

IMPACT



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President Richard Linton, left, and Provost Charles Taber pose with the quarter-scale tractor during their visit to the college in April.

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From the Dean

Greetings from Rathbone Hall and the Carl R. Ice College of Engineering, where the semester is going strong and the familiar buzz of our buildings filled with eager students is a much-welcomed sound compared to the quiet of summer.

The last year has been a strong one for K-State engineering, and there are many worthy accomplishments highlighted throughout this issue of Impact.

Most importantly, the demand for our students from engineering firms across the state and region is higher than I've seen in the last 20 years. While we've put a great deal of focus on recruiting new students, it's easy to forget why increasing our numbers matters. Put simply, industry needs more engineers. Every student who chooses to come to K-State to study with us is a technology leader who can help drive economic prosperity for all of Kansas and the surrounding region. This helps to fulfill our land-grant mission and is the main reason we do what we do — educate students.

From an enrollment perspective, this fall has been one of the strongest classes in several years, with new students coming in at a pace similar to the numbers we were seeing in 2019. As you'll read further along in the magazine, scholarships are a primary driver for enrollment within the college. The generosity of alumni and stakeholders opens the door to K-State for so many — we truly appreciate it.

We've continued to upgrade some of our facilities, and we are excited the renovation of west Seaton Hall has been approved for the summer of 2023. The project includes additional matching funds from the Kansas Board of Regents that have allowed us to expand the scope of the upgrades and truly transform the space into something our students and faculty can better utilize.

Our competition teams have continued to produce strong results at the national level, including our Wildcat Wind Power Team that brought home first place from its national U.S. Department of Energy-sponsored competition for the first time in the club's history. It's been good to see each of these teams get back to business as usual and begin traveling and competing again.

We also announced the appointments of two new department heads this year, with Jennifer Anthony becoming the head



of the Tim Taylor Department of Chemical Engineering and Mark Wilkins joining us from the University of Nebraska-Lincoln as head of the Carl and Melinda Helwig Department of Biological and Agricultural Engineering. I'm confident both will do excellent things for K-State in these leadership roles.

Lastly, we welcomed a new president at K-State this year, Richard Linton. He has an excellent vision for the university but is also welcoming input from the larger K-State community through a series of community visits and participation in surveys. If he finds himself in your area over the coming months, I'd encourage you to participate in these open forums.

Matthew J. O'Keefe, Ph.D.
Dean and LeRoy C. and Aileen H. Paslay Chair

Lessening the load

Steve Blume creates scholarship to pay forward support he received as a K-State student



Steve and Debbie Blume

A chance encounter at Kansas State University's open house led Steve Blume to his academic major and a successful career.

"The head of agricultural engineering was walking through, greeting prospective students," Blume explained. "He asked me about my grades and ACT score. After I told him, he said he thought he could get me a scholarship, which he did. I thought I wanted to study engineering and that sealed the deal."

Blume majored in agricultural engineering. After graduating in 1979, he made a career working in the oil and gas industry.

As a first-generation student, Blume didn't know what to expect when he decided to go to college, but he knew he had to work hard to get good grades in the challenging engineering field.

"Everyone talks about their great time at college — going out to parties, etc. I didn't do any of that," Blume said. "I studied, played intramural basketball, worked out and went to a few football games. But that's OK. It was a good choice for me at the time. Now I can enjoy all the hard work I put into it."

The relationships Blume forged in college are some of his fondest memories.

"The support and the relationships I had with my professors, especially the ag engineering professors, are some really good memories," Blume said. "They mentored me and coached me to be successful in school and be prepared for my career afterward."

"I hope the scholarship motivates more STEM-related students to go to K-State and major in engineering. And if there's fear about money, I can help them out with this scholarship to lessen that concern."

— Steve Blume

To pay back the assistance he received while a K-State student, Blume created a scholarship for first-generation students majoring in engineering.

"I hope the scholarship motivates more STEM-related students to go to K-State and major in engineering," Blume said. "And if there's fear about money, I can help them out with this scholarship to lessen that concern."

Engineering runs in Blume's family — two of his four sons are engineers, and his wife, Debbie, is an engineer. One piece of advice Blume passed on to his sons is applicable to all students.

"To those who receive the scholarship, I want them to be passionate about being engineers, passionate about getting a good education at K-State and then passionate about applying what they learned in their jobs," Blume said. "If they are, they will be successful."

by Marisa Larson, KSU Foundation

Scholarship program sees growth in first year

As part of its commitment to student success, the Carl R. Ice College of Engineering revamped its scholarship allocation process in 2022 in order to leverage existing funding to help recruit new students to grow the college while also providing much needed merit and financial need support to existing students.

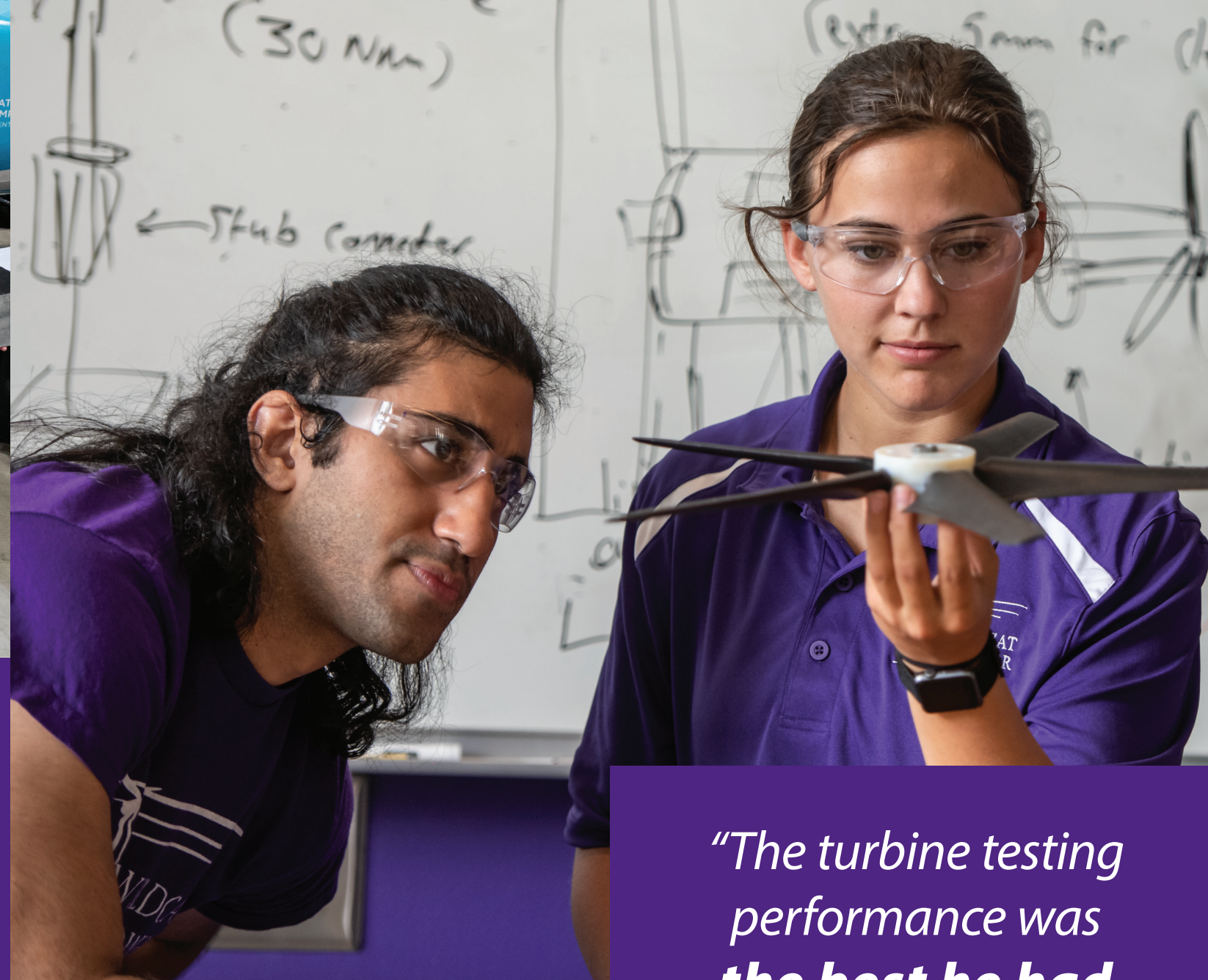
In years past, the college was forced to spend the largest portion of its scholarship funding on its highest-achieving students through the Putnam Scholarship program, which was designed to cover most or all of the cost of tuition at K-State. That program was discontinued in 2019, and most of the students in that program have since graduated and left the university. This change offered senior associate dean Gary Clark the opportunity to modify the college's scholarship program and distribute awards to far more students.

"With this new flexibility, we wanted to design the program in a way that incentivizes excellent academic performance, both before they arrive at K-State and after they get here," Clark said. "Our new model allows students from a variety of backgrounds to receive scholarships and does a better job of rewarding more of our high-achieving students."

Additionally, the program provides a first-year award based on high school merit. Regardless of the first-year award level, all of these students are then considered equally for their renewal award, which is based on their K-State GPA. Providing a performance-based option for all students, rather than a standard four-year award based solely upon high school merit, was a priority in this process.

The early results from the new program show a marked improvement in the percentage of accepted awards as well as more than 100 new students enrolled in fall 2022 as compared to fall 2021. After allocating \$2.8 million in scholarships in 2021, the college spent nearly \$4.2 million in 2022 under the new program, reemphasizing the need for additional scholarship funds.

To learn how you can invest in scholarships, please contact the engineering development team at **785-775-2000** or engineering@ksufoundation.org.



Wildcat Wind Power notches first-ever win

Kansas State University's Wildcat Wind Power team won for the first time in club history at the 2022 Collegiate Wind Competition, a U.S. Department of Energy event in San Antonio May 16-18.

The K-State team battled 11 other schools to claim the top prize in the yearlong national competition. The team designed, built and tested its model wind turbines throughout the academic year before presenting and testing the models in a wind tunnel at the event, which was in conjunction with the American Clean Power Association's CLEANPOWER 2022 conference and exhibition.

Hongyu Wu, faculty advisor for Wildcat Wind Power, was pleased to see the team's hard work pay off.

"I am so proud of our team's effort in this competition," Wu said. "The chief judge was very complimentary of the team's performance, saying the turbine testing performance was the best he had seen since the inception of the DOE Collegiate Wind Competition."

The competition is divided into four contests that test the skills of the team on its ability to create a viable model, along with rating the team's design and presentation skills, its ability to design an offshore wind farm and its effectiveness in wind-related outreach.

K-State placed in the top half of each contest, winning in turbine testing, taking second in turbine prototype, fourth in

connection creation and fifth in project development to finish with the highest overall score.

"We developed the turbine early in the fall semester and continued design and testing right up until we left for San Antonio," said Hayden Dillavou, vice president of the club. "We have our own wind tunnel and workspace in the basement of the engineering building, where we do most of our testing and design work."

Dillavou said the club is made up primarily of mechanical and electrical engineering students but welcomes members from all majors and backgrounds, including those outside the Carl R. Ice College of Engineering.

*"The turbine testing performance was **the best he had seen since the inception of the DOE Collegiate Wind Competition.**"*

Hongyu Wu
advisor for Wildcat Wind Power



Mark Nyquist

Alumni Fellow
2022

Be curious. That's just part of being an engineer, you have to be curious about whatever it is that you're looking at. — **Mark Nyquist**

When **Mark Nyquist** thinks back to what helped set his career on a path to success decades ago, he credits Kansas State University and the Carl R. Ice College of Engineering for preparing him well for the multitude of challenges he faced as an engineer and executive.

"If you go all the way back to the beginning of my career, I felt really confident when I graduated," Nyquist said. "The broad range of classes and content that were in my classes really prepared me for so many circumstances that I engaged. So it gave me some problem-solving capabilities that I felt like maybe others from other institutions didn't have, so I think it really set me on the path."

Nyquist was chosen in the spring as the college's 2022 Alumni Fellow, returning to campus to meet with students, faculty and staff and engage with administrators both in the college and the broader university.

"It's humbling – I'm very honored," he said. "I was surprised when I found out, frankly, when I think about all the accomplished engineering professionals that have come out of Kansas State. All (engineering) alums are so proud of K-State and proud to be a part of this college and the university."

Nyquist recently retired after 18 years as the CEO and chairman of DynaTen Corporation out of Fort Worth, Texas, leading the company through its merger with Comfort Systems U.S.A. in 2014. He began with the company as chief operating officer in 1994.

He graduated from K-State with a bachelor's in construction science in 1980 and has remained connected to the university over the years since, including marking his fifth year on the College of Engineering advisory council. He will serve as council chair in 2023-2024.

Nyquist said serving on the council has led him to admire the college faculty and leadership for navigating through difficult obstacles.

"Probably the most rewarding part for me is gaining a better understanding of the business elements of higher education," he said. "I'm accustomed to running a business and the challenges that presents, but I hadn't really considered the business elements of higher education and all of the challenges that are associated with that."

"It's been an honor to serve on the council with a group of brilliant engineering alums that have worked their careers in a variety of engineering disciplines. Everyone brings a unique perspective to the process. I always find that serving on any board or committee brings more back to me than what I deliver."

As for what advice he would give current or future engineering students, he settled on three things: stay the course, be curious and be aware of your personal brand.

"I remember as a freshman getting a little anxious, wondering if this is more than I could handle," he said. "But I would say stay the course. It gets easier as you go. Then down the road, be curious. That's just part of being an engineer, you have to be curious about whatever it is that you're looking at. Curiosity is the pathway to innovation and finding solutions."

"Finally, be aware of your personal brand. We all have our own brand, whether you've considered it or not, believe me, everybody has their own brand. And so, think about your personal brand as you interact with staff, students, your future employers and peers. Always have that be front of mind."



Visit engg.us/alumni-fellow-22 to watch the video interview of 2022 Alumni Fellow Mark Nyquist.



Sustainability starts with research

Sustainability is an important aspect of nearly everything happening within the Carl R. Ice College of Engineering. More than just a buzzword, the word sustainable appears in the college's mission statement and the design, building and operation of sustainable infrastructure is one of the college's top research strengths.

Joining with partners who are prioritizing sustainable systems, faculty continue to produce cutting-edge ideas and push the envelope of what is possible with engineering ingenuity.

Two projects headline what has been a strong year for research within the college, which has secured \$31.2 million in funding for projects, many of which are working to develop a sustainable future. Both projects are funded through Established Program to Stimulate Competitive Research, or EPSCoR, grants from the National Science Foundation, which aim to build collaborative interdisciplinary teams with complementary expertise and resources.



“Creating a protective layer over soil when growing field crops could help farmers better manage many issues at once.”

- Vaishali Sharda

Sharda developing spray-on bioplastics

Vaishali Sharda, assistant professor in the Carl and Melinda Helwig Department of Biological and Agricultural Engineering at Kansas State University, received a nearly \$6 million grant to develop spray-on bioplastics that protect soil and control weeds in an environmentally friendly way.

Sharda is directing the four-year collaborative project, “Bioplastics with Regenerative Agricultural Properties,” or BioWRAP, alongside three co-principal investigators from K-State and researchers from the University of Nebraska-Lincoln and the South Dakota School of Mines. Joining her from K-State are Ajay Sharda, associate professor of biological and agricultural engineering; Pascal Hitzler, professor of computer science; and Katherine Nelson, assistant professor of geography and geospatial sciences.

The project aims to reduce the use of plastics, herbicides and associated environmental impacts in agricultural production by creating an all-in-one bioplastic system that can better manage weeds, nutrients, soils and water resources.

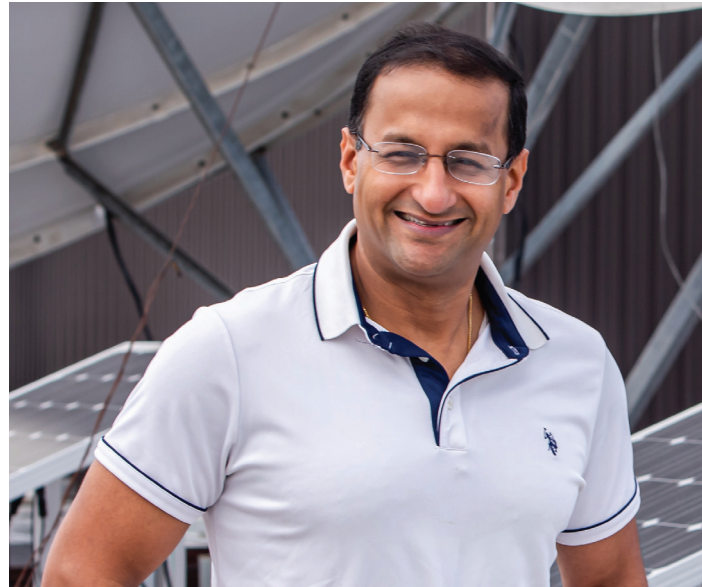
“Creating a protective layer over soil when growing field crops could help farmers better manage many issues at once,” Sharda said. “Covering soil with sheet plastic prevents weed growth, erosion and moisture loss, but using large amounts plastic creates waste, is not eco-friendly, and is too costly for field crops.”

“New, locally sourced types of bioplastics that fully break down into safe by-products can be made. These new materials could provide farmers with a green way to control weeds, fertilize crops, protect soil and water resources, and work with nature to better manage their fields.”

The envisioned product will be a spray-on biodegradable plastic that can be administered to row crop production systems. Three types of biopolymers will be tested: Polyhydroxyalkanoate (PHA)-based, protein-based and hybrid polymers. The product would be locally produced from plant and animal proteins like corn stover and chicken feathers and infused with nutrients and microbes that will add to soil health as the covering degrades.

“I find that the most challenging societal problems typically require solutions that cut across disciplinary boundaries.”

– Bala Natarajan



Natarajan leading K-State portion of \$24 million project

Ensuring that infrastructure is equipped to support all communities after a disaster, including historically underserved groups that often receive less aid in the aftermath, is the aim of a five-year, \$24 million statewide initiative.

K-State joins a collaborative group of 16 other universities and colleges in Kansas, along with industry leaders and disaster experts, for the project, which is designed to better equip communities with limited resources before and after a natural disaster strikes. The project is titled “Adaptive and Resilient Infrastructures Driven by Social Equity.”

Bala Natarajan, Steve Hsu Keystone research scholar and Clair N. Palmer and Sara M. Palmer electrical engineering professor in the Mike Wiegars Department of Electrical and Computer Engineering, is leading K-State’s portion of the project and all of the research.

“I find that the most challenging societal problems typically require solutions that cut across disciplinary boundaries,” Natarajan said. “That is why I am excited to work on this unique project, as it brings together a diverse team of researchers from across Kansas to help create a paradigm shift in resilience science and engineering.”

The project’s overall goal is to determine how infrastructure resilience intersects with social equity and how human

capacity, physical infrastructure and policy levers can be designed to achieve socially equitable outcomes that collectively improve decisions and community resilience. The NSF will provide \$20 million, with the state of Kansas adding \$4 million in matching funds.

Belinda Sturm at the University of Kansas will serve as principal investigator on the project. Joining Natarajan from the Carl R. Ice College of Engineering at K-State as co-principal investigators are George Amariuca and Lior Shamir, both from computer science; Husain Aziz, civil engineering; Anil Pahwa, electrical and computer engineering; and Vaishali Sharda, biological and agricultural engineering. Jason Bergtold, agricultural economics, joins from the College of Agriculture.

“The team will leverage fundamental advances and tools from social sciences, engineering and computer sciences to develop a new social equity-driven paradigm that will transform the way researchers and communities approach smart and resilient communities,” Natarajan said. “Working closely with multiple stakeholders, we are looking forward to translating our theoretical modeling and analysis work into a meaningful decision support framework that Kansas communities can use in their policymaking, planning and operation of critical infrastructures.”

Targeting underserved populations, the project will introduce more than 2,400 Kansas families to resilience, resulting in an understanding of individual capacity and preparedness for disasters while providing pipelines to higher education.



Company of the Year 2022

The Kansas State University Carl R. Ice College of Engineering honored Great Plains Manufacturing Inc. as its 2022 Company of the Year at a reception, Sept. 21, in Engineering Hall.

This annual selection is based on exhibited commitment to engineering education, as well as high standards and quality performance in the engineering profession.

Great Plains Manufacturing Inc. was established in 1976 and has been a leader in the manufacturing of agricultural implements for tillage, seeding and planting in the United States, as well as a leading producer of dirt working, turf maintenance, material handling and landscaping equipment. Based in Salina, the company has eight manufacturing facilities in central Kansas and operates as a wholly-owned subsidiary of Kubota North America, which purchased the company in 2016.

“It’s a privilege to recognize Great Plains Manufacturing as our 2022 Company of the Year,” said Matt O’Keefe, dean of the Carl R. Ice College of Engineering. “The company’s investment in the college, both in direct financial support of students and faculty, as well as hiring our graduates, is much appreciated.”

Great Plains is an Engineering Leadership and Innovation, or ELI, corporate partner in the college, taking part in the investment opportunity that includes hosting an annual Career Spotlight Day on campus and mentoring and interacting with ELI Scholars throughout the school year.

The company recruits students in the biological systems, computer, electrical, environmental, industrial and mechanical engineering majors, as well as agricultural technology management, computer science, and construction science



and management majors. The company also has provided direct support for student scholarships and assists in support of faculty and research. Additionally, Great Plains has sponsored the Helwig Farms Quarter-Scale Tractor Team and partnered with students working on senior design projects.

Making big moves

Engineering student to represent K-State at twirling world championship



Bailey Walke is used to being busy.

The sophomore in mechanical engineering is head twirler section leader and feature twirler with the Kansas State University Marching Band, which paired with her time commitment as a competitive solo twirler, amount to more than 12 hours of practice per week, not including gamedays.

Academically, she is enrolled in an accelerated concurrent bachelor's and master's program, with a minor in physics for good measure, and a member of Wildcat Rocketry and Women in Mechanical and Nuclear Engineering. She also finds time to do undergraduate research in Jared Hobeck's Multifunctional Structures Lab.

"It's been a struggle to figure out how that really works together," Walke said. "But I'm happy to be able to do it and to be able to say I can be an engineering major and a twirler and compete at the world level is really cool."

Walke, who hails from West Des Moines, Iowa, has been twirling for most of her life, beginning at age 3. She saw a twirler at a dance recital for one of her cousins and started to mimic her when she got home with a spoon. Walke's mother decided to sign her up and she's been twirling ever since.

"My mom found that studio and signed me up for lessons and the rest is history," Walke said. "I started competing when I was 5, so I've been in the game for a long time, and I've never had any regrets about it."

"That's how I really know it's one of my true passions because I've never gotten sick of the grind, the everyday grind of practice and competing. It's just always been a huge passion of mine."

Walke's devotion for twirling will culminate in her overseas trip next summer, traveling to Liverpool, England, in August 2023 to represent the United States at the International Baton Twirling Federation's World Baton Twirling Championship.

"I was just so shocked that I could even accomplish such a thing," she said. "This last summer was tough for me because I was working an 8-to-5 internship and I would go practice for four hours a day. So it wasn't really summer — I was more busy than I am here."



Walke said she is excited to represent the United States on the world stage, which she qualified to do after placing in the top four in two categories at the National Baton Twirling Association's national championships.

"I'm really excited to represent my country and also this university at a level that really hasn't been represented before, for twirling at least," she said. "I'm just super proud to be that person to kind of break the barrier through."

Walke said even though she is quite busy, the marching band offers constant support.

"The band is such a huge motivator and support system for me," she said. "I couldn't be more proud to be a member of the Pride of Wildcat Land, and I have made 400 amazing friends and will probably make so many more throughout my career here."



Visit engg.us/walke-22 to see feature twirler Bailey Walke in action.



Engineers without borders

Within the Carl R. Ice College of Engineering, there are a variety of groups students can join to make friends, learn new skills and concentrate on something they're passionate about.

But few groups have the global impact of Engineers Without Borders, an organization seeking to build a better world

through engineering projects that empower communities to meet their basic human needs and equip leaders to solve the world's most pressing challenges.

The group secures funding for its projects, then travels all over the world to turn plans into action, solving problems for people



Few groups have the global impact of Engineers Without Borders.

in need in a sustainable way. The club currently has two active projects, a water well project in Nicaragua in Central America and a school build in Malawi in southeastern Africa.

The K-State chapter of Engineers Without Borders was established in 2014 with the first community project in El Amate, Guatemala.

“Over the eight years, we had multiple projects to serve the community including the construction of a school, a latrine for

the school, a kitchen to serve the school and a retaining wall to protect the foundation of the school,” said Zack Kelvington, president of the K-State chapter. “Each project came one at a time, and we were able to establish a close relationship with the people of El Amate.

“Our members played soccer with their kids, and before we closed out our partnership with them, they threw the travel



team a festival in celebration for everything that had been accomplished. It was wonderful.”

The group has a membership of around 35 that spans many majors and disciplines across the university, even outside the College of Engineering. One of its goals is to continue to recruit new members from outside the college with different perspectives.

The group secures funding for its trips up front before executing the planning and making the trip. They work hard to submit grant applications and work with other financial partners, including the Konza Rotary Club, Black & Veatch, and Burns & McDonnell, along with private donations. The group also fundraises by volunteering at K-State events.

If you are interested in helping this group make a better world, one project at a time, donations can be made online.



Give to Engineers
Without Borders at
engg.us/ewb-give.

Hutchinson travels to Peru for environmental project

Stacy Hutchinson, associate dean for research and graduate programs and professor of biological and agricultural engineering within the Carl R. Ice College of Engineering, spent nearly three weeks in Peru over the summer helping locals deal with an abundance of acid created through the coffee production in the region.

Hutchinson traveled to Moyobamba, Peru, in the northern part of the country to work with Aroselvanor Coffee Cooperative in reducing the environmental impact of coffee production, specifically, developing a treatment system for the wastewater created in coffee processing. Part of the challenge in this work was developing a system with only the resources on hand in the region, which required a creative solution.

The team analyzed the issues through a series of tours and field research before developing the plan, ultimately creating a natural filter with local rocks. The filter was hand dug and holds 4 cubic meters of water.



INVENT AMAZING

CARL R. ICE COLLEGE OF ENGINEERING

2022 Open House Awards

Yellow Brick Award

Chemical Engineering

Outstanding Student Organization Award

1st place – Powercat Motorsports

Degree Program Display

1st place – Chemical Engineering’s “Endless Opportunities through Chemical Engineering”

Children’s Display

1st place – Construction Science and Management’s “Toolbox Construction”

Innovation Display

1st place – “CS Portal Maps” by Kyler Gish, Andrew Booze, Lauren Grieb and Nhcolas Aponte

2022 Leadership Reception Awards

Dave and Virginia Braun Innovation Award

“Valorization of Food Waste” by Erin Pearson, Gillian Falcon, Sophia Shaar and Sierra Staatz

Tau Beta Pi Underclassman of the Year

Emma Worthington – *biological systems engineering*

W. Leroy Culbertson Steel Ring Leadership Scholarship

Grace Wojcik – *mechanical engineering*

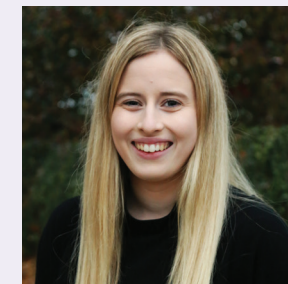
Braden Funk – *computer engineering*

Clair A. Mauch Steel Ring Advisor of the Year

Charles Carlson – *teaching assistant professor, electrical and computer engineering*

Saint Patricia and Saint Patrick

The honor of Saint Patricia and Saint Patrick is awarded annually to two outstanding graduating seniors in the Carl R. Ice College of Engineering who have been nominated by their respective departments in recognition of their leadership and contributions within their department, impact on the college and K-State community, and strong record of academic excellence.



St. Patricia
Elizabeth Seidl
biological systems engineering



St. Patrick
Cooper Bredehoeft
industrial engineering



New biomedical lab dedicated to Tong family

On March 25, the college formally unveiled and dedicated the Tong Family Biomedical Education and Innovation Laboratory, a space that will support biomedical engineering students and faculty for many years to come.

The lab is equipped with state-of-the-art instrumentation and wet lab equipment for undergraduate classes and labs. The biomedical engineering junior design and senior design courses utilize the space as well as other biomedical-related courses such as bioinstrumentation, biomaterials and biomechanics.

The generosity of Peter and Janet Tong and their family has elevated biomedical engineering at K-State and will help recruit top students to continue to grow the program.



The biomedical engineering undergraduate degree option, first introduced in fall 2018, celebrated its first graduating class in spring 2022 as 18 students completed the program. Offered through the Mike Wieggers Department of Electrical and Computer Engineering, the program is designed to meet the industry need for engineers ready to solve medical and life science issues. Graduates of the program have a variety of career options, including graduate or medical school, or working in hospitals or at companies that design and produce medical software and devices.



College faculty secure three CAREER awards

Three faculty members in the Carl R. Ice College of Engineering each secured Faculty Early Career Development, or CAREER, awards from the National Science Foundation this spring.

These significant milestone grants designed to reward young and promising researchers typically involve more than \$500,000 in research funding. Below are brief summaries of each faculty member's ongoing projects awarded through this prestigious NSF grant process.

Quantifying nitrous oxide emissions

Jeongdae Im, Jeffrey and Joy Lessman Keystone research scholar and assistant professor of civil engineering, is investigating the nitrous oxide emissions from forage conservation, which is the practice of stockpiling plants or parts of plants that serve as food for livestock. This process often relies on fermentation, as the lactic acid produced works as a natural preservative for forage crops. But microorganisms that produce greenhouse gases also thrive in this environment.



The five-year, \$600,000 project aims to provide an understanding of the conserved forage biome and open up a new avenue toward eco-friendly forage management and a sustainable cattle industry.

Im will carry out an integrated laboratory and field research program to quantify nitrous oxide emissions in forage conservations while also investigating the microbial processes that control such emissions. His prior research has already identified a potential solution to this issue that reduces nitrous oxide emissions by 95%. Im has filed a provisional patent and is collaborating with Corteva AgriScience to develop a novel inoculant.

"The outcome of this research will also address one of NSF's 14 grand challenges for engineering in the 21st century, in this case, managing the nitrogen cycle," Im said. "It should accelerate our ability to design and implement safe, effective and sustainable agricultural resource management strategies going forward."

Atomically thin material architectures

Inventing field-effect transistors that achieve high-performance signals with ultra-low electronic noise and laying the foundation for emerging biosensor technologies is the research focus of **Suprem Das**, Jeffrey and Joy Lessman — Carl and Mary Ice Keystone research scholar and assistant professor in the industrial and manufacturing systems engineering department.

Das' five-year, \$500,000 project is investigating the science and technology of atomically thin materials and their nano-engineered structure, including field-effect transistors, a fundamental building block of future bioelectronics. A field-effect transistor uses an electric field to control the flow of current in a semiconductor.



The project aims to study field-effect transistors with two-dimensional atomically thin materials with unique one-dimensional metal contacts designed with high-performance and low-noise characteristics.

Das is investigating the use of graphene, hexagonal boron nitride and transition metal di-chalcogenides to form atomically thin field-effect transistors.

"Given their unprecedented physics and chemistry at the atomic level, these devices will revolutionize their use in electronics, communication and cyber systems, as well as in health care and environmental sensing," Das said.

Power grid defense

A robust defense of our nation's power grid is as important as ever as cyber-data attacks become more sophisticated and common. Enhancing the resiliency of cyber-physical power grids under such attacks and providing system operators the tools they need to enhance situational awareness is essential.

This is the research focus of **Hongyu Wu**, Michelle Munson-Serban Simu Keystone research scholar and associate professor in the Mike Wieggers Department of Electrical and Computer Engineering.



His five-year, \$500,000 project aims to provide tools to power system operators while also promoting public awareness and understanding of smart grid cybersecurity, contributing to power engineering education, and preparing a diverse learning community with requisite knowledge and skillsets to tackle the security challenges of future power grids.

"This CAREER project aims to provide a theoretical foundation and design guiding principles that will unlock the full potential of moving-target-defense approaches and significantly enhance the resiliency of cyber-physical power grids under cyber-data attacks," said Wu, who also holds the Lucas-Rathbone professorship in engineering. "This project will develop novel optimization, graph theory, low-rank matrix theory and machine learning methods for optimal planning and operation of moving-target-defense devices, rapid detection, accurate identification and robust mitigation of cyber-data attacks."

Additionally, Wu said this project will transform existing bulk transmission system operations that rely on limited cyber-layer security mechanisms to proactive approaches using widely deployed smart devices.



To learn more about each project, watch short video interviews with Im, Das and Wu at engg.us/career-awards-22.



SEATON SOCIETY

Carl R. Ice College of Engineering

March 5, 2022



HALL OF FAME CLASS OF 2022

Induction to the hall is the highest honor bestowed on its alumni by the college. Honorees are recognized for their professional success and accomplishment, involvement with and support of the Carl R. Ice College of Engineering, dedication to K-State, and professional and public service.



Larry Erickson
CHE '60, Ph.D. '64



Michelle Munson
EE, PHYS '96



Cindy Wallis-Lage
CE '85



PROFESSIONAL PROGRESS AWARD

Nominated by their respective department heads and confirmed by the dean, 10 alumni were honored for significant early to mid-career success.

Slade Engstrom
CE '03

Philip Sears
CS '03

Brian Truskett
CNSM '01

John Mudd
ME '98

Julie Vick
IE '02

Emily Tilgner
ARE '03

Vinit Gupta
EE M.S. '02

Benjamin Tryon
CHE '08

Nicolette Jackson
BAE '05

Silpan Patel
CMPEN '05

College awards

Clair A. Mauch Steel Ring Advisor of the Year | Charles Carlson | ECE

Sue Barsamian Engineering Award for Excellence in Diversity and Inclusion | Melanie M. Derby | MNE

James L. Hollis Award for Excellence in Undergraduate Teaching | Mohammadhosein Ghasemi Baboly | MNE

Robert R. and Lila L. Snell Excellence in Undergraduate Teaching Award | Kimberly Waggle Kramer | ARE-CNS

Commerce Bank and W.T. Kemper Foundation Undergraduate Outstanding Teaching Award | Ronald Brockhoff | MNE

Larry E. and Laurel Erickson Public Service Award | Behrooz Mirafzal | ECE

Myers-Alford Memorial Teaching Award | Hani Melhem | CE

Charles H. Scholer Faculty Award | Melanie M. Derby | MNE

Dean's Award of Excellence – Teaching | Daniel Flippo | BAE

Dean's Award of Excellence – Research | Punit Prakash | ECE

Frankenhoff Outstanding Research Award | Ajay Sharda | BAE

Engineering Unclassified Staff Award of Excellence | Mayumi Saito | ECE

Team Award of Excellence

Recruitment

Kelsie Jones, Leanne Reineman and Craig Wanklyn

Biomedical Engineering Lab

Erik Grimm, Jason Richards, Mayumi Saito, Benjamin Thurlow, Steven Warren and Ryan Zecha

New faculty

Hande McGinty | CS | assistant professor

Bo Liu | ECE | research assistant professor

Gennifer Riley | MNE | teaching assistant professor

Paul Snider | DOE | professor of practice

Aram Vajdi | ECE | research assistant professor

Qijui Yang | ECE | research assistant professor

Promotions, tenure and sabbaticals

Placidus Amama | CHE | *promoted to full professor*

George Amariuca | CS | *received tenure*

Nathan Bean | CS | *promoted to teaching assistant professor*

Chris Jones | CE | *promoted to full professor*

Hani Melhem | CE | *granted sabbatical leave for 2022-2023*

Pavithra Prabhakar | CS | *granted sabbatical leave for 2022-2023*

Andrew Sneed | ARE-CNS | *promoted to assistant professor*

Scott Thompson | MNE | *received tenure*

Hinckley joins development team



Chris Hinckley started as a development officer for the Carl R. Ice College of Engineering in September. He brings strong relationship-building skills and a background in sales from Epitex, where he most recently worked as a senior account manager.

Hinckley is a proud "Poke," graduating from Oklahoma State University in 2014, however, he joined the Wildcat family when he married his wife, Sara, who is a proud alumna of the College of Education.

2022 Convocation



The college hosted a reception to celebrate new employees and 2022 award recipients following its fall convocation on Sept. 29.



Anthony named CHE department head

Jennifer Anthony, Tim Taylor chair in chemical engineering and associate professor at Kansas State University, has been named head of the Tim Taylor Department of Chemical Engineering. She also holds the title of Wayne and Barbara Harms — Carl and Mary Ice Keystone research scholar. She had been serving as the interim head of the department since July 2019.

Anthony received her bachelor's degree in chemical engineering with an environmental program emphasis from the University of Colorado at Boulder, and completed both her master's and doctoral degrees at the University of Notre Dame. She was a postdoctoral scholar at the California Institute of Technology before joining the K-State faculty in 2005.

She replaces James Edgar, university distinguished professor and Tom H. Barrett university faculty chair, who spent three years as a program manager at the National Science Foundation, Division of Materials Research, Electronic and Photonic Materials program in Alexandria, Virginia. Edgar has returned to K-State as a faculty member in the department.



Wilkins named BAE department head

Mark Wilkins, has been named head of the Carl and Melinda Helwig Department of Biological and Agricultural Engineering.

The announcement was made by Matt O'Keefe, dean of the Carl R. Ice College of Engineering, after a national search. Wilkins replaced Joe Harner, who retired after 38 years at K-State, including 12 years as department head.

Wilkins served as the graduate programs chair and professor of biological systems engineering at the University of Nebraska, Lincoln, as well as the director of the Industrial Agricultural Products Center and Nebraska Corn Checkoff Presidential Chair at Nebraska-Lincoln. He arrived there after 11 years as a faculty member in the biosystems and agricultural engineering department at Oklahoma State University.

Wilkins is active in both the American Society of Agricultural and Biological Engineers, or ASABE, and the International Bioprocessing Association. He received a Leadership Citation in 2019 from the Meetings Council of ASABE, and was also named an Outstanding Associate Editor by the organization in 2019.

College adds two degree programs

The Carl R. Ice College of Engineering has added a pair of undergraduate degree programs to its portfolio in the last year, bringing the number of programs offered to 14 and giving prospective students more academic options than ever before.

With approval from the Kansas Board of Regents, the college added cybersecurity as a Bachelor of Science degree program. Offered through the computer science department, the curriculum of 120 credit hours became officially available in fall 2022.

As our world continues to integrate computers into every part of our lives, the need to protect those systems only becomes more important over time. Currently, the demand for cybersecurity professionals is at an all-time high and continues to grow rapidly. Additionally, educational pathways to a career in cybersecurity remain limited, especially in the state of Kansas, where K-State's bachelor's program will be the first undergraduate offering in cybersecurity in the state.

The college also added a Bachelor of Science in Agricultural Technology Management, which formerly resided in the College of Agriculture. The program has been taught and administered through the Carl and Melinda Helwig Department of Biological and Agricultural Engineering for many years, but was not formally a part of the college's degree offerings until now.



Aguilar crowned Miss K-State 2022



Miss K-State 2022 Abby Aguilar, left, with Miss K-State 2021 Katie Dreiling, 2022 mechanical engineering graduate, on April 12, 2022. (Photo courtesy of Kenedi Kelso)

Abby Aguilar, sophomore in biomedical engineering, won the Miss K-State title, representing the Philippine Student Association in the annual competition held in April. The fundraiser benefits the Delta Upsilon Global Service Initiative and draws in a variety of participants, both from Greek organizations and other campus groups.

Her talent in the competition was fencing and she also performed a skit about her future career in medicine during the event. Aguilar also used the platform to speak about an issue she's passionate about – racial equity in health care.

Additionally, Aguilar was named the 2022 recipient of the Sue Barsamian Engineering Student Award for Excellence in Diversity and Inclusion at the college's sixth annual Diversity, Equity and Inclusion Summit, held Nov. 1.

Carl R. Ice College of Engineering Advisory Council



Blake Brosa, CNSM '09
Bureau Veritas

Kevin Burke, ME '86
Burke Construction Group

Chrysta Castañeda, IE '85
The Castañeda Firm

Tim Chadwick, CNS '90
MMC Corp.

Jim Coen, CE '82
MVP Holdings LLC – retired

Richard Fornelli, CE '72, M.S. '73
CH2M – retired

Kimberly “Kim” Gerard, CE '84
360 Electrical LLC

Don Glaser, ME '74
Glendo LLC – retired

Deyona “Dee” Hays, EE '89
Excellence Engineering LLC; HeelzFirst LLC

Kevin Honomichl, CE '86
BHC

Bryce Huschka, IE '07
ExxonMobil Product Solutions Company

Warren Kennedy, CHE '90
Burns & McDonnell

Karl Miller, ME '84
Jingoli Power LLC

Mark Nyquist, CNS '80
DynaTen Corporation – retired

Robert Reichenberger, EE '89
Solar Prime

David Schettler, ME '83
Tenaska Energy – retired

Simeon Terry, IE '91
Austin Commercial

Art Umble, CE '82
Stantec Consulting Services Inc.

Beth Ward, IE '93
Smart Warehousing

Jerry Westhoff, CE '74
J.J. Westhoff Construction Co.

Jane Zhu, IE Ph.D. '92
Veritas Technologies LLC

Whitewashing KS Hill



Members of Tau Beta Pi cleared brush, picked up trash and whitewashed the iconic concrete letters on KS Hill on Saturday, Oct. 15. This has been an annual community service project of Tau Beta Pi since 1974.

Alumni recognitions

1988

Bob Copple (IE, M.S. '89) was selected for statewide recognition by the Kansas Society of Professional Engineers for outstanding service to the community, state and nation as a leader impacting the engineering and health professions. Specifically, he was honored at the June 2022 awards ceremony for his significant impact on the regional and statewide response to the COVID-19 pandemic. He also received the Tri-Valley chapter's Outstanding Citizen Award for his work.

2016

Thomas Feldhausen (ME, M.S. '17) was one of 22 recipients of SME's Outstanding Young Manufacturing Engineer Award, designed to recognize significant achievements and leadership in the field of manufacturing engineering.

2019

Fernanda De La Torre (CS) has been named a Paul & Daisy Soros Fellow for 2022. The program supports outstanding immigrants and children of immigrants who are pursuing a graduate education in the United States. They select 30 individuals per year and each receive up to \$90,000 towards their graduate education.

De La Torre won a two-year post baccalaureate fellowship from the department of brain and cognitive sciences at MIT, then transitioned into the department's doctoral program and is developing computational models of multisensory perception and imagination.

2022

Ceci Schmitz (EE) was selected for the National Science Foundation's Graduate Research Fellowship. She currently attends Duke University and is pursuing her doctorate in biomedical engineering.

The NSF Graduate Research Fellowship recognizes outstanding students who are pursuing research-based master's and doctoral degrees in the sciences, technology, engineering or mathematics. Fellowship recipients receive three years of funding, including a \$34,000 annual stipend and a \$12,000 payment to the university in lieu of tuition and fees.

In memoriam

1954 | Faculty

Robert R. Snell (CE, M.S. '60) died June 24, 2022 in Manhattan. He was a professor of civil engineering at K-State for 36 years, serving as head of the department for 20 of those years. He was named Engineer of the Year in 1986 by the Kansas Engineering Society and spent many years serving the K-State athletic department as the Big 8 and Big 12 faculty representative. Snell was a longtime member of the Tri-Valley Chapter of the Kansas Engineering Society and served as state president and regional vice president. He was also active in the American Society of Civil Engineers. He is survived by his wife Lila and children Vicki and Robert, along with five grandchildren and nine great-grandchildren.

1963

Jarold “Jerry” Boettcher (NE), Manhattan, died Aug. 21, 2022. Following stints in New York and Kansas City, Missouri, in finance, he worked in Beloit, Kansas, for 28 years, retiring as CEO and president of Boettcher Enterprises in 2007 and moving to Manhattan. He is survived by his wife, Barbara, along with four children and 10 grandchildren.

1993

Michael R. Base (ARE), Tulsa, Oklahoma, died Nov. 27, 2021. He worked as a consulting engineer, becoming a partner at Lee & Browne Consulting Engineers in 2004. Base is survived by his wife Emily, and children Christopher, Bailey, Allie and Andrea.

Faculty

John C. Matthews, Sequim, Washington, died July 19, 2022. Matthews spent more than 30 years as a professor in the Tim Taylor Department of Chemical Engineering before his retirement in 1998. He won several awards during his time at K-State, including the Ervin W. Segebrecht Honorary award in 1988 and the James L. Hollis Award for Excellence in Undergraduate Teaching in 1993. He is survived by his wife, Nancy, sons Harry, Andy, Kenneth and Jason, and three grandchildren. The John C. Matthews Scholarship fund has been set up in his name. Contributions can be made at engg.us/matthews-scholarship.

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Below: Turn to page 10 to read how faculty in college are working to develop a sustainable future.



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k-state.edu/request-info

