgraduate School, developed a web-based simulation tool to give the commander the ability to make informed and decisive decisions. In their paper titled, *The Hurricane Decision Simulator: A tool for Marine Forces in New Orleans to practice operations management in advance of a hurricane*, Regnier and MacKenzie created the Hurricane Decision Simulator (HDS) to allow Marine Forces Reserve personnel to practice making decisions in the context of many realistic simulated storms and forecasts.

This gives the decision-makers a chance to better understand the decisions, the forecast products, and the relationship between the forecasted hurricanes and their decisions. When the National Hurricane Center identifies a real threat, the MFR will be better prepared, having made similar decisions based on their experience with the simulator.

Regnier and MacKenzie's paper was a finalist for the 2017 Manufacturing & Service Operations Management Practice-Based Competition and a finalist for the 2017 Public Sector and Operations Research Paper Competition for the Institute for Operations Research and the Management Sciences.



The Hurricane Decision Simulator presents MFR leaders with a realistic simulation to make decisions about impending hurricanes.

Two IEs named Academic All-Big12 in swimming, diving

Two industrial engineering student-athletes have been named to the 2018 Academic All-Big 12 Women's Swimming & Diving Team.

Evan Hundley, a junior sprint freestyle/backstroke swimmer, and Katherine Mueller, a sophomore diver, were both 2018 Academic All-Big 12 Women's Swimming & Diving first team selections, the conference announced in February.

Hundley made the Academic All-Big 12 first team for the second consecutive year. The Eldridge, Iowa-native was one of just seven swimmers and divers in the conference to hold a 4.0 grade point-average (GPA). Three of those seven with 4.0 GPAs are from Iowa State.

Mueller was named Academic All-Big 12 during the first year she was eligible for the honor. (Freshmen are not eligible.) The Lockridge, Iowa-native was an All-Big 12 second team selection on platform in 2017, which marked the fifth-straight year that multiple Cyclone divers earned All-Big 12 honors on platform.

Hundley and Mueller are among 14 Cyclone swimmers and divers named to the first team for having a grade-point average (GPA) of 3.20 or higher. Two Cyclones were also named to the second team with GPAs between 3.00 and 3.19. The 16 Cyclone honorees was Iowa State's highest number since 2015 when 16 Cyclones were also recognized.

Q&A with Sri Ramesh

Srikanthan "Sri" Ramesh is a PhD student in industrial engineering and a graduate researcher in Dr. Iris Rivero's Interdisciplinary Manufacturing Engineering and Design lab. He has receieved a number of awards and honors since arriving on campus in fall 2015. He plans to complete his degree requirements in spring 2020.

Tell us a bit about yourself: where are you from and when did you first become interested in engineering?

I earned my bachelor's degree in mechanical engineering from India where I was born and raised. Honestly, I had no clue about what I signed up for when I enrolled for my bachelor's degree but within a couple of semesters into my engineering program, I knew for sure that I wouldn't have been happy and satisfied doing anything else. I find it hard to explain why I do what I do!

Why did you choose to attend Iowa State? Why did you choose to study industrial engineering?

During the summer of 2014, I earned a summer research fellowship to work in the Advanced Nanoengineering Laboratory in the Indian Institute of Technology. I got to know about Iowa State from my adviser. I decided to apply to the IMSE department because of its interdisciplinary nature and also because of the strong manufacturing focus of the department.

Tell us a bit about your research interests and a project that you are currently working on.

I am interested in anything that relates manufacturing process with biomedical applications. I am currently working on developing polymeric composites that can be deposited using a bioprinter to make three dimensional architectures that could induce the growth of bones when placed in the human body.

From the perspective of a teacher/TA, what advice would you offer to current or incoming students?

As far as undergraduate students are concerned, I would encourage them to get involved in the undergraduate research opportunities that the department offers. I think it helps shape one's scientific thinking and reasoning which is very important to be successful in the engineering profession. I would encourage them to try and consciously improve the way they think and solve problems by learning from experienced and successful professionals – be it a professor or a manager at an internship. And more importantly, an early realization of the fact that education is more than just grades can always be helpful.

Grad students find a home in IMSE

The transition to a new graduate program can be difficult. There's finding a place to live, learning your way around town, and meeting new people. On top of all of that, students still have to focus on their studies and research. Moving from another country can present even more challenges.

For incoming graduate students in the Department of Industrial and Manufacturing Systems Engineering, they have extra help on their side. Deb McDonough in student services, makes that transition process as easy as possible for incoming graduate students.

For Deb, that process starts months before students even arrive in Ames, keeping in constant communication throughout the process, and providing them with the information they need to get all of their documents in order. When students arrive on campus in August, IMSE Orientation Week shows them the ropes to ensure a smooth transition.

Orientation week covers everything from an introduction to the department, to essentials on their new home, and who to contact for a variety of situations.

"When I first got here, I had to follow the map on my cell phone so that I would not get lost," Zhuoyi Zhao, a PhD student from China, said. "Deb gave us university maps with all the information we might need."

Zhao, who is studying operations research, found it essential to meet the faculty and learn what opportunities and activities are available for students.

"The IMSE department also arranged the health screening and ISSO check-in for us," Zhao said. "This is not common in other departments. I have seen my friends who just got here and did not know many people to ask for help. They had to figure all of these things out by themselves. How lucky we were!"

For Deb, her goal is to make students feel welcome and comfortable knowing that they have a resource in their corner. In creating the orientation week, Deb thought back to her days as a student to find out what incoming students were looking for.

"There hadn't been anything to welcome students and I thought about my days as a student and what kinds of things would be helpful for me to have known," McDonough said.

Deb has thought of everything, not only providing students with the resources they need to be successful in the classroom or lab, but also where to find events from the Student Activities Council, how to contact the police, how to take advantage of student counseling, and what to do for fun in Ames.

In June 2016, an apartment building near campus burned down and several IMSE students lost their belongings in the fire.

"I saw them in the hallway and asked if I could do anything to help," McDonough remembers. "They said, 'No we're okay, you told us all to get renters insurance so we are covered.' That was the point where I realized how important it is to make them feel at home."

Deb's main goal is to make students feel welcome and give them all of the resources they need to be successful.

"Deb was instrumental in my transition from Tarleton State University," Sharon Lau said. "She was the point of contact for graduate students and did a great job to keep everything in check."

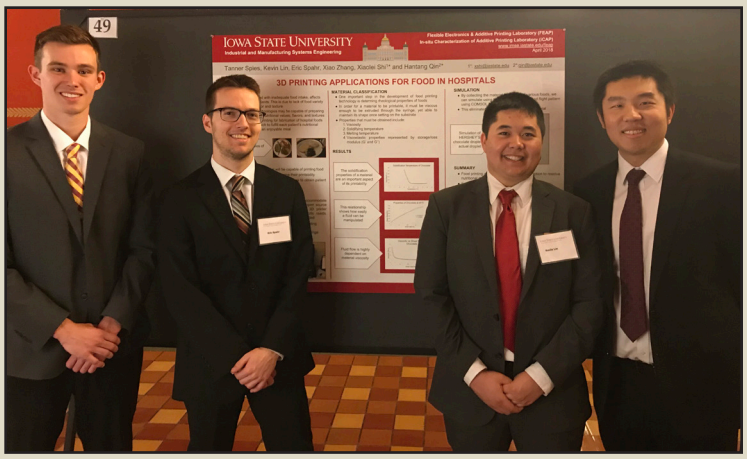
Even before IMSE students arrive at Iowa State, they can be confident in knowing that Deb is there to make sure they have everything they need.

"Deb made my transition to ISU pretty smooth," Zhao said. "I knew the moment I stepped in a new country, there was someone really cares about me. I feel so grateful to have her."

IE students present research at the Iowa statehouse

A group of industrial engineering students traveled to Des Moines in April to present their research to lawmakers, media, and other members of the public at the capitol.

Undergraduate research assistants from industrial and manufacturing systems engineering (IMSE) assistant professor Hantang Qin's Flexible Electronics and Additive Printing (FEAP) Lab visited the statehouse on April 3 to share their research for the 13th annual Research at the Capitol event. The event included 60 projects, with 20 from each of Iowa's three regent universities.



IMSE assistant professor Hantang Qin poses with his undergraduate research assistants at the Research at the Capitol event April 3 in Des Moines. From left: Tanner Spies, Eric Spahr, Kevin Lin, and Hantang Qin.

One of the Iowa State groups consisted of Qin along with Kevin Lin, Eric Spahr, and Tanner Spies, all of whom were seniors in industrial engineering. The group's project – entitled "Application of 3D printing to food preparation at Ames hospitals" – can have an impact in Iowa and more broadly.

"Our research project is about 3D food printing in hospitals. We believe that use of 3D printer food in hospitals has the capability of improving the lives of those in Iowa hospitals. Also, we use a lot of corn and soy based products which are the main crops here in Iowa," Lin said.

The atmosphere at the event was lively as dozens of people rotated in and out of the rotunda in the state's 131-year old capitol building.

"The event was very friendly, informative and beneficial to all of those involved. We were able to speak to medical professionals about our project which shed light on this new field," said Lin. "The Capitol building is very beautiful and historical and it was an honor to represent Iowa State University at a statewide level."

This project was a collaboration between IMSE and adjunct assistant professor Xiaolei Shi from Iowa State's Food Science and Human Nutrition Department. Lin said he enjoyed the opportunity to present their research to an audience outside of Ames.

"I think that sharing our research with lawmakers, media members, and the public is just as important as sharing it with other researchers. We are funded by taxpayers, as well as lawmakers, and if they are able to see that their contribution is making an impact on us as aspiring researchers, as well as the lives of the people we impact, then they will be more inclined to help us in the future," Lin said, adding that they had the opportunity to speak with Sen. Herman C. Quirmbach, an associate professor of economics at Iowa State who represents Iowa's 23rd district which includes Ames and other parts of Story County.

Qin said he was proud of the way his students presented themselves and the department throughout the event.

"I was very impressed with the way the students represented themselves, the IMSE department, and Iowa State University," said Qin. "They are dedicated to developing a next-generation 3D food printer to serve Iowans and possibly to make a broader impact on the manufacturing industry. They did a great job of explaining the research to a non-scientific audience while also showing the applications that this research can have in Iowa, and in the hospital and food industries more broadly."

He said he thought this was a great opportunity for his students and would be receptive to bringing another group back to Des Moines in the future.

"This was a great opportunity for our students and I would love to bring a group back here in the future. Events likes this do a great job of showcasing the great research taking place at Iowa State, as well as the other regent universities, for Iowans that might not otherwise know that it's taking place. We are the 3D food printing group at Iowa State and we hope people will reach out to us for possible collaborations in the future. By working together we can better develop solutions."

IE's Hylen pitches win over Hawkeyes

Emma Hylen, a junior in industrial engineering, pitched the win in a 4-2 victory over the in-state rival Iowa Hawkeyes on April 25.

Hylen pitched all 7.0 innings, giving up just two runs on five hits including six scoreless frames to close the game. The win was Hylen's 10th of the season and gave the Cyclones the edge in this year's Iowa Corn Cy-Hawk series, putting the overall series at 7-6-1 in favor of the Cyclones.

IE grad is fourth generation from her family with Iowa State connection

One recent industrial engineering (IE) graduate has embraced her great grandfather's mantra that "an engineer can do anything" as she prepares to begin her career.

Emily Carter graduated with her BS in IE in May. Her great grandfather Joseph Walkup served as chair of the IE department (originally called "General Engineering") from 1942 to 1973, her grandfather Robert Walkup graduated with his BS in IE in 1960, and her mother Holly Walkup Carter graduated with a BS in IE in 1983.

Joseph Walkup always encouraged his children and his students that "an engineer can do anything" and that message has continued to resonate for more than half a century.

Joseph Walkup

Joseph Walkup earned his BME (bachelor of mechanical engineering) and BA from The Ohio State University in 1932. After graduation he worked for General Electric (GE) for seven years before being hired as an assistant professor of industrial engineering at his alma mater. During this time, he also earned a professional degree in industrial engineering. He then served one year as head of the industrial engineering department at the University of Pittsburgh before being hired as a professor and head of the general engineering department at Iowa State.

Walkup's term as head of general engineering – which was renamed industrial engineering 1956 – spanned from 1942 to 1973. Over his career he taught Industrial Organization, Safety Engineering, Manpower Management, and Job Evaluation. He also served on the Athletic Council and the Traffic Committee's Safety Council. Outside of his responsibilities with the university, he was involved with the Ames Rotary Club, the YMCA of ISU, and local Boy Scout troops. He was also a licensed pilot and enjoyed fishing.

In 1974 Walkup established the Wildah Turnbull and Joseph K. Walkup Memorial Fund at The Ohio State University in memory of his late wife.

A scene from a General Engineering course taught by Joseph Walkup in the 1950s. Photo courtesy of Iowa State University Special Collections and University Archives

Joseph Walkup passed away in 2001. The Joseph K. Walkup Prominence in Industrial Engineering award was established at Iowa State in 2003 and in 2011 the Joseph Walkup Professorship was endowed.

Robert "Bob" Walkup

Robert "Bob" Walkup grew up in Ames and from an early age his father Joseph instilled in him the importance of education. The younger Walkup was a three-sport athlete (football, basketball, track) as a prep at Ames High but took a seat on the bench during his senior year in 1955 to focus on his studies. That year Ames won the state title in boys basketball.

Joseph's emphasis on hard work continued when Bob enrolled as a student at Iowa State.

"I studied. I don't think I even dated. I never went downtown for a beer. I was either at home or at the library," Bob Walkup said in 2013, adding that his father always found "relevant work" for him to do when classes weren't in session.

After completing his BS in IE in 1960, Bob Walkup spent more than 35 years in industry working for Rockwell International, Fairchild Republic, and Hughes Aircraft Company. Through this work he was able to live in various parts of the country and the world including New York, Iowa, Texas, California, and even Australia when he worked as an engineer at a U.S. satellite tracking station during the Cold War.

Walkup also applied his engineering skills and knowledge when he worked in municipal government, serving as the mayor of Tucson, Arizona from 1999 to 2011. During his tenure Walkup oversaw a $200 million streetcar modernization project.

"It really came to bear in the first time the city was involved in the design of a fairly sophisticated transportation project. It's not something a city of any size gets to do every day," he said in that same 2013 article. "But they had a mayor who understood the project from an engineering standpoint. I found myself sitting in the boardroom of Rockwell International, discussing its contract for the propulsion system. A mayor with no engineering background would not have been able to carry that conversation."

Following his stint as Tucson's mayor, Walkup was appointed honorary consul to South Korea, serving as a liaison for the roughly 50,000 South Koreans living in Arizona. Though he has had the opportunity to travel the world since leaving Ames, Walkup said his time at Iowa State helped to provide him with the framework necessary for a successful career in engineering and beyond.

"I am so proud of the IE faculty and staff which through the many years has maintained their commitment to excellence. Their ongoing support of the students and graduates from the department has led to countless very successful careers in engineering not only in America but around the world as well," he said.

Holly Walkup Carter (center) poses with her grandfather Joseph Walkup (left) and father Bob Walkup outside of Stephens Auditorium following the 1983 commencement ceremony.

Holly Walkup Carter

Holly Walkup Carter grew up knowing that she would eventually become a Cyclone engineer.

"From the time I was little I remember my grandfather and father talking about the fact that engineers are the ones who solve the world's problems and that Iowa State was the best college to go to for engineering so I just naturally wanted to be a part of that too," she said.

In addition to her IE studies, Walkup Carter spent four summers serving as an IE co-op for Rockwell International in her hometown of Cedar Rapids.

"Receiving on-the-job training played a critical role in inspiring me to persevere through all the difficult coursework because I really enjoyed the sense of satisfaction that solving difficult problems brought and I knew that if I could stay-the-course I would love the career," Walkup Carter said.

She said that the co-op experience coupled with the knowledge she gained in the IE curriculum helped her to land her dream job as a Manufacturing Management Program (MMP) engineer for GE upon completing her BS in 1983. After graduating from the MMP program she moved to GE's Aircraft Engine Division in Albuquerque, New Mexico, where she held a number of different engineering positions in Quality, Production Control, and Engineering Management.

She left GE in 2000 so she could put all of her efforts into homeschooling her two children: Emily and Matthew. In 2017 she received her Nutritional Therapy Practitioner certification and earlier this year launched her own business, Cornerstone Nutrition and Wellness.

Much like her father, Holly said that Iowa State's IE curriculum helped to get her to where she is today and that her time at Iowa State provided her with memories that will last a lifetime.

"Much of my time at ISU is a hazy blur due to years of sleep deprivation however, I'll never forget walking across campus on crisp fall days listening to the Campanile play in the background, trying to stay warm as we cheered on our beloved Cyclones at football games, watching the floats sail by at the VEISHEA parade, and the lifelong friendships I was blessed to create with my sorority sisters at Kappa Alpha Theta."

Emily Carter

When it came time for Emily Carter to apply to college, Iowa State was the obvious choice considering she grew up reading books featuring Cy the Cyclone and listening to family members singing the Iowa State Fight Song.

"Once I knew that I wanted to be an engineer, Iowa State seemed like a natural choice," said Carter, adding that being a legacy contributed to her decision. "I also loved the campus, truly felt that Iowa State wanted its students to excel, and the faculty were more than willing to go out of their way to help them succeed."

She said declaring IE as her major was another easy decision.

"My mother, grandfather, and great grandfather were all engineers, specifically industrial engineers. Over the years they would talk to me about various IE topics like Lean and Six Sigma, emphasizing that IE was like being a detective, where you were given a problem and had to figure out the root cause rather than fixing the symptoms," said Carter. "In addition, they stressed that IE was the most people-oriented field of engineering and that it wasn't just sitting behind a desk all day. Based on everything they told me, I really felt like IE was a perfect fit."

Growing up, Carter lived in various parts of the United States including New Mexico, Georgia, and Washington state. She was exposed to engineering at an early age through her family but said it wasn't until high school that she really began developing a deeper interest in engineering, particularly in regard to solving difficult problems and determining the root cause of those problems.

Carter kept busy since arriving on campus in the fall of 2012. She was a member of Delta Delta Delta sorority as well as Alpha Pi Mu, the IE honors society. She also served as an ambassador and eventually executive co-chair of the Engineering Career Fair. In addition, she served as a Student Admissions Representative for four years which involved giving campus tours to prospective students. Carter has also stayed busy with various internships and co-ops at Whirlpool, The Walt Disney Company, and Raytheon Missile Systems. She said that industrial engineering can be a good degree choice for students who want some flexibility with their career options after college.

Emily Carter (center) poses with her grandfather Bob Walkup (left) and her mother Holly Walkup Carter at the College of Engineering football tailgate during the 2016-17 season.

"What makes industrial engineering unique compared to other engineering disciplines is its versatility. Every business benefits from industrial engineering techniques and tools, making it possible to work in almost any industry. IE provides you with unique projects and challenges making sure you never get bored and gives you the opportunity to improve people's lives while saving your company millions of dollars," she said.

From teaching college courses, to working in Fortune 500 businesses, to leading large cities, to owning their own companies, to just beginning their careers, one thing is clear when reviewing the diverse career paths of these four generations of Iowa State industrial engineers: Joseph Walkup was correct, an engineer really *can* do anything.

Transfer IE student aims to ease college transition for her peers

For one industrial engineering (IE) student, it took leaving Iowa for her to discover how much she loves her home state.

Emily Robinson just completed her first year in Iowa State's IE program. Prior to her decision to return to Iowa she studied industrial engineering at Purdue University but left after one year when she decided that the Ames-based university would be a better fit for her professional goals.

"Purdue was my stepping-out-of-the-comfort-zone experience. Coming out of high school, I had never lived anywhere but my small hometown, and I was ready for a change. I liked the challenge that Purdue promised, so I packed up and moved to Indiana at 17 years old," Robinson said.

She said that the year (2016-17) she spent in West Lafayette was valuable because it was her first experience at a four-year university and taught her for the first time how to live independently and manage her time.

"I enjoyed the challenges I was presented with, but as I learned the importance of networking, I realized it would be more valuable to move back to Iowa," said Robinson. "I wanted to have this network in my home state, where I see myself beginning my full-time career."

Robinson grew up in Creston, Iowa and excelled at math and science classes. In high school she considered careers in management or human resources but ultimately settled on engineering because she thought it would be "exciting" and "different." While still in high school, Robinson was able to complete her associate of science degree from Southwestern Community College. She said that this experience helped to prepare her for the transition of entering a four-year university.

"The community college environment was very conducive to developing relationships with faculty members. In a smaller situation like this, especially

Robinson

as a young student, it was less intimidating for my shy self to approach professors and develop these important relationships with them. I think this made it much easier for me to continue this at Iowa State and Purdue, where I could strengthen the networking skills I need to help me in the future," she said.

Robinson will serve as an IDEAL Transitions Peer Mentor for the 2018-19 school year. She hopes to use her experience as a way to help other students who might be transferring into Iowa State from either a community college or another four-year institution.

"Since I have experience as both a community college and four-year university transfer student, I am able to connect with students from both backgrounds, which I believe is important. Knowing that someone has been in your shoes before helps when you feel a bit lost on a new campus," she said.

Robinson also hopes to share her passion for both engineering and business with her peers. Her father – Bill Robinson – is a former business faculty member at the Buena Vista University campus in Creston and he spurred her interest in the field. She felt that industrial engineering was a good fit for her undergraduate studies since it allowed her to combine business with engineering.

"My focus area for my degree is Engineering Management, which has allowed me to bring these two passions together," said Robinson. "I think the approach engineers have to problem solving is much different than those of other majors. In a management-level position, this approach gives a different way of looking at the situation, which is sometimes all you need to solve a problem."

Not only was Iowa State's proximity to her hometown a major influence on her decision to transfer, she said she also felt a strong connection with faculty members from Iowa State's IE department.

"The professors here, especially in the IE department, want you to succeed," said Robinson. "This sense of community is ultimately what sealed the deal in my decision. I think everyone here has this sense of the Iowa work ethic, meaning we all know we have to work hard to get where we want to be."

Robinson plans to complete the requirements for her BS in industrial engineering by July 2019. Eventually she hopes to pursue a master's degree in an engineering management-related plan of study.

As she prepares to enter the final year of her adventure at Iowa State, she offers two pieces of advice to her fellow students.

"First. Yes, it is hard. Yes, you will take classes you don't enjoy. Yes, you may get bad grades in these courses because you aren't as interested in them. That is normal, and completely okay. Don't let this scare you. If you're truly passionate about engineering, you will be able to make it through," she said.

"And second. College is a huge change. Adapting to the culture and freedom may seem like a huge task, without even considering classes. However, you are not the only one. Everyone is experiencing this new sense of freedom, and it truly is rewarding to watch yourself grow through the process. There are so many opportunities presented to you throughout your college education that can lead to cool experiences and skills to benefit you in your future career. As long as you put in the work, it will all pay off."

Engineers developing data-driven 'FactBoard' to improve factory operations

Reports of missing parts, machinery problems or any other issues on a factory floor don't always move quickly to decision-makers.

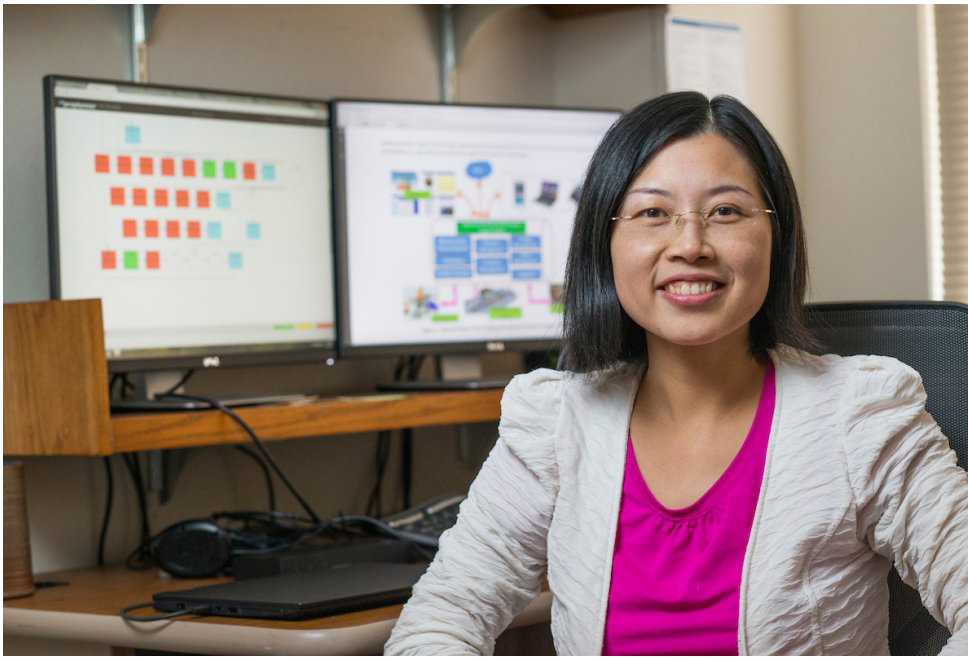
Sometimes, data collection is workers writing a few notes on a pad. It could be hours or sometimes even days before managers see the notes and make corrections.

That can cause delays, increase costs and frustrate customers.

Guiping Hu, an associate professor of industrial and manufacturing systems engineering at Iowa State University, is working with several companies to develop a data-driven, real-time solution.

She calls it FactBoard. It's a software system that's designed to take in all the information that's available on a factory floor and display it on visual dashboards so it's accessible and useful.

"Companies collect data from the shop floor – a rich amount of data," Hu said. "It's collected, but it's not often utilized in a timely, effective and efficient manner."



Guiping Hu is leading development of FactBoard, a software tool designed to improve operations on factory floors. Photo by Christopher Gannon.

So Hu, who has studied supply chain and manufacturing systems optimization from her graduate school days a decade ago at the University of Pittsburgh, is developing FactBoard with collaboration from manufacturers Deere & Co. and Boeing Co. She's also working with Ames-based Proplanner, a company that provides manufacturing software and information technology support; and Factory Right, an Atlanta company that provides information technology to manufacturers.

Hu's FactBoard research team includes faculty collaborators Sarah Ryan, Iowa State's Joseph Walkup Professor in Industrial and Manufacturing Systems Engineering, who studies ways to support and improve decision-making; Lizhi Wang, an Iowa State associate professor of industrial and manufacturing systems engineering who studies mathematical modeling; and Caroline Krejci, a former Iowa State faculty member who studies simulations and is now an assistant professor of industrial engineering at the University of Texas at Arlington.

The two-year, $2.6 million project is supported by the Digital Manufacturing and Design Innovation Institute based in Chicago, with cost-share funds from Iowa State and the researchers' industry partners.

While the study will result in conference presentations and papers for academic journals, Hu said the primary goal is applied research that results in software that makes measurable differences on factory floors.

Boeing and John Deere are planning to implement the software on their shop floors, she said. The software will be integrated into the factory's existing computers, workstations and other hardware. It can also be called up on smartphones and other devices.

"FactBoard will import all of these data feeds from the shop floor into a central depository," she said. "And then it will broadcast the information to the right people and assist the decision- making on the shop floor in a real-time, efficient and effective manner."

A worker, for example, might notice a shortage of parts that could eventually halt production.

"The worker can put a logistics request/report into FactBoard," Hu said. "FactBoard will send a message to the materials coordinator and the shop floor manager. The idea is to keep communicating – to get the right information to the right people at the right time."

Depending on the urgency of the situation, FactBoard could send out batch emails, or a text message or a phone call, she said.

FactBoard will also analyze any production issues and help managers find solutions and make decisions, Hu said. In the case of that parts shortage noticed by a worker, FactBoard could help supervisors temporarily modify the production sequence.

To make sure FactBoard provides the information manufacturers need, Hu has sent graduate students to factory floors to collect data, identify problems, write specifications and study interfaces with existing hardware. Building FactBoard on an existing software platform developed by Proplanner has allowed the research group to develop deployable software within one year and begin testing on factory floors.

Hu said the initial testing will include fixing bugs, changing specifications and collecting manufacturer feedback – all with big goals in mind.

"Manufacturers expect FactBoard to help them continue smooth operations, reduce delays, reduce inventory and improve customer happiness," Hu said. "They want to see production that's more efficient and effective."

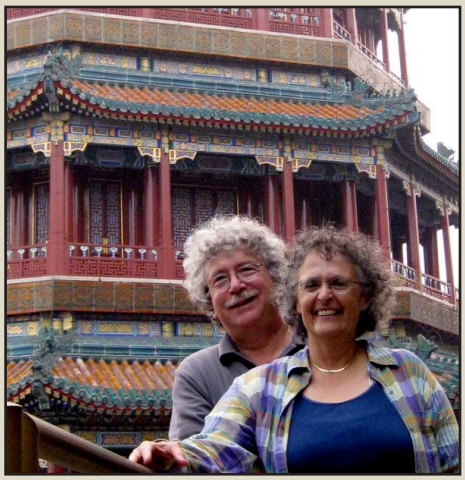
IE's first female graduate finds success in academia

When Janice (Cohen) Klein became the first woman to graduate with a degree in industrial engineering from Iowa State, she had no idea that it would be her first step toward a long and fruitful career in academia.

Klein grew up in Council Bluffs, Iowa. Her father, Ben Cohen, was trained as an engineer but went into the family retail business after returning from World War II. Her brother, Gerald Cohen, was also an engineer.

"I guess you could say engineering was in my genes," Klein said.

By the time she graduated high school she was ready to trade the rolling hills of Western Iowa for the rugged mountains of Colorado so she enrolled at the University of Colorado at Boulder (CU) where she planned to study to become a math teacher.



Jan Klein poses with her husband Dan while in China.

"Women who were mathematically inclined were guided into education in the late 1960's to teach math since the assumption was that girls either wouldn't be interested or wouldn't be able to find a job in engineering," she said.

It was at CU where she met a female engineering student who encouraged her to declare an engineering major, adding that she could always pursue a teaching certificate later if she couldn't find a career in the field of engineering. Klein decided she wanted to study industrial engineering (IE) but since it wasn't offered at CU she decided to return to her home state.

"After asking around, I was told that Iowa State had one of the best IE programs in the Midwest," said Klein. "Since I was an Iowa resident, it made sense to transfer to Iowa State."

Klein came into Iowa State as a junior and immediately fell in love with the manufacturing aspects of the IE curriculum. She was especially interested in her job design course which would later become the focus of her academic research and consulting in socio-technical systems.

After graduating with her BS in IE she was hired by General Electric (GE) to work in their Manufacturing Management Program, first in Ohio, and then in Massachusetts, north of Boston.

"One of my first assignments as a manufacturing engineer was to do time studies, a direct application of my IE degree," said Klein. "The next assignment was as a production control supervisor where I started to apply the human side of my studies."

It was while working for GE that Klein met her husband of 42 years, Dan, who is also an engineer. In addition to working for GE, Jan began taking night classes in the Boston University's master of business administration (MBA) program. Two years after completing her MBA, Janice Klein was accepted into the PhD program in Industrial Relations at the Massachusetts Institute of Technology's (MIT) Sloan School of Management.

"My PhD dissertation research was on the changing role of first-line supervisors with the introduction of employee participation programs. Here again, I was able to directly apply the knowledge I had gained in my ISU IE studies, particularly in job design and factory management," Klein said.

After completing her PhD, Klein had planned to return to industry either in manufacturing or as a consultant. Much to her surprise she was offered a job on the faculty of the Production and Operations Management (POM) program at the Harvard Business School.

"To be honest, I never envisioned myself as an academic," said Klein. "Teaching POM was a natural extension of my IE education. Learning and teaching about the Toyota Production System led me to do research in socio-technical systems where I was able to marry my interest in job design, work teams and manufacturing systems."

After eight years on the faculty at Harvard, Klein returned to her alma mater (MIT, not ISU) to serve on the faculty of the Leaders for Manufacturing Program at MIT's Sloan School of Management. During her time at MIT she helped to develop and teach courses for a two-year integrated leadership program for engineers working on both a MS in engineering and a MBA degree.

"It is actually one course that spans the entire two years, which is rather unique in that aspect. The idea is to integrate leadership into the fabric of the two-year educational program. In addition to teaching traditional leadership theories and frameworks, it uses team projects in other courses and a six-month internship, as leadership practice fields," she said.

Klein retired in 2013 but continues to serve as a senior lecturer at MIT Sloan, mentoring action learning teams for both an Operations and a Global Organization laboratory course. Outside of the classroom she is actively involved with the farmer's market in her "adopted hometown" of Gloucester, Mass. and also works with a land trust to help preserve farmland in Northeast Massachusetts and coordinate outreach to local farmers, especially new ones. In any spare time she manages to find she enjoys gardening (fruits and vegetables), cooking, and walking on the beach.

While Janice Klein's life has taken many twists and turns that she never expected, she said she has a special place in her heart for Iowa State University since it provided her with much of the foundation that helped to get her where she is today.

"I was blessed with parents and a grandmother who passed along a strong belief that through education and hard work I could achieve whatever I set my mind to, including getting an engineering degree in a field where there were very few women. I also have to admit to being very lucky to be in the right place at the right time. But bottom line, it is hard to imagine my career without the foundation of my IE education at ISU."

IE's first female PhD grad finds success in utility consulting

Karen (Hallaman) Ponder became the first woman to complete a PhD in industrial engineering at Iowa State when she graduated in 1978.

Ponder was born in Lake Charles, Louisiana and spent most of her formative years along the Gulf Coast in the Pelican State. She attributes her interest in engineering to her parents. Her father, Charles Hallaman, was a mechanical engineer while her mother, Florence Hallaman, worked as a draftswoman during World War II.

She attended McNeese State University in her hometown of Lake Charles and graduated with a bachelor's degree in mathematical statistics.

"McNeese was a much different experience than Iowa State since research was not a priority," said Ponder. "However, they had faculty who excelled in teaching and gave me the desire to go on to graduate school."

Karen Ponder (far right) poses with her family during her son's wedding.

Ponder moved to Ames in 1973 to pursue a MS in statistics, citing "Iowa State's national reputation in statistics" as her reason for attending. It was in the stats department that Ponder met her now-husband of 43 years, Wendell Ponder. After completing her MS she knew she wanted to pursue another degree but wanted to focus on something other than statistics.

"I was first attracted to industrial engineering since it used a great deal of the mathematics I studied and involved more practical matters," said Ponder. "Initially I thought that operations research would be my focus, and I met with several faculty members to discuss my options. Through this process I learned about engineering valuation, the Iowa curves, and public utility depreciation."

While in grad school, Ponder's office was in the Engineering Annex which was to the south and east of where Marston Water Tower currently stands. As a graduate student she received support from the Power Affiliate Group which through utility companies in the state provided funding for graduate students interested in the electric utility industry.

"That was an extraordinarily valuable experience that allowed me to focus on research," said Ponder. "One summer I participated in a survey of various Iowa utilities on their accounting practices. That was a fascinating transition into the real world."

While at Iowa State, Ponder developed a strong relationship with longtime IE professor Harold Cowles who she said was the major influence on her professional development.

"Dr. Harold Cowles, my major professor, was a wonderful mentor and fostered my interest in the subject," Ponder said.

Cowles along with Dr. Gerald W. Smith and Dr. G. E. Lamp, Jr., taught a series of classes to employees of the Bell System who came to Ames for a five-week workshop where the topics ranged from engineering economics to depreciation. She said that by sitting in a classroom full of utility professionals she learned how to apply various concepts in the curriculum to the real world.

But even outside of the class, Ponder said she developed memories that will always keep Iowa State near and dear to her.

"I have very fond memories of the campus itself as the leaves would change colors in the fall, the Campanile, Madrigal Dinners, shows at the Maintenance Shop in the Union," she said.

After completing her PhD Ponder moved to the Dallas-Fort Worth area, but parts of Ames never left her.

"My time at Iowa State shaped the rest of my professional life," said Ponder. "For many years, I worked at the local electric utility performing depreciation studies, using the skills I acquired in the engineering valuation program.

Ponder's skillset afforded her the opportunity to work from home to care for her children while they were young. Part of that work included teaching engineering valuation skills through a seminar developed by Dr. W.C. Fitch, an alumnus of Iowa State's engineering valuation program.

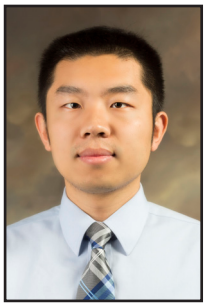
Since 2004 Ponder has worked for the Alliance Consulting Group performing depreciation studies for utility companies across the United States. In her free time she enjoys spending time with her family

"We are blessed with children, grandchildren, nieces and nephews who help keep me young at heart," said Ponder. "I also enjoy reading and seeing the world in different ways."

Ponder said she becomes nostalgic when thinking about her time at Iowa State and acknowledges that it was the foundation laid by Iowa State faculty members in the early 20th century that helped to create a positive experience for students both before and after her.

"Iowa State fostered the study of life of industrial property in the early days of the 20th century as Professor Marston encouraged the early pioneers in engineering valuation. I regret that engineering valuation as a curriculum is no longer part of the industrial engineering graduate program. For me, it has been a field of study that has been the focus of my career."

Q&A with new IMSE assistant professor Hantang Qin


Qin

Hantang Qin joined the IMSE faculty at Iowa State in fall 2017 after completing his PhD in industrial engineering from North Carolina State University. Dr. Qin recently sat down with us to discuss his background, his current research, and everything in between:

Tell us a bit about yourself. Where are you originally from and when did you first begin developing an interest in engineering?

I originally graduated from Zhejiang University in Hangzhou, China, with a degree in electrical engineering. At that time, I was involved in research projects related to magnetic levitation control systems. The maglev train runs 430 kilometers per hour - or 286 miles per hour - and is the best in the world. It makes me feel excited just being part of the most advanced technology which may be used on the most advanced products.

Tell me about some of the research projects you're currently working on. What are the different applications that this research has?

I am trying to set up a micro/nano scale hybrid manufacturing system for fabrication of electronic components based on electrohydrodynamic inkjet printing and laser ablation. If successful, my group will be able to generate functional devices for flexible electronics and wearable devices. Another project I am working on is related to quality control and assurance in additive manufacturing. We would like to significantly reduce defect rates with the help of machine vision systems. Last but not least, I'm also working on recycling metal powders from additive manufacturing machines for sustainability analysis.

Part of the mission of Iowa State University is to help Iowans and the state of Iowa. In what ways might you be able to help Iowa and Iowans through your research?

Speaking of serving Iowans, I will introduce my 3D food printing projects. Previous studies showed malnutrition affects 20 to 50 percent of patients in hospital. If not treated properly, under-nutrition may worsen health situations, extend hospital stays, and decrease quality of life. The nutritional risk in hospitals has been associated with inadequate food intake, mainly due to lack of food variety and compromised flavor and texture. The application of 3D printing to fabricate hospital food provides a new approach to fulfill each patient's expectation and eating ability as well as control the cost of trained staff. The goal of this project is to enable the healthy lives of patients and seniors in local hospitals and nursing homes of Ames and to design the next generation materials and manufacturing technologies for 3D food printing.

What have been your impressions of Ames and Iowa since moving here?

I believe I just went through the longest and harshest winter of Ames in the past ten years. So, from now on, each winter is a better winter. People here are so nice and friendly. My family loves Ames and Iowa. We are officially part of the Cyclone family and consider ourselves Iowans already!

IMSE partners with industry to sponsor three research symposiums

Three mini research symposiums were hosted by the Department of Industrial and Manufacturing Systems Engineering (IMSE) during the fall of 2017. Each forum was intended to increase collaboration between Iowa State University corresponding faculty and respective company researchers who jointly partnered in this endeavor. The Symposiums consisted of an overall welcoming and presentation on what core areas would be covered including company vision, research investments, and collaborations. Then, throughout the day(s) there were short sessions or lightning talks held focusing on the specific research topics of interest. Networking lunches, poster sessions, and lab facilities tours were also held. Final feedback sessions concluded each symposium with IMSE administrators and company representatives discussing next steps and action items that would stimulate and increase further research collaboration.

John Deere

Mini Research Symposium on Advanced Manufacturing

August 2-3, 2017

Collaboration Goal Areas: additive manufacturing, lightweight materials manufacturing, robotics and automation in manufacturing and internet of things and digital manufacturing.

Rockwell Collins

Mini Research Symposium

August 16, 2017

Collaboration Goal Areas: training, ergonomics, information security, robotics, automaton, and autonomous systems.

Danfoss Power Solutions

Mini Research Symposium

Thursday, December 14, 2017

Collaboration Goal Areas: digital supply chain, digital manufacturing, advanced manufacturing processes and virtual/augmented reality.

Get Involved!

Does your organization want to collaborate with Iowa State's IMSE department for a symposium or another project/event?

Contact
Krista Briley
kbriley@iastate.edu
515.294.0127

In Memoriam: Gerald W. Smith (1929-2017)

Gerald W. Smith, Emeritus Professor of Industrial and Manufacturing Systems Engineering (IMSE) passed away August 5, 2017 at the age of 87.

Survivors include his wife of 59 years, Phyllis, son Brian (Fazia Ali), sisters-in-law Lois Lorenz and Barbara Seydel as well as several nieces, grandnieces, and a grandnephew. He was preceded in death by his parents, brother Gene, brothers-in-law Lyle Lorenz and Kenneth Frey, and sisters-in-law Johnina Smith, Joyce Seydel, and Marjorie Frey.

Gerald Wavern was born December 1, 1929 in Des Moines, Iowa to Anthony and Marie Sorenson Smith. He lived in Fort Dodge and Sioux City where he graduated from Central High School. He earned his bachelor's degree in General Engineering from Iowa State University (ISU) in 1952. He worked for Collins Radio Company in Cedar Rapids from 1952 to 1954 and served in the U.S. Army at Fort Huachuca, Arizona from 1954 to 1956.

Following his stint with the U.S. Army, Dr. Smith returned to Ames and joined the faculty in Industrial Engineering at ISU while pursuing a Master of Science (1958) and Ph.D. (1961). He was a faculty member in the Industrial Engineering Department at Iowa State University until his retirement in 1987. To many of his students he was known as Dr. Engineering Economy. He authored an engineering textbook, Engineering Economy: Analysis of Capital Expenditures that was published by the Iowa State University press. Another publication of his, originating in 1970, Engineering Economy Abstracts, was recognized as a valuable professional service by the Engineering Economy Division of the American Society for Engineering Education (ASEE).

Dr. Smith's career in the area of engineering economy made him nationally known for his pioneering work in this area. He established a major commitment to continuing education and also was very influential in organizing and offering extension courses. In 1963, Dr. Smith originated the Engineering Economics program for the Bell Telephone System that continued for 20 years. He also annually taught a continuing education course and implemented the Management of Capital Investments Program that involved more than 120 companies and organizations.

His work in the field was recognized both locally and nationally. In 1969, Dr. Smith was named an Alcoa Professor, in 1974 he received the ISU Faculty Citation Award, and in 1981 he was given the Amoco Outstanding Teacher Award from ISU's College of Engineering. The Institute for Industrial Engineers (IIE) honored Dr. Smith in 1986 with the Wellington Award for outstanding contributions in engineering economy.

Rivero hosts NSF Workshop on advanced manufacturing

Iris Rivero, associate professor in IMSE, hosted an NSF Workshop at Reiman Gardens on campus for the advancement of URM women in engineering academia emphasizing their potential research development in the field of Advanced Manufacturing this past Fall. Discussions were held in the core areas of Design of Materials, Additive Manufacturing, and Hybrid Manufacturing and included opportunities to prepare the next generation of researchers in these areas through interactive panels, discussion of professional development opportunities by invited speakers, and the formation of work groups among participants. Presentations by Keynote speakers and networking receptions further stimulated the engagement of participants to explore research opportunities in these manufacturing areas.

The final day of the workshop was dedicated to the discussions led by an NSF program director from CMMI as well as by a DoD program director about strategies for the development of proposals in manufacturing. Designed and organized by Rivero, an integral part of the workshop followed directly after this discussion in which participants were offered one-on-one time during a speed mentoring session with former program directors who were able to provide some insight from the academic side of things as well as give some guidance regarding professional advancement to attendees.

Outgoing IAC members

IMSE faculty, staff, and students extend our sincere appreciation for the time, effort, and support, as well as, the input and guidance these Industrial Advisory Council (IAC) members have provided. The department benefits greatly from the contributions of industrial and alumni representatives such as these former members. They were valuable resources and wonderful advocates for the department. We have gained and learned from their knowledge and experience which has assisted the department with continuous improvements and a commitment towards the IMSE vision, mission, and future success. Thank you Alan, Jerry, David, and Mike for your service and dedication to the IMSE team!

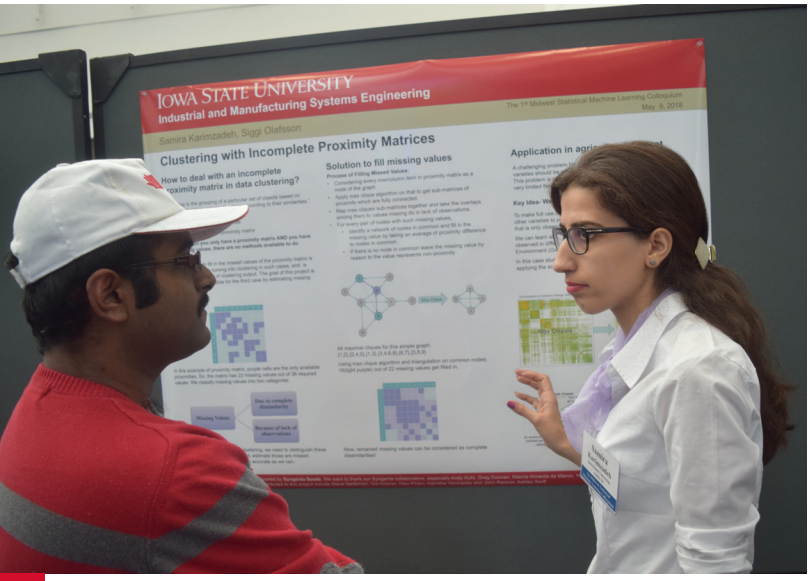
Alan Anselman
Lennox Industries
2001-2018

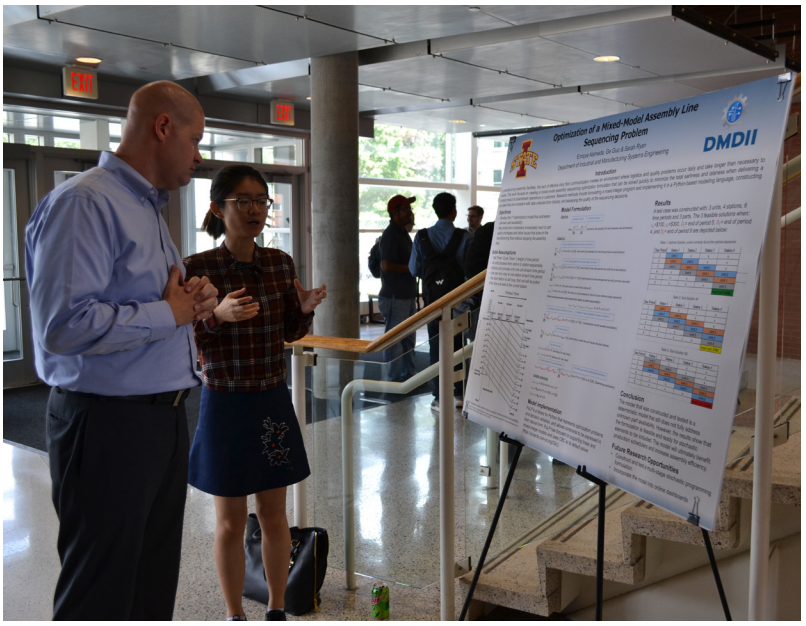
Jerry Dierickx
The Boeing Company
2013-2018

David Drew
3M
2013-2018

Mike Trachta
Mercy Health Network
2006-2018

The year in photos





Above, left: IE PhD student Samira Karimzadeh presents her research - entitled "Cluster with Incomplete Proximity Matrices" - during the 1st Midwest Statistical Machine Learning Colloquium on May 9, 2018.

Above, right: Spring 2018 IE PhD graduate Ge Guo presents her research - entitled "Optimization of a Mixed-Model Assembly Line Sequencing Problem" - during the John Deere Mini Research Symposium on Advanced Manufacturing on August 2, 2018.

Right: IMSE faculty and staff members pose for a photo at the fall 2017 College of Engineering/IMSE tailgate on September 28, 2017.

Below: Student award winners pose at the IMSE honors luncheon on April 20, 2018.

Above, left: Aaron Mehner presents his research - entitled "Atmospheric Pressure Fluctuations in Natural and Wind-Farm Boundary Layers" - at the poster session for the Wind Energy Science, Engineering, and Policy Research Experience for Undergraduates (REU) on Aug. 2, 2017. IMSE associate professor John Jackman (right) oversaw the REU program.

Above, right: Students pose during the IMSE fall picnic hosted in the Black Engineering Building courtyard on September 15, 2017.

Left: IMSE student Michelle Larsen poses with Helen McRoberts after receiving the Keith L. & Helen F. McRoberts Health Care Scholarship during IMSE honors luncheon on April 20, 2018.

Below: Student presenters pose during the 6th Annual Undergraduate and Graduate Research Symposium on April 19, 2018.

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Year(s) of Graduation/Degree(s)

Career activities, professional honors, family information, story ideas, and any other information:

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