

# IMSENews

Spring 2021

How do you plan a mass vaccination clinic?  
Industrial engineering students are working on it.



2019  
1918



# Letter From the Chair

Dear Friends and Alumni,

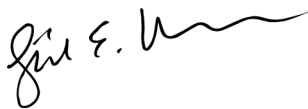
As our nation and the world appears to be rounding the corner on this terrible pandemic, I am so excited for our department, our university and our daily lives to return to some sense of normalcy. This past year or so has been very challenging for all of us, but I couldn't be prouder of the way that students, faculty and staff in the Department of Industrial and Manufacturing Systems Engineering at Iowa State University have conducted themselves as we've had to rework our entire operation to account for social distancing and other measures we've taken to reduce the spread of the virus. Dealing with COVID-19 has actually worked its way into our curriculum and this magazine includes two articles about COVID-19-related projects that students and faculty in our department have pursued.

Separate from COVID-19, the research in our department continues on. This issue contains a story about a project that is using data analytics to study the HIV/AIDS virus. For another project, researchers have developed a software that simulates weather conditions for pilots in training. And on a third project, researchers have created a virtual environment that uses avatars and realistic simulations of electrical circuits to test the effectiveness of teaching complex engineering tasks without needing to travel.

Unfortunately, this has also been a year that we have lost some of our department's close friends. In this magazine you will read tribute articles about three of our alums who have recently passed. While we are deeply saddened to have lost these individuals, we hope you will be inspired to read about the many great things they did accomplish during their lifetimes.

You'll also read about some of the accomplishments of our current students as well as our alums. I am happy that we were able to celebrate commencement in-person this semester, and I look even more forward to next semester, when we'll be able to host our department graduation celebration together in one room once again. But for now, let's celebrate the great accomplishments of our students, alumni and faculty.

With warmest regards from Cyclone land!



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

*A special thanks to **Max Morris** (second from left) and **Steve Vardeman** (third from left) who retired at the end of the 2019-20 and 2020-21 school years, respectively. We held a reception on May 6, 2021 to celebrate their careers. Combined they have served ISU for over 60 years. Thanks for your service, Dr. Morris and Dr. Vardeman! Enjoy retirement!*

*From left: Dan Nettleton, Chair of Stats Dept.; Morris; Vardeman; and Gül E. Kremer, Chair of IMSE Dept.*



## Cover Photo Caption

Iowa State's COVID-19 vaccination plan ramped up starting April 20 as all adult students qualify and a mass vaccination clinic takes over State Gym's three basketball courts. But it's not as simple as setting up booths and having vaccines ready. That's where industrial engineering students come in...*read more about this effort on page 12*

**Main photo courtesy of Christopher Gannon/ISU News Service; Secondary photo courtesy of ISU Special Collections and University Archives**

## Publication Credits

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# Awards and Honors

## Faculty and Staff

### **Stephen Gilbert** *Associate Professor*

Omurtag Research Excellence Award from IMSE Department

### **Aaron Jordan** *Laboratory Supervisor*

Omurtag Staff Excellence Award from IMSE Department;  
Chair's Choice Award from IMSE Department

### **Jo Min** *John B. Slater Fellow in Sustainable Design & Manufacturing*

Chair's Choice Award from IMSE Department

### **Frank Peters** *C. G. "Turk" and Joyce A. Therkildsen Professor*

Don Grant Award for Excellence in  
Teaching from IMSE Department

### **Hantang Qin** *Assistant Professor*

Omurtag Award for Junior Research  
Excellence from IMSE Department

### **Mike Renze** *Systems Support Specialist*

Excellence in Instructional Support Award from  
COVID-19 Exceptional Effort Awards Program

### **Lizhi Wang** *Associate Professor*

1st place in Data Analytics and Information Systems  
division of the Institute of Industrial and Systems  
Engineers' (IISE) Mobile/Web App Competition

## Students

### **Faezeh Akhavadegan, Javad Ansarifard and Saba Moeiniazade**

Research Excellence Award (Summer 2020)  
from ISU Graduate College

### **Trevor Gould, Joseph Kim, Daniel Swegle, and Macie VanNurden**

Semi-finalists for 2020 Simio Student Simulation Competition

### **Liangkui Jiang and Daniel Schimpf**

Teaching Excellence Award (Fall 2020) from ISU Graduate College

### **Liangkui Jiang, Saeed Khaki, and Daniel Schimpf**

Research Excellence Award (Spring 2021) from ISU Graduate College

### **Sam Schwierking, Grace Nashleanas,**

### **Tyler Brenza and Colton Richardson**

Best Undergraduate Poster Award at 2021  
IMSE Student Research Symposium

### **Ani Yam, Trevor Gould, and Liyuani Delgado Tapia**

Undergraduate People's Choice Award and Best Undergraduate  
Presentation Awards at 2021 IMSE Student Research Symposium

### **Eric Weflen, Michael Ginther, Mohamed Eldakrouy, Kazi Safowan**

### **Shahed, Timothy Dorn and Mriga Kher**

Best Overall Graduate Award at 2021 IMSE Student Research Symposium

### **Mitchell Black**

Best Overall Undergraduate Award at 2021  
IMSE Student Research Symposium

### **Landon Getting**

1st place at IISE Undergraduate Technical Paper  
Competition North-Central Region

### **Cora Hicks**

Named Outstanding Senior for Fall 2020 by ISU College of Engineering;  
Honorable Mention for 2020 Simio Student Simulation Competition

### **Liangkui Jiang**

IISE 2021 M&D Best Student Paper Award

### **Jameel Kelley**

Graduate Student Teaching Impact Award from  
COVID-19 Exceptional Effort Awards Program

### **Joseph Kim**

Dean's Student Leadership Award from ISU College of Engineering

### **Bethany Lippert**

Honorable Mention for 2020 Simio Student Simulation Competition

### **Saba Moeiniazade**

2nd place at 2020 INFORMS student poster competition

### **Parvin Mohammadiarvekeh**

Graduate People's Choice Award at 2021 IMSE  
Student Research Symposium

### **Mohsen ShahHosseini**

Research Excellence Award (Fall 2020) from ISU Graduate College

### **Charchit Shukla**

Best Paper Award in IISE Engineering Economy Track

### **Ryan Utterback**

Named Outstanding Senior in IE for Spring  
2021 by ISU College of Engineering

### **Eric Weflen**

1st place in Existing Business category at ISU  
College by College Pitch Off contest

### **Zhuoyi Zhao**

1st place winner, DAIS Division Web/Mobile App Competition  
2020 IISE Annual Conference; Best Graduate Poster  
Award at 2021 IMSE Student Research Symposium

# How a kid from Defiance, Iowa with an IE degree became a successful venture capitalist

From growing up in a town of fewer than 400 people to working with companies valued in the billions, **Fred Dotzler** has done a lot in his career but he never forgets about the role that Iowa State University played in shaping him personally and professionally as a young man.

Dotzler grew up in Defiance, Iowa, which he said had a population of about 380 when he was growing up. By the time he graduated at the age of 17 he had taken all of the math and science courses offered at the now-defunct St. Paul's Catholic High School.

"I did every math problem in every math textbook available to me," Dotzler said, adding that his teacher Sister Francis Marie played a major role in nurturing his development in the STEM field.

After being impressed during a campus visit to Ames, and because of the lack of economic opportunity he saw in his hometown, Dotzler decided to attend Iowa State (the only college to which he applied). He had money saved from delivering papers, shoveling snow and many other jobs back in Defiance which would cover his first year of college, but he knew he'd need to get scholarship support to cover the rest of it.

During his first couple of quarters, he maintained a strong grade point average and eventually qualified for a handful of scholarships. Though Dotzler came in with the intention of studying civil engineering, he switched to industrial engineering (IE) after the end of his sophomore year, citing the business applications of IE aligning closer to his professional aspirations.

Though he was able to complete many of the foundational IE courses during his first two years, Dotzler had to work extra hard his final two years of college to ensure he completed his degree within four years. He remembers taking 21 credits one semester, which required special permission from the dean.

Despite the aggressive course load, Dotzler recalls the good times he had in the classroom. In particular he remembers taking an IE design course with longtime faculty member **Victor Tamashunas**, whom Dotzler considers to be one of the most memorable professors from his time at ISU.



*Dotzler's senior photo from the 1967 Iowa State University yearbook.*

"He was a wonderful person," Dotzler said. "I was fortunate to be lab mates with a couple friends I met through the curriculum which really made the course a lot of fun. I learned a lot and developed some lifelong friendships during my time at Iowa State."

He also stayed busy with other on-campus and off-campus activities. He was a member of Chi Epsilon (civil engineering honorary), Gamma Epsilon Sigma (industrial engineering honorary) and Tau Beta Pi (engineering honorary) as well as Cardinal Key and Knights of St. Patrick. He pledged Alpha Tau Omega (a social fraternity) his sophomore year, which had a profound impact on both his personal and professional development.

"I thought that fraternities were good for social development and I found ATO to be a good place for me," said Dotzler. "Being in the fraternity was a big part of my time at ISU. I met many friends through ATO, some of whom I still stay in contact with today."

After completing his B.S. in IE in the Spring of 1967, Dotzler was hired as a systems engineer/sales trainee for IBM at a time when computers were often larger than refrigerators as opposed to the handheld devices we use today. A couple years later, Dotzler returned to school, this time pursuing a M.B.A. from the University of Chicago.

It was in grad school that Dotzler had his first opportunity to travel abroad. Encouraged by an Iranian friend, Dotzler applied for and was accepted into an exchange program at the University of Louvain in Belgium, sponsored by the University of Chicago. In addition to his studies, Dotzler worked during the summer on a marketing project for IBM in Geneva, Switzerland.

*Victor "Vic" Tamashunas (second from right) works with students from a plant layout design course in the 1970s. Tamashunas served on the IMSE faculty at Iowa State from 1956 to 1991.*



"What I learned through my year plus in Europe was geography, French, history, art, gastronomy, wine, and I got an advanced degree in economics," he said, adding that at that time one U.S. dollar equated to roughly 4.3 Swiss francs, compared to today where one Swiss franc is 1.07 dollars.

Upon returning stateside in 1971, Dotzler met the love of his life – Cassandra Whitt, an in-flight supervisor for Delta Air Lines – and a year later the couple wed. Throughout the 70s and early part of the 80s, Dotzler worked in various positions (finance, marketing, manufacturing, business development) across various sectors (pharmaceuticals, medical instruments, biotechnology research tools).

By the mid-1980s, Dotzler's work extended into venture capital. (To learn more about venture capitalists, check out the article that Dotzler published in *The Journal of Private Equity* in 2001: "What Do Venture Capitalists Really Do, and Where Do They Learn to Do It?"). Dotzler started with Crosspoint Venture Partners before founding Medicus Venture Partners in 1989. Ten years later, he co-founded De Novo Ventures where he currently serves as managing director. During his career as a venture capitalist, Dotzler has invested in eight companies that have achieved market values greater than \$1 billion. Given his vast amount of industry experience, Dotzler offers advice for young entrepreneurs today.

"An entrepreneur must understand the customer for whom one wants to develop a product or service. Discover their needs and limitations," said Dotzler, adding that the book *Competing Against Luck* by Clayton M. Christensen can be helpful for aspiring entrepreneurs. "Entrepreneurs should strive to learn as much as possible about the technology they intend to use in their startup. Begin thinking early about the team members you'd like to join you in building the company."

*Dotzler (second row, far right) poses with other members of the Knights of St. Patrick in the 1967 Iowa State University yearbook.*

## Knights of St. Patrick Honor Outstanding Engineers



Front Row: William C. Tobin, sr. (treas.); Edd L. Soenke, sr. (v.p.); David W. Huyette, sr. (pres.); Courtney J. Goodwin, sr. (sec.); Mike Moier, sr. Second Row: Robert Yelick, sr.; Kirk Malcolm, sr.; Albert Hanks, sr.; William Anderson, sr.; Fredrick Dotzler, sr. Third Row: Robert C. Miller, sr.; Peter A. Koser, sr.; Craig J. Nelson, sr.; Richard L. Mohr, sr.; Dennis W. Shafer, sr. Top Row: Rich Soukup, sr.; Carl Rausch, sr.; Richard Kunz, sr.; Richard Hoeftle, sr.; Alan Gilliland, sr.; Carl Lippenberger, sr.; Robert Elam, sr.

## Alpha Tau Omega



Front Row: Fred Dotzler, sr.; Bill Meyer, soph. (sec.); Steve Holaday, sr. (pres.); Mom Schuchardt (housemother); Dan Wedemeyer, sr. (v.p.); Mike Sorden, jr. (treas.). Second Row: Dennis Brightwell, jr.; Michael Kent, sr.; Joel Klemish, fr.; Richard Jenkins, fr.; Michael Holmes, soph.; Douglas Ohde, soph. Third Row: Paul Heiser, fr.; Mike Sjeklocha, soph.; Bob Engdahl, fr.; Donn Wright, fr.; Jim Overholt, soph.; Alan Cozzens, soph.; John Callender, II, fr. Top Row: Lowell Sundermann, jr.; Ray Raddewig, sr.; Lynn Theisen, soph.; Thomas Howell, jr.; Charles Borden, fr.; Daniel Kramer, sr.; David LaFontaine, fr.; Grover Edmiston, III, fr.

*Dotzler (front row, left) poses with other members of Alpha Tau Omega fraternity in the 1967 Iowa State University yearbook.*

Dotzler is also involved in several other activities, outside of his work as a venture capitalist. He has served as a Trustee of The Salk Institute in La Jolla, Calif. since 2010, and has been a Trustee of the Santa Fe Institute in Santa Fe, N.M. since 2015. He also serves as an advisor to the Gruter Institute, a behavior research non-profit based in Portola Valley, Calif.

"Aspects of these trusteeships that are rewarding are the quality of the scientists, the other trustees and the network you develop. These people are so bright. It's just mindboggling I get to be part of it," he said.

In his free time, Dotzler enjoys reading. He spends about two hours each day reading and has been on a nonfiction kick for 20 years. He prefers the feel of physical books, as opposed to reading from his iPad. He also enjoys listening to The Great Courses so that he can continue to learn and develop professionally. Dotzler tries to exercise six days each week, alternating between swimming and walking.



*Dotzler*

Fred and Cassandra raised two daughters. Whitney has a M.D. and Ph.D. from the University of Vermont where she is now a neonatologist. Cecelia is pursuing her Ph.D. in organizational psychology from Claremont Graduate University after earning her M.B.A. and spending 15 years working in industry. Fred and Cassandra also keep busy with their four grandchildren.

In 2018, the Frederick and Cassandra Dotzler Scholarship was established. Fred never forgot about his roots in Defiance, so he wanted the scholarship to support kids from southwest Iowa.

"Looking back on it all, I've had a lot of transitions in my life but nothing compares to the transition from Defiance, Iowa to graduating from Iowa State," he said. "I owe a tremendous debt to Iowa State for admitting me and helping me finance my industrial engineering degree. The most important thing I took from the curriculum was teaching myself how to think analytically because those skills have served me well in every job I've had."

# Ryan Utterback:

## Outstanding senior in industrial engineering

**Major:** Industrial Engineering

**Hometown:** Ankeny, Iowa

**Clubs and activities:** The Institute of Industrial and Systems Engineers (IISE), undergraduate teaching assistant, undergraduate research assistant, the Engineering Ambassador and Mentor Program (TEAM), and the Rapid Manufacturing Club

**Awards and honors:** First Place IISE Midwest Region Technical Paper Competition, best presentation at the IE undergraduate research symposium, second place excellence in quality award in IE361, TEAM rookie of the year award, Bert & Joan Lamberti Scholarship, and the College of Engineering Dean's List

**Who was your most influential mentor while at Iowa State?**

Without a doubt, Frank Peters, associate professor of industrial and manufacturing systems engineering. I remember being nervous my freshman year to visit Dr. Peters in his office with the intent to learn more about undergraduate research opportunities. I couldn't be happier that I did speak to him that day. Fast forward to my senior year, I am an undergraduate teaching assistant and research assistant, both under Dr. Peters. He has always been someone I look up to as a mentor for advice and guidance in the field.

**What's your favorite memory of your time at Iowa State?**

One of my favorite memories would be living in Helser Hall my freshman year. It is always fun to look back on the late nights with new friends. Living in such close proximity to so many people was a recipe for many good times.



**What's your favorite place on campus?**

Central campus. With the grand presence of Curtis and Beardshear to the east and west with the campanile and MU to your south, you feel completely immersed in our great campus at Iowa State.

**What's your advice for first-year students just starting at Iowa State engineering students?**

Get to know as many faculty members and fellow students in your department as possible! Not only does it make getting through your classes more manageable, but you'll also make great friendships.

**What's one lesson you're taking away from this challenging pandemic year?**

You are rarely alone in your struggles regardless of the subject matter. Whether you are struggling with isolation at home or with a challenging class, chances are someone else is in your exact position and would be more than willing to offer assistance.

**What are your plans for after graduation?**

Following graduation, I will be moving to Iowa City to start my career as a Process Engineer with Procter and Gamble.

*Contributed by Gillian Mohn/Engineering College Relations*

**For the full list of 2020-21  
IMSE graduates, visit:**

[imse.iastate.edu/2020-21-imse-graduates](https://imse.iastate.edu/2020-21-imse-graduates)

# Research project simulates weather conditions for pilots in training

Navigating realistic weather conditions during the pilot training process could become easier because of an Iowa State University research project involving augmented reality (AR).

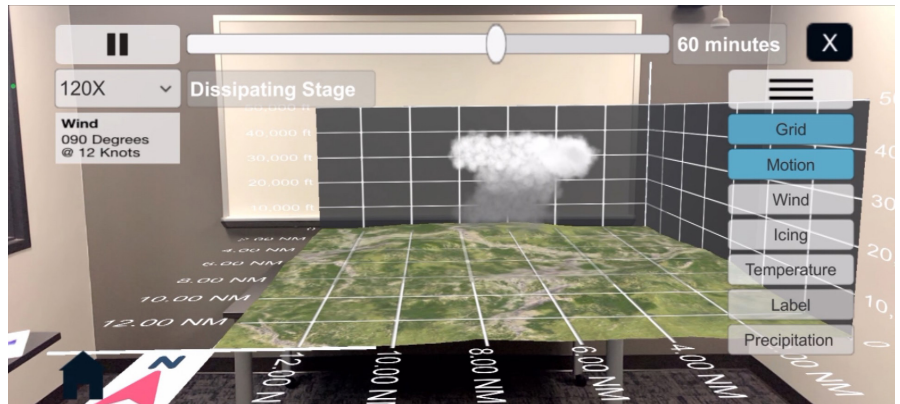
**Michael Dorneich**, associate professor of industrial and manufacturing systems engineering, and **Eliot Winer**, professor of mechanical engineering and director of the Virtual Reality Applications Center (VRAC), are leading the Iowa State University effort for the Augmented Weather Interfaces Project (AWIP), which is part of the Federal Aviation Administration's Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability (PEGASAS).

"The goal of our work is to apply augmented reality, or AR, capabilities to enhance general aviation weather training," said Philippe Meister, a Ph.D. candidate with co-majors in rhetoric and professional communication as well as the human computer interaction (HCI) graduate program.

The Iowa State University (ISU) team collaborates with researchers at Western Michigan University (WMU) for the project, which is part of a bigger AWIP effort led by Barrett Caldwell, a professor of industrial engineering at Purdue University. The team designs and develops new 3D AR weather models, learning modules, and assessment tools as well as materials that help the flight training community learn to use the new AR capabilities. These capabilities are being integrated into WeatherXplore, a weather training application developed by WMU to connect digital content with aviation educational material.

Work on this two-year project began in October 2019 and thus far, the team has developed a three-dimensional model of a single-cell thunderstorm and delivered it using augmented reality technologies and smartphones. In the next phase of the work, they will develop 3D AR thunderstorm learning materials and will assess the benefits of using the 3D AR materials compared to traditional print materials.

Winer, and his graduate students Jack Miller and Kexin Wang, built 3D weather models and delivered them with augmented reality technologies. Dorneich and Meister then applied training techniques to design effective learning activities with these models. The goal is to integrate these new activities into existing training curriculums. Additionally, Dorneich and Meister will apply human factors methods to evaluate the effectiveness of the AR-enhanced curriculum compared to a traditional print curriculum.



*A screenshot from the Augmented Weather Interfaces Project (AWIP) application.*

This project builds upon previous research Winer and Dorneich have conducted through VRAC. Previously, Winer used AR to provide augmented assembly instructions of airframe elements for shop floor technicians, showing that assembly was dramatically faster and had fewer errors. Dorneich has worked extensively with the FAA to develop and evaluate aviation-related technologies.

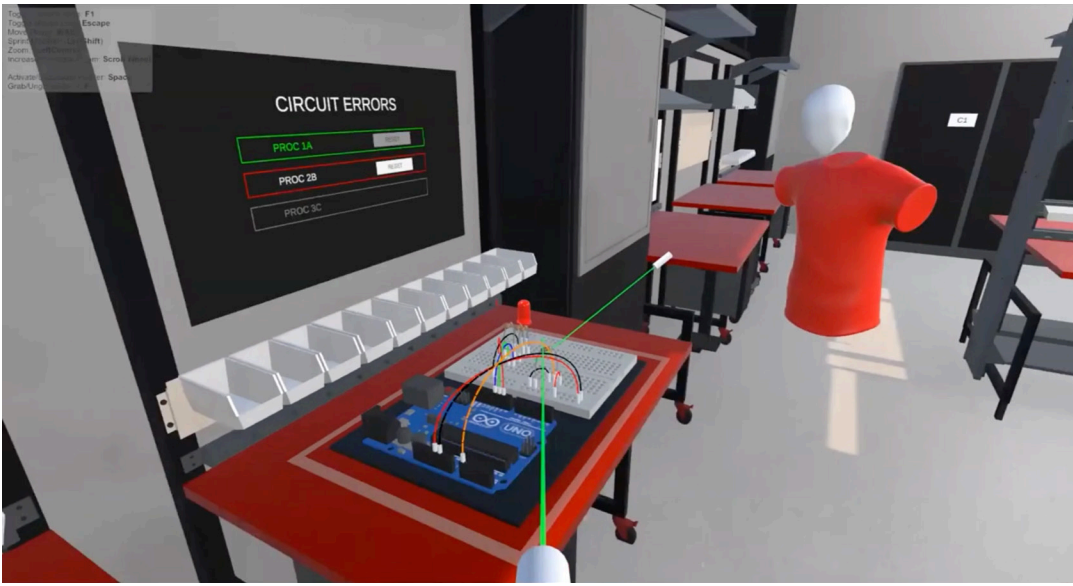
"In our current project, we are applying AR to classroom training of pilots, and exploring how best to integrate AR into traditional printed learning materials to enhance ground training of pilots," Dorneich said.

Lori Brown and Geoff Whitehurst, both associate professors in the College of Aviation at WMU, contributed their expertise in aviation weather and utilizing digital content in the classroom. Meister, who majored in writing as an undergraduate at the University of Wisconsin-La Crosse and also holds a M.A. in rhetoric and professional communication from Iowa State University, brought his background in technical communication.

"I use communication strategies to make the learning experiences logical, credible and impactful. I use HCI methods to design the AR learning experiences, improve the experiences through iterative testing, and measure learning outcomes," said Meister, adding that he also applied material that he learned in Dorneich's Design and Evaluation for Human Computer Interaction course.

"At the end, I will evaluate the AR-enhanced learning experience compared to the traditional experience to assess the benefits of AR-enhanced learning for students in GA weather training," said Meister. "I am really interested in how people are using new media technologies in professional settings to communicate technical information."

# Circuit World: A Multiplayer Virtual Environment for Researching Engineering Learning



Circuit World is a program designed by researchers with Iowa State University's Virtual Reality Applications Center. The virtual program uses avatars and realistic simulations of electrical circuits to test the effectiveness of teaching complex engineering tasks without the need for travel. **Stephen Gilbert**, associate professor, is the lead IMSE faculty member for this project.

## Check it out

[imse.iastate.edu/circuit-world](http://imse.iastate.edu/circuit-world)

## Winter session: Engineering students make the most of break

For the first time ever, Iowa State offered a winter session spanning from December 14, 2020, to January 21, 2021.

Iowa State's winter session appealed to students for a variety of reasons. Whether it be to lighten their spring class load, fill their ample free time over break, or allow them to complete their class remotely, the session drew high student enrollment across campus.

### Getting ahead

"I think the biggest benefit of this winter session is to get ahead and lighten students' class loads in the future by getting a class done during this winter session. If students were a bit behind on their graduation track or wanted to just take one less class in the spring this was a great way to do it," said **Ally Aichinger**, senior in industrial engineering and undergrad teaching assistant.

Aichinger is the undergraduate TA for IE 305: Engineering Economic Analysis, a popular elective for many engineering students and other undergrads from other colleges. It was one of three classes offered by the College of Engineering over the winter course. Others included CON E: Engineering Law and ME: Computer-Aided Design.

### Flexibility

However, taking an intensive winter session over a break time came with some tradeoffs. A large portion of the session ran during the holidays. So, while many students weren't gathering or traveling in traditional ways, there was an added aspect of having to juggle the course with holiday or family commitments.

With that in mind, the IE 305 course was designed to be flexible. Aichinger said the entire course allowed students to work at their own pace. Students read the text and watched all the pre-recorded lectures before completing their corresponding assignments.

This allowed students to complete the course at a pace and location fitting to them. Aichinger was also able to work as a TA while working from home.

### Staying engaged

Aichinger said students had the option to communicate with course instructor **Cameron MacKenzie**, assistant professor of industrial and manufacturing systems engineering, by email, Zoom or WebEx.

Aichinger mentioned another positive of the winter session was that it kept students in the school mindset over an extra long break period.

*Contributed by Martha Haas/Engineering College Relations*

# Applying data analytics to study the HIV/AIDS Virus

Researchers at Iowa State University are combining their industrial engineering and data analytics knowledge with the medical expertise of researchers at the University of Iowa for a project that could understand the progression of HIV and eventually improve treatment of the virus.

Hillel Haim, assistant professor of microbiology and immunology at the University of Iowa, is leading the effort, while **Guiping Hu**, associate professor of industrial and manufacturing systems engineering (IMSE) at Iowa State University, is a co-PI. The researchers are studying the most effective treatment strategies to combat human immunodeficiency virus type 1 (HIV-1). As the virus mutates differently in individuals, it can affect the efficacy of certain medicines, so the researchers are examining multiple variables to determine the most effective treatment based on different conditions. Haim and his team conduct the medical research in the lab and collect patients' data, then Hu and her team apply their knowledge of data analytics, using tools such as optimization and machine learning models.

"In the medical field there is more and more data available, in part, because of reduced costs for data generation and the availability of medical images," said Hu. "We have been using data analytics and optimization techniques to define parameters, determine the most effective models, develop strategies to improve the accuracy, and other performance metrics."

Hu initially connected with Haim a few years back. Iowa State's IMSE department provided funding for a Ph.D. student to conduct some preliminary analysis, which was eventually used for this current project. Despite the sports rivalry between the two universities, Hu said the collaboration has been great.

"We complement each other in the research disciplines and expertise for this project," said Hu. "The University of Iowa has a great medical program and are able to collect reliable research data through their labs and medical facilities. Then they rely on the strong machine learning and data analytics expertise we have here at Iowa State University to turn that data in useful knowledge and actionable results. By connecting people and leveraging our expertise, it's a win-win situation."

Though Hu's research focuses on operations research and analytics, one of the department's four research focus areas, this was her first major venture into the medical field. She plans to do more health and medical-related research in the future, including a potential collaboration with Mayo Clinic that she currently has in the works. Hu said that she likes the innovative and impactful nature of this research, and that the knowledge gained and algorithms developed for a healthcare or medical project can be adapted to other applications.

Work on this project started in 2019 and the researchers hope to have this initial phase wrapped by the end of 2021. The Foundation for AIDS Research provided support for this project.



*Hu*



*Haim*

## Lizhi Wang promoted to full professor

IMSE's **Lizhi Wang** has been promoted from associate professor to full professor, after approval from the Iowa Board of Regents in April.

Wang joined the IMSE faculty as an assistant professor in 2007, and was promoted to associate professor in 2013. He holds a Ph.D. in industrial engineering from the University of Pittsburgh as well as a B.S. in management science and a B.E.

in automation, both from the University of Science and Technology of China.

His research focuses on electric power and energy systems as well as energy infrastructure. In addition to his full-time appointment with IMSE, Wang also has a courtesy appointment with electrical and computer engineering.

The promotion will take effect at the start of the 2021-22 school year.



# IE alum, former Tucson mayor Bob Walkup passes away



*Bob Walkup (circled in red) poses with others members of the Engineers division of Iowa State's Army Reserve Officer Training Corps (AROTC).*

**Robert “Bob” Walkup**, an alum of Iowa State University’s industrial engineering program who had a long and successful career in various sectors, passed away on March 12th at the age of 84. Prior to his death he was diagnosed with a rare genetic form of idiopathic pulmonary fibrosis, as reported by [tucson.com](#).

Bob was born in Ames in 1936. He was the son of **Joseph Walkup**, who served as the chair of industrial engineering (IE) at Iowa State from 1942 to 1973. The elder Walkup instilled in his son the importance of education and often said that “an engineer can do anything.”

As a student at Iowa State, Bob was a member of the Engineers division of the Army Reserve Officer Training Corps (AROTC). When he completed his B.S. in IE in 1960, he served in the Army Corps of Engineers. He then had a three-and-a-half-decade career in the aerospace industry, including stints with Rockwell International, Fairchild Republic and Hughes Aircraft Company. His work took him to New York, Texas, California, and even Australia, when he worked as an engineer at a U.S. satellite tracking station during the Cold War.

Following his father’s mantra that “an engineer can do anything,” Bob left the aerospace industry in the late 1990s to pursue public office. He was elected and served three terms as mayor of Tucson, Arizona from 1999 to 2011.

Elected as a centrist Republican, Bob often took a bi-partisan approach to issues and initiatives. He was the first mayor from Arizona to sign on to the U.S. Mayors Climate Protection

Agreement. His environmental efforts resulted in higher recycling rates, a LEED certification requirement for new buildings and expansion of solar capacity, all within the city of Tucson.

Bob was also instrumental in a nearly \$200 million public transportation project that brought a streetcar to town, connecting some of the city’s “major activity centers.” Bob credited the late Arizona senator John McCain for his effort in making the project a reality.

Bob was near the end of his third and final mayoral term when on Jan. 8, 2011, a gunman killed six and wounded 13 more (including U.S. Representative Gabby Giffords) on the city’s northwest side. Bob commended the citizens of Tucson for their response in the aftermath of the shooting.

“They saw new heroes emerge at the scene of unspeakable tragedy. Indeed, they saw Tucson. One troubled man at his worst and one million of us at our best,” he told the *Arizona Daily Star*.

*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*



Bob's daughter **Holly Carter** followed in her father's footsteps and completed her B.S. in IE 1983. Much like her father, Holly's career started in the aerospace industry. She eventually left the industry so she could focus her efforts on homeschooling her two children. In 2017 she received her Nutritional Therapy Practitioner certification and the following year launched her own business, Cornerstone Nutrition and Wellness.

Holly's daughter **Emily Carter** became the fourth generation from their family with an IE connection at Iowa State, when she completed her B.S. in 2018. As a student she was busy with her sorority (Delta Delta Delta) and completed internships and co-ops with Whirlpool, The Walt Disney Company, and Raytheon Missiles & Defense. Emily currently works as the operations internship and special projects lead for Raytheon Missiles & Defense in Tucson, Ariz.

"My grandfather was always extremely encouraging and so proud that I was carrying on the family tradition of getting an industrial engineering degree from Iowa State University," said Emily. "Many times during my internships we would discuss the situations I was facing and sort through the potential solutions together. He was so wise and had such a positive, uplifting attitude about life and work that it definitely inspired me to do more and push harder. He believed in me and that helped me to believe in myself."

**Gül E. Kremer**, C.G. "Turk" & Joyce A. Therkildsen Department Chair of Industrial and Manufacturing Systems Engineering at Iowa State University, had the privilege of visiting with Bob in Tucson and in Ames. She said a phone call she received from Bob roughly one year ago will forever remain dear to her heart.

"It was the early days of the pandemic; maybe we were two weeks in with the unexpected move to online learning in the middle of Spring 2020 semester," said Kremer. "A call on my direct line, which is not listed, found me working away late in the day. I picked up the phone, and quickly realized it was Bob on the other end. He said: 'I am surprised to reach you this easily.' Typically, my assistant would patch him into me. We laughed about it. He was calling to ask what we needed to keep the mission moving. I described to him how we were handling various things. Of course, thanked him for thinking about IMSE. I remember walking to my car reflecting on friends who would be there in our darkest hour. Bob has been a friend on our best day, and also on our worst day."



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

Now without Bob Walkup, Kremer said she plans to stay in touch with Emily so that the Walkup family can still remain connected to the IMSE department at Iowa State.

"Emily, in a true Walkup fashion, offered to carry the torch forward to the future in remaining connected to IMSE. But of course, all our alumni are ours to remain connected, especially those who are with us on our best and also most difficult days," Kremer said.

**Sarah Ryan**, professor of IMSE, holds the title of Joseph Walkup Professor thanks to an endowment established by the Walkup family. She has gotten to know the Walkup family over the years and said she fondly remembers her interactions with Bob.

"I greatly enjoyed my conversations with Bob and his family on their visits to IMSE," said Ryan. "Bob asked insightful questions about my research and generously shared his perspectives based on his long engagement with sustainability issues at the nexus of technology and public policy. His friendly supportiveness of the department will be sorely missed."

# How do you plan a mass vaccination clinic? Industrial engineering students are working on it



*Industrial engineering students helped design Iowa State's mass vaccination clinic at State Gym. Photo by Christopher Gannon.*

In mid-April, Iowa State University's COVID-19 vaccination plan ramped up as all adult students became eligible and a mass vaccination clinic took over State Gym's three basketball courts.

But it's not as simple as setting up booths and having vaccines ready. That's where industrial engineering students come in.

Earlier this spring, students in an undergraduate research program led by **Sarah Ryan**, the Joseph Walkup Professor of industrial and manufacturing systems engineering, started studying what was then an abstract idea: designing a mass vaccination clinic.

"We met with the students in the Emergency Operations Center to go through their ideas and to brief them on our preliminary projections," ISU Emergency Manager Clayton Oliver said of their discussion earlier this semester.

The students observed Iowa State's smaller vaccination clinics in late March, and began analyzing data down to the second: how long it takes someone to wait in line, to register, to walk from one station to the next, to get vaccinated, to walk to the observation area. These details filled out the students' queueing network model.

Then, on April 6, Iowa State announced that a mass vaccination clinic would be held starting April 20. It was no longer an abstract project.

"With any research project, you typically start out with some objectives, then things change along the way and you have to adjust as you go," Ryan said. "I was worried the students would be frustrated by that, but I was encouraged that they understand this clinic has to adapt to events as they happen."

It might take five minutes to vaccinate someone – but that can vary. Appointments are scheduled five minutes apart – but some arrive early or late. People will sign in at registration stations – but some will have issues signing in and will need to be helped at another station.

"With a queueing network model, we get a glimpse ahead at issues they might confront so they can make adjustments on the fly," said **Tyler Brenza**, junior in industrial engineering.

This kind of accuracy is important as last-minute changes can have ripple effects, Oliver said. They want to avoid wasted vaccine doses, over-scheduling and long wait times.

By the students' preliminary calculations, the clinic could vaccinate more than 2,000 students per day – an estimate that will likely change depending on the evolving situation.

**Colton Richardson**, sophomore in industrial engineering, said he enjoyed working on a real-world problem and gaining a better understanding of what it takes to organize a mass vaccination clinic: "I got vaccinated the same day we had done observations. It's weird how different the patients see it versus how we're observing it."

"I'm really glad we got to work with these students," Oliver said. "I feel like over the past year we've been parental in telling the student population to not do a lot of things, and they haven't had many opportunities to feel like they're taking constructive action. This was a way for them to contribute directly to the solution."

*Contributed by Chelsea Davis/ISU News Service*



*An ISU student receives a COVID-19 vaccine at Iowa State's mass vaccination clinic at State Gym on Thursday, April 15. Photo by Christopher Gannon.*

## The Research Team

**Tyler Brenza**, junior from Evergreen Park, Illinois

**Grace Nashleanas**, senior from Grimes, Iowa

**Colton Richardson**, sophomore from Byron, Illinois

**Sam Schwierking**, junior from Lowell, Michigan

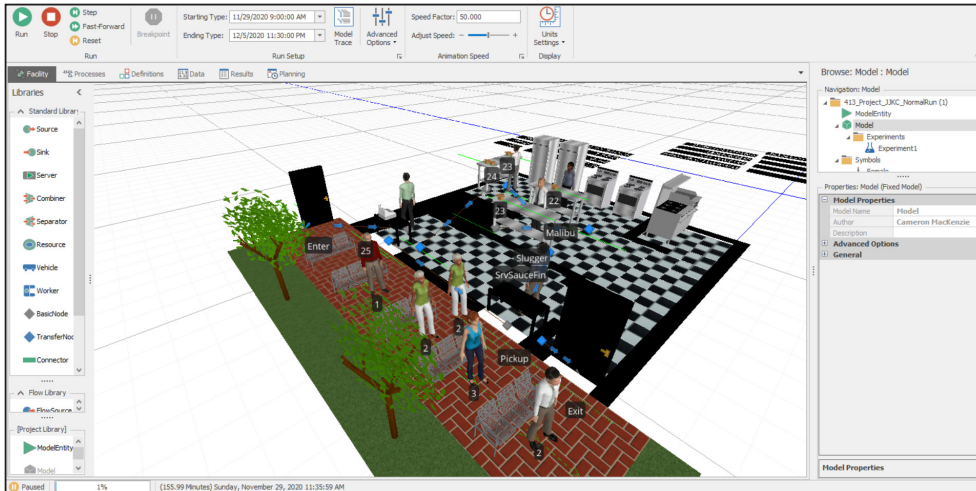
Project management by **Ghazal Shah Abadi**, Ph.D. student

Team led by **Sarah Ryan**, the Joseph Walkup Professor of industrial and manufacturing systems engineering

**Check out the video:**  
[imse.iastate.edu/covid-clinic](https://imse.iastate.edu/covid-clinic)



# IE course challenges students to consider COVID-19 when modeling and simulating



*A shot of the user interface for the Simio software, which is used by students in I E 413: Stochastic Modeling, Analysis and Simulation.*

I E 413: Stochastic Modeling, Analysis and Simulation had a new twist this semester because of the COVID-19 pandemic.

I E 413 is part of the industrial and manufacturing systems engineering (IMSE) department's operations research curriculum and the course focuses on modeling uncertainty, covering the basic concepts of stochastic processes, queueing theory and discrete-event simulation.

"Industrial engineers need to understand uncertainty and account for uncertainty in their analysis," said **Cameron MacKenzie**, assistant professor of IMSE and one of the two instructors for I E 413. "Stochastic is a fancy name for uncertainty. This course teaches students how to properly model and incorporate uncertainty in their analysis and models."

Students in the course use Simio, a computer simulation software program. Each year Simio hosts an international competition, calling for students to create a simulation using their software and analyzing a problem devised by Simio. MacKenzie integrated the contest into I E 413 during the fall 2019 semester, when one of his student teams was named honorable mention, so he decided to make the contest part of the course again for fall 2020.

The Fall 2020 contest had a new spin as participants were tasked with simulating the process and maximizing efficiencies for a barbecue restaurant in the era of COVID-19. The student teams simulated customers coming into the restaurant, ordering, and the food being made and served by the employees, while accounting

for adequate physical distancing among the customers. The students then studied ways to improve the restaurant's operations by analyzing the amount of meat that should be prepared each day and the number of employees that should be working at any given time.

One challenge this semester was that their restaurant could only have a maximum of five people waiting in line at a time, to ensure they distance adequately to reduce the spread of COVID-19. This forced students to reconsider other aspects of their restaurant operation because if the process wasn't smooth and effective,

the simulated customers (just like real life customers) might leave and find another restaurant if they get stuck waiting in line too long.

"I E 413 is known to be a challenging course, and even with COVID-19 adaptations it's retained its level of difficulty and its high-quality educational merit," said **Cora Hicks**, an industrial engineering (IE) student who completed her B.S. in Fall 2020. "I believe Professors MacKenzie and Olafsson have taught I E 413 with COVID-19 adaptations extremely well, and I feel I will be able to effectively use both Simio and R [another software taught in I E 413] in my future career to model and simulate systems."

The structure of the course was also adapted for COVID-19. This semester the course was taught in a hybrid format, meaning lectures were largely delivered online while the computer lab section was taught in-person inside Black Engineering Building. However, the lab sections were smaller (seven sections compared to four in the past) and students were adequately spaced at the workstations.

As the semester progressed, the students wanted more time in the computer lab to develop their simulation. The department was able to accommodate the students in this regard, and MacKenzie said the students did a nice job of sanitizing their stations, wearing masks and adequately distancing themselves.

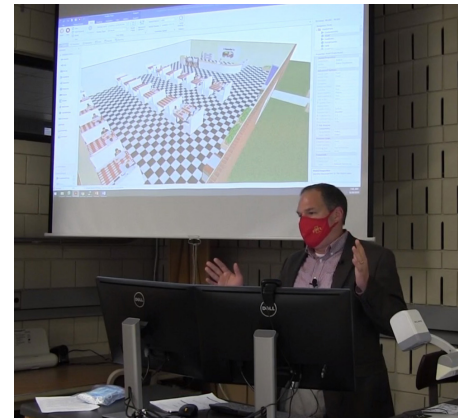
"It was difficult to not be in a classroom with other students that I could collaborate with," said **Bethany Lippert**, a senior in IE. "It took more effort to reach out and ask questions since lectures

weren't live, but the professors were always willing to help if asked. This was a challenging class, but in the end it is very rewarding to look back on all that I have learned."

To make up for the lack of face-to-face interaction, MacKenzie and **Siggi Olafsson**, associate professor of IMSE and co-instructor for I E 413, developed an online discussion forum and made themselves available during virtual office hours. Olafsson also offered a live video review session to help students prepare for exams, which the students indicated was helpful to them. MacKenzie said the lack of face-to-face interaction was difficult for him since getting to know students is one of his favorite parts of the job, but he understands it was necessary within the context of the pandemic.

Overall, MacKenzie said he was proud of what he saw from his students despite all of the COVID-19 induced hardships.

"I was impressed with the efforts the students gave toward the project and in the final exam. The students' projects turned out well, and I commend them for working hard in the class and making it through despite all of the challenges of this semester," MacKenzie said.



*Cameron MacKenzie, assistant professor of industrial and manufacturing systems engineering, gives a demo during I E 413: Stochastic Modeling, Analysis and Simulation.*

## Vardeman retires after nearly four decades at ISU

Longtime Iowa State University faculty member **Steve Vardeman** officially retired at the conclusion of the 2020-21 school year.

Vardeman first joined the Iowa State University faculty as an assistant professor of statistics in 1981. He became an associate professor in 1983 and in 1985 joined the industrial engineering (IE) department, serving appointments in both statistics and IE. He was promoted to full professor in 1986 and in 2005 attained the rank of university professor. The title of university professor is awarded to a faculty member who has acted as a change agent by making significant contributions to improve the university and who has demonstrated outstanding performance in at least one other area of faculty responsibility. Nominees must hold the rank of professor and have served at least 10 years on the Iowa State faculty.

Throughout his career, Vardeman has advised more than 50 master's students, more than 30 Ph.D. students, and countless undergraduates. He has taught 22 different statistics courses ranging from introductory survey classes to the upper graduate student level, focused on material such as Bayesian statistics and modern multivariate statistical learning.

His research interests include Statistical Machine Learning, Business and Engineering Analytics, Engineering and Natural Science applications of Statistics, Statistics and Metrology, Directional Data Analysis, Defense and Homeland Security applications of Statistics, Industrial applications, Statistical Education, and the development of new Statistical Theory and Methods. He has published more than 80 papers in refereed journals and has authored or co-authored five textbooks.



Vardeman holds a Ph.D. in statistics from Michigan State University as well as a M.S. and B.S. in statistics from Iowa State University. He served on the statistics faculty at Purdue University for six years, prior to joining the ISU faculty in 1981.

He has served as a visiting faculty member for Los Alamos National Lab since 2000 and in 2011 he founded Analytics Iowa LLC, of which he currently serves as principal statistician. He has also served in editorial roles for publications such as *The American Statistician*, *Technometrics*, *Naval Research Logistics* and *Statistics Surveys*. He is a Fellow of the American Statistical Association and an Elected Member of the International Statistical Institute.

"These forty years on the Faculty at ISU have been a great blessing to me and my family. I have had wonderful colleagues and students and interesting and meaningful work to do. My appointment in IE has been absolutely central. The opportunity to sit in the midst of IEs and interact with them in their intellectual and educational pursuits has immeasurably enriched my own. Regular teaching of and curriculum development for IE 361 - including the external student projects that predates my joining the department - has been a blast," said Vardeman.

"We'll see what develops after May 15. For sure, Professor Ken Ryan of West Virginia University and I are going to produce a graduate text in Statistical Machine Learning. Jo Ellen and I have bikes to ride, grandkids to watch run and wrestle and national parks to enjoy. And we intend to dedicate much of our remaining energy to volunteer Christian service and teaching of the Bible and - in Jo Ellen's case - English as a second language."

# Iowa roots shaped late alum's career

Though much of **Francis B. Francois'** career took place outside of Iowa, it seems that the general engineering graduate never forgot about his Iowa roots.

Francois was born in 1934 and grew up on a farm in Barnum, Iowa. He chose to attend Iowa State College (now called Iowa State University), which was about 75 miles southeast of his hometown, and selected general engineering (now called industrial engineering) as his major.

He was an active student during his time on campus, participating in a handful of engineering and non-engineering activities. He was a member of the student chapters of the American Society of Mechanical Engineers (AMSE), the Society of Industrial Engineers, the General Engineering Society and the Engineering Council. He also pledged to the Gamma Epsilon Sigma honorary, was active in various musical activities, served on the Board of Control for the campus radio station KMRI, and was even a member of the Friley Hall Camera Club.

Upon completing his B.S. in general engineering in 1956, Francois began working as a patent examiner in the U.S. Patent Office, and eventually became a patent advisor for the Applied Physics Laboratory at Johns Hopkins University. During this era, he took night classes through the law school at The George Washington University in Washington D.C. He was admitted to the Maryland bar in 1960 and from 1962 to 1980 practiced patent and trademark law with the firm of Bacon and Thomas.

Outside of his patent litigation he also worked in the public sector, serving as an Orphan's Court Judge in Prince George's County, Maryland. He eventually served as County Commissioner and finally as a member of the County Council for 10 years. He served on various subcommittees and worked on other projects pertaining to transportation, public works and community development.

He left elected office in 1980 to serve as executive director of the American Association of State Highway and Transportation Officials, a position he would hold until his retirement in 1999. Because of his background in local



*Francois' senior photo from the 1956 yearbook.*

and regional government, coupled with his understanding of public policy, "Francois played an influential role in the development of national transportation policy and in the continuing evolution of the federal-state partnership that shapes the U.S. transportation system," according to the Transportation Research Board. His work throughout his career touched various facets including transportation infrastructure, environmental quality, planning and zoning, community investment and civil rights.

In retirement, Francois wrote two books. His first, *Two Guys from Barnum, Iowa and How They Helped Save Basketball*, was published in 2008 and told the true story of two men from Francois' hometown who patented the "break-away basketball goal" which allowed players to dunk the ball without breaking the backboard or bending the rim. Then in 2011, he published *Me? I'm from Iowa*, a personal memoir about growing up in Iowa and how it influenced his career which took him to all 50 states and over 30 countries

Throughout his career, Francois won various awards and honors. Among the most prestigious was his election into the National Academy of Engineering (NAE) in 1999. In 2003, he received the Anson Marston Medal from Iowa State University, which recognizes "outstanding achievement in advancing engineering science, technology, or policy having national and international impact in academics, industry, public service, government, or other venues." In 2000, the American Association of State Highway and Transportation Officials established the Francis B. Francois award to recognize members who have "implemented an outstanding innovative transportation-related program."

Francis B. Francois passed away in Chicago on February 17, 2021 at the age of 87. He is survived by his five children and seven grandchildren.

*Francois poses with other members of the Iowa State's chapter of the Industrial Engineering Society.*

## Engineering

### INDUSTRIAL ENG. SOCIETY

*1st row: Godden (pres.), Wallis (v. pres.), Shohet, Hansen, Francois, G. H. Frost (adv.), 2nd row: Jennings, Gerwitz, Sasunic, Lowry, Hickey, Steenson, Miller, 3rd row: Mohr, Moffitt, Drake, Miller, Goltman, Boulton, McGarry.*



# A legacy left by late IE alum Linda Schmidt

Industrial engineering alum **Linda Schmidt** passed away earlier this month at the age of 62.

Schmidt served on the faculty in the Department of Mechanical Engineering at the University of Maryland at the time of her passing. She held a B.S. and M.S. in industrial engineering (IE) from Iowa State University and a Ph.D. in mechanical engineering from Carnegie Mellon University. Her dissertation was titled “An Implementation Using Grammars of an Abstraction-Based Model of Mechanical Design for Design Optimization and Design Space Characterization.”

Born in Blue Island, Ill., Schmidt completed her B.S. in 1989 and her M.S. in 1991. Her research at Iowa State focused on queueing theory. She was advised by John Jackman, who serves as an associate professor of industrial and manufacturing systems engineering (IMSE) at Iowa State, but is currently on administrative leave for an appointment with the National Science Foundation. **Leslie Potter**, teaching professor in IMSE, remembers Schmidt as a fellow researcher.

“In the spring of 1991, Linda and I worked together for **Dr. John Jackman**,” said Potter. “She was a graduate student and I was an undergraduate research assistant. We traveled to Fort Dodge together and spent several days collecting data related to municipal equipment, including dump trucks, snow plows, and the like. Working with Linda was so much fun; she was enthusiastic about everything she did. We were able to reconnect a few years ago during a visit she made to ISU. It is very sad to have such a talented and energetic colleague gone so young.”



*Schmidt*

Schmidt joined the University of Maryland faculty as an assistant professor in 1995. During her career she published more than 80 refereed publications. She also received numerous accolades including a National Science Foundation Faculty Early Career Award for research and the American Society of Engineering Education’s (ASEE) Fred Merryfield Design Award. She was a Fellow in the American Society of Mechanical Engineers (ASME) as well as a member of both ASEE and the Society of Mechanical Engineers. Having collaborated frequently with her in the ASEE and ASME communities and for research on Systematic Ideation Effectiveness Study of TRIZ (sponsored by the National Science Foundation), **Gül E. Kremer**, C.G. “Turk” & Joyce A. Therkildsen Department Chair of IMSE, fondly remembers her colleague.

“I am mourning the loss of a peer woman leader in engineering, a research collaborator, an IMSE alumna, and a close friend,” said Kremer. “Words cannot describe the hole Linda left behind.”

At Maryland, Schmidt founded and directed the Designer Assistance Tool Laboratory (DATLab), a workroom where students can hold group meetings, brainstorming sessions, and use a wide selection of construction tools and materials. She impacted countless students during her tenure in the classroom, most recently teaching “Product Engineering and Manufacturing” as well as the senior capstone course. Along with colleague, George Dieter, Schmidt co-authored the fourth, fifth and sixth editions of the textbook *Engineering Design*.

Linda Schmidt is fondly remembered for her devotion to her students as well as to her family and friends.

## End-of-the-Semester Events!

*Undergraduate and graduate students from IMSE pose during the Spring 2021 department student research symposium hosted inside Marston Hall on April 22, 2021.*



*Members of IMSE’s Industrial Advisory Council pose during their Spring 2021 meeting. From left: Dave Gardner, Valerie Boelman, David G. Rush, Shelley Finnestad, Dave Corbin, Shane Gydesen, Alan Caslavka, Lynn Long and Wayne Flory.*



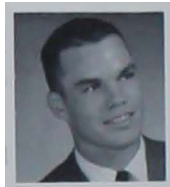
# From the gridirons of the Midwest to the sunny beaches of Florida

In 1954, 18-year old **Robert “Bob” Bird** had a difficult decision to make: play football at Iowa State College (now called Iowa State University), or play for the Cyclones’ cross-state rival – the University of Iowa Hawkeyes. Ultimately, he ended up in Ames, and he considers it one of the best decisions he has ever made.

Bird was born in Rock Rapids in far northwest Iowa and his family eventually settled in Waterloo. He attended Waterloo East High School where he played football and baseball, and was a member of the Trojans’ 1954 spring baseball state championship team. (Iowa high schools played a spring baseball tournament between 1928 and 1972). East finished that season with a 17-1 record, and in 2019 the team was inducted into the school’s Athletics Hall of Fame.

Bird’s baseball coach, Bill Waters, was not only a strong mentor on the diamond, but also in the classroom. Waters, who taught math classes at Waterloo East, encouraged Bird to consider majoring in engineering when he got to college.

“I liked the idea of general engineering [now called industrial engineering] because at the time it included basic engineering classes plus a year each of electrical, mechanical and chemical as well as some business courses,” Bird said.



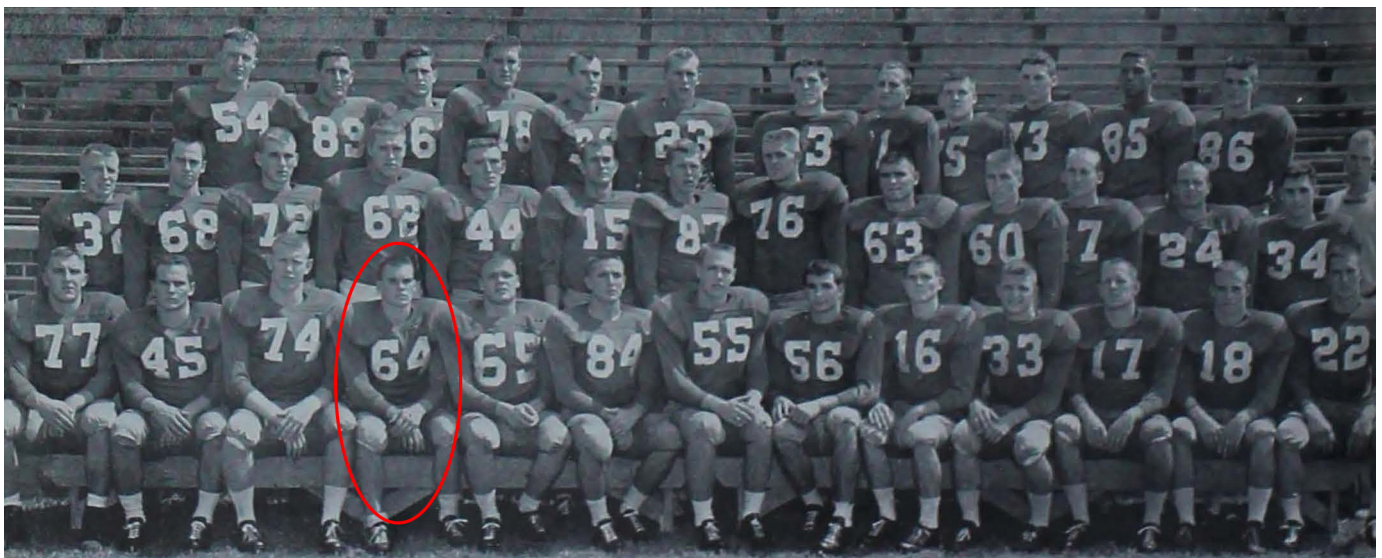
*Bird’s senior photo from the 1958 Iowa State yearbook.*

By his senior year of high school, Bird had offers to play football at both Iowa and Iowa State. Neither school was particularly strong at football during this era – Iowa posted a 17-24-4 record between 1950 and 1954, while Iowa State went 15-29-2 during that same time – so Bird based his decision on where he thought he’d receive a better education. After having lunch with Ike Hayes, an All-American guard (according to the News Enterprise Association) for the Cyclones and the older brother of longtime Ohio State Buckeyes coach Woody Hayes, Bird made his decision.

“He convinced me I would get a better engineering education at Iowa State,” said Bird. “Ike reminded me that football is temporary but your education will last the rest of your life.”

Bird arrived on the Iowa State campus in the fall of 1954 and immediately immersed himself in schoolwork, football, fraternity life and more. He said he remembers taking a course taught by longtime general/industrial engineering department chair **Joseph Walkup**, which focused on engineering problem solving skills that he would go on to use throughout his career. (In 1956, Iowa State’s Department of General Engineering was renamed the Department of Industrial Engineering.) Bird’s strong work ethic helped him to stand out amongst his peers.

“One Monday I had several facial cuts from the Saturday football game, but I had my assignments done where others didn’t and



*Bird (circled in red) poses with other members of the 1957 Iowa State Cyclones football team.*



*Bird, circled in red, poses with other members of Scabbard and Blade during the 1957-58 school year.*

he [Walkup] made quite a point of it," said Bird, who played both guard and linebacker.

Through his time on the gridiron, he learned how to be an ethical competitor, the importance of properly executing his assignments and the need to work as a team to achieve a common goal. He said these skills also came in handy throughout his career.

Off the field, Bird was a member of Sigma Alpha Epsilon fraternity. He lived in the fraternity's elegant brick and stone house on Lynn Street and "developed an ability to concentrate on study regardless of what distractions there were." Bird was also a member of Knights of St. Patrick as well as Scabbard and Blade, a national military honorary on campus. He went on to serve in the U.S. Army working his way up to the rank of captain.

Bird completed his B.S. in industrial engineering in 1958 and was hired by Westinghouse Electric. He started out selling electric power equipment in Detroit, and eventually went on to earn his M.B.A. with a focus on marketing from the University of Detroit.

However, he never forgot the skills that he learned in Iowa State's industrial engineering curriculum.

"My IE education was just right for creating relationships needed in selling technology products," Bird said, adding that he also learned a lot on the job.

In 1972, Bird started his own company – Bob Bird Sales – and worked as sales agent, selling technology equipment in the Detroit area. Bird also published various print products, largely focused on happiness and positivity. However, as work picked up with Bob Bird Sales, he put his publishing efforts on hold. Today, at age 84, he still operates his company and now has the time to return to some of his publishing efforts.



*Bird*

"Now, I hope to be involved in developing a subscription website which will include short content that when understood and acted on can help large numbers of subscribers increase their happiness," he said.

In his free time, Bird enjoys fly-fishing and has a deep fondness for music, a passion he shares with others in his family. He and his wife Sherry have been married for 59 years, and together they have two children and five grandchildren. In 2019, Bob and Sherry relocated to Sarasota, Florida. He said he considers himself "a very lucky guy" and never forgets about his Iowa roots.

"My fondest memories are that the fifties were a great time to learn, work hard and have fun. I loved growing up in Iowa and my years at Iowa State," he said.



*Bird, circled in red, poses with other members of Knights of St. Patrick engineering honorary during the 1957-58 school year.*

# Dancing the night away... For The Kids!

It took a high school internship for one industrial engineering student to realize that engineering involves more than just building roads and bridges.

**Sarah Longmire**, a Spring 2021 industrial engineering graduate, “loved” her science and math classes growing up in Iowa City. She was a bit apprehensive about the field of engineering, admitting she thought engineers only “built stuff,” but her father and grandfather (an engineer) encouraged her to learn more about the different types of engineering. After losing a bet with her father, she had to uphold her end of the bargain by taking a high school engineering course.



*Longmire*

“Through that course, I found that I really enjoyed engineering but I was more interested in a non-traditional engineering role,” said Longmire. “Later in high school I had the chance to intern for Collins Aerospace and was able to shadow a variety of engineers. This is when I realized that industrial engineering would be the best fit for me.”

She was fairly certain she would study industrial engineering (IE) in college, knowing that an IE degree allowed her the career versatility to serve in everything from technical positions to more business-oriented roles. She felt that Iowa State University had more of a “collaborative emphasis” compared to the other schools she considered, which ultimately led her to pursue her engineering adventure in Ames.

“When I toured other schools, I was turned off by how much they encouraged classmates to compete with each other. While I am very competitive, I realize that the engineering world is all about working with teams to solve problems, and I wanted an environment that encouraged that,” she said.

Longmire got involved with research her freshman year and she said she is still grateful to **Frank Peters**, C. G. “Turk” and Joyce A. Therkildsen Professor and associate professor of industrial and manufacturing systems engineering, who brought her on to his undergraduate research team. Through this experience she

did everything from outreach efforts with local schools to projects with manufacturing companies. Longmire went on to take I E 348: Solidification Processes with Peters, whom she said has been one of her most impactful professors at Iowa State.

Longmire is also building an impressive resume with her other activities outside of the classroom. She is involved with Pi Beta Phi sorority and has interned with the Anning Johnson Company as well as The Boeing Company. She also consults for Iowa State’s CyBIZ Lab.

Another student organization near and dear to Longmire’s heart is Dance Marathon. Dance Marathon is a once-a-year, 12-hour dance event. Organizers raise money in the months leading up to the event with proceeds going to the University of Iowa Stead Family Children’s Hospital back in Longmire’s hometown of Iowa

*Longmire (right) poses with other Dance Marathon organizers on central campus.*





*Longmire was named to the Cardinal Court during Homecoming 2020. Here she poses with her sash outside of the Alumni Center.*

City. Part of the funds also go to children in the Ames area who are battling life-threatening illnesses.

Longmire has been involved with Dance Marathon in various capacities since her freshman year and served as the organization's executive co-director and president for 2020-2021. In this role her responsibilities included, overseeing a 20-person executive team and a 100-person committee as well as helping to organize an event with about 500 participants. Organizers made special adaptations to this year's Dance Marathon – which took place on April 17 and raised \$184,579.24 – to accommodate COVID-19 protocols.

Longmire completed her B.S. in IE in Spring 2021. She said some of her fondest memories from her time at Iowa State include Dance Marathon, football games in Jack Trice Stadium and “staying until 2 a.m. at the library drinking cranberry Red Bulls and eating cheese sticks.” Upon graduation she will move to Salt Lake City where she will work as an operations analyst for

**To learn more about  
Dance Marathon  
at  
Iowa State University  
visit:  
[dm.stuorg.iastate.edu](https://dm.stuorg.iastate.edu)**

Goldman Sachs. She said she expects content from courses like I E 222: Design & Analysis Methods for System Improvements, I E 312: Optimization and I E 361: Statistical Quality Assurance to be especially relevant to her position. Reflecting back on it, she said majoring in IE was a great decision, particularly for anyone who likes to always be working on something that is both rewarding and exciting.

“IE is all about driving efficiencies and making everyone's overall experience better and I've found that there is hardly ever a dull moment being an IE,” she said.

*Longmire interned with the Anning Johnson Company as a student at Iowa State. Here she poses at a worksite.*



# Sea-loving Saudi finds a loving home at landlocked Iowa State University



*Alsaggaf poses in his graduation cap and gown outside of Marston Hall.*

Growing up in coastal Saudi Arabia, **Fahad Alsaggaf** developed a strong personal connection to the sea. So, it was a major change of scenery when he attended college in a landlocked state like Iowa, but he said he has never regretted his decision.

Alsaggaf grew up in Jeddah, Saudi Arabia, a port city along the Red Sea. He describes his hometown as “the most beautiful city on the Red Sea,” but adds with a laugh “I’m not biased at all.” Growing up, he said he and his family were always close to the sea, whether that be snorkeling or fishing or just relaxing on the beach.

“There was something special about seeing the sun sink into the sea,” said Alsaggaf. “How the colors collided was perfect.”

Alsaggaf developed a strong appreciation for art and other creative endeavors growing up, but he also had an analytical side.

“My favorite art was seeing how everything can come together perfectly in a math equation or a formula. Simplifying an equation or finding the common factor almost felt like an art,” he said.

When it came time for college, he had some sense that he might pursue studies in STEM but wasn’t entirely sure where he would go. A family friend recommended he check out Iowa State University, but Alsaggaf admits he was “hesitant” at first to attend a foreign institution half a world away. But after scoping out the campus and the city of Ames on Google Maps, he started coming around. He knew that he would be replacing the sand and sea of the Arabian Peninsula with the prairies and rivers of the Upper Midwest. Ultimately, he decided this change of scenery would serve him well both personally and professionally.

Alsaggaf said he felt welcomed by the Iowa State University community as soon as he arrived on campus in Fall 2014. He



*Alsaggaf poses outside of the Saudia Airlines headquarters in Jeddah.*

made friends right away during orientation, and though he came in undeclared he eventually selected industrial engineering (IE) as his major, citing that it allowed him to work closely with other people to solve technical problems. It was his I E 148: Information Engineering course with **Leslie Potter** that further reinforced to him that he made the right decision with IE.

“Leslie had this energy in the class that kept all students motivated,” Alsaggaf said. “The class was focused on Excel skills, yet, I was very engaged by Leslie’s every word. Every presentation she gave assured me that I had chosen the right major that fits with my skills and capabilities.”

Senior capstone with **Dave Sly** was another course that stood out to Alsaggaf. He said that he appreciated how capstone gave him the opportunity to take everything he had learned in the curriculum up to that point and apply it to a real-world project.

Alsaggaf also developed his skills and capabilities outside of the classroom. He was active with the

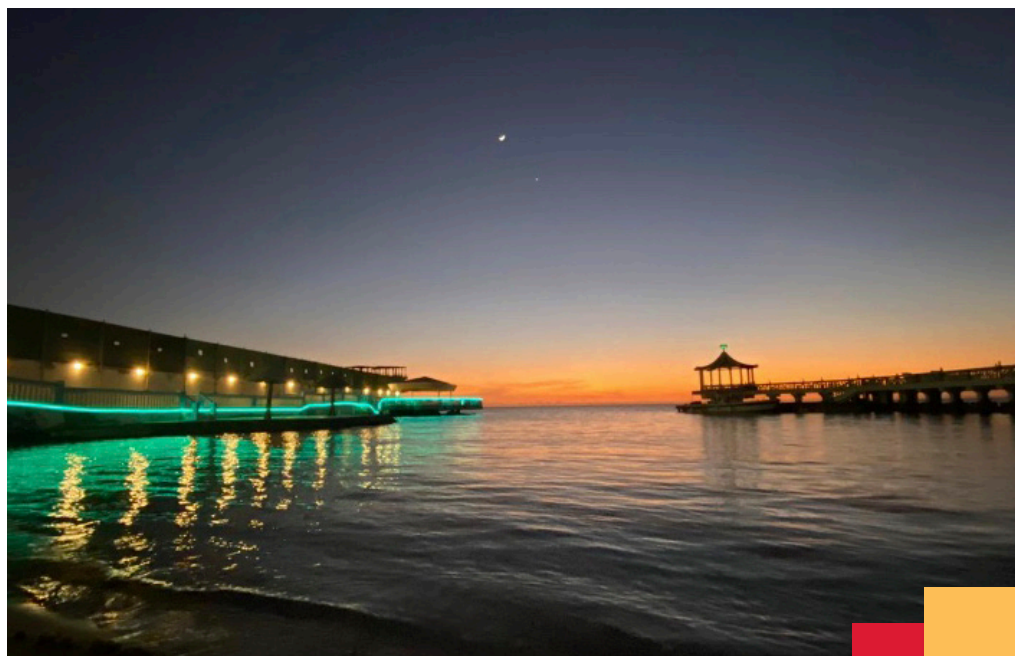
Sales Engineering Club which he said provided a network of people and other resources that allowed him to improve himself as an engineer. He was also involved with DubH (the university’s hip hop club) which he said allowed him to “get a bit out of my comfort zone” and to take a break from the rigors of the IE course load.

Alsaggaf graduated with his B.S. in IE in Fall 2018. He now works as a fleet acquisition and development specialist for Saudia Airlines. He said courses such as I E 148, I E 248: Engineering System Design, Manufacturing Processes and Specifications and I E 348: Solidification Processes provided him with the skills and knowledge in problem-solving, statistics, trend analysis and more, which he regularly applies to his work.

Though he’s only been away from campus for a couple years, Alsaggaf said he still regularly thinks about all the good times he had as a student and looks forward to the COVID-19 pandemic subsiding so he can return for a visit. He said he is happy to be back in his home country but will forever know that choosing his adventure at Iowa State was one of the best decisions he ever made.

“It felt like the right place. The trees, the buildings, the art, Lake Laverne and let’s not forget the cardinal and gold all came together perfectly like the sun sinking in the sea or like a math equation coming together,” he said.

*The sun sets along the Saudi Arabian coast. Photo courtesy of Fahad Alsaggaf*



# IOWA STATE UNIVERSITY

## Department of Industrial and Manufacturing Systems Engineering

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