



3E - Engineering Excellence Edwardsville

siue.edu/engineering

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE
SCHOOL OF ENGINEERING

MESSAGE FROM THE DEAN



Thank you for reading the SIUE School of Engineering’s newly named publication, *3E - Engineering, Excellence, Edwardsville*. We are eager to share recent highlights and points of pride in this annual magazine.

Through the support and dedication of many, the Student Design Center is now on its way to completion. The nearly \$6 million price tag posed a real challenge to our goal of building a place where teams of students could work together to bring their projects to life.

However, we believed that the building was absolutely necessary, and we are grateful to all who contributed to bring this goal to reality. We especially want to thank:

- The Fowler family of J.F. Electric who donated \$1.25 million toward the completion of our Student Design Center, which will be known as the Fowler Student Design Center
- Ed Grady who provided \$1 million to not only support the design center project, but also to provide scholarships for both engineering and business students
- Ralph Korte who allocated \$500,000 to go toward the design center project

Now that our Student Design Center campaign has come to a close, we are working on new development priorities to continue to enrich the educational opportunities.

- Other accomplishments the School has seen in 2018:
- We continue to move forward with two new and innovative programs
 - BS program in cybersecurity engineering
 - MS program in bioengineering
 - We are diligently increasing awareness of the School across the region and the nation
 - A notable increase in female and minority enrollment has shown that our efforts to increase our School’s diversity are paying off
 - The School saw a record 381 students graduate during the 2018 academic year

We extend our sincere appreciation to those alumni and friends who have offered their support to our School in any form. Your participation allows us to enrich the educational experiences we provide, and helps our students and faculty continue to be recognized for the excellent work they do.

Sincerely,

Cem Karacal, PhD
Dean

SCHOOL OF ENGINEERING MISSION

The mission of the School of Engineering is to provide excellent innovative engineering, computer science and construction education to citizens of Illinois, the greater St. Louis metropolitan area and representatives of the global community. The School focuses on strong undergraduate education and graduate programs that serve the needs of full-time students and employed professionals. The faculty conducts basic and applied research and outreach activities in partnership with others who contribute to technological advancement in our fields.

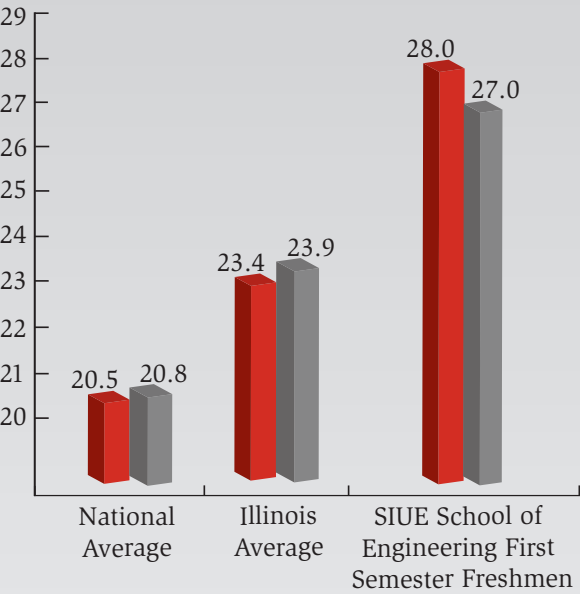
ABOUT THE SCHOOL OF ENGINEERING

Increasingly high enrollment, rising academic qualifications of applicants, and a nearly 100 percent placement of graduates in the engineering fields are clear testimonies to the quality of engineering education at SIUE.

Since 1982, the School of Engineering has prepared students to meet the growing needs in our region and nation for more engineers, computer scientists and construction managers. Fueling the prosperity of our region, the School has graduated more than 7,000 engineering professionals. More than 60 percent of our graduates have taken positions in the St. Louis metro area.

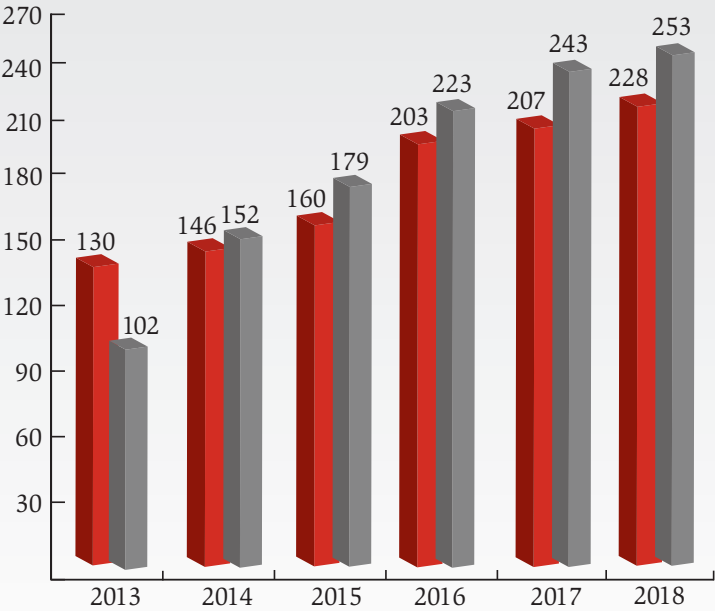
2018 ACT Scores

■ ACT Math ■ ACT Composite



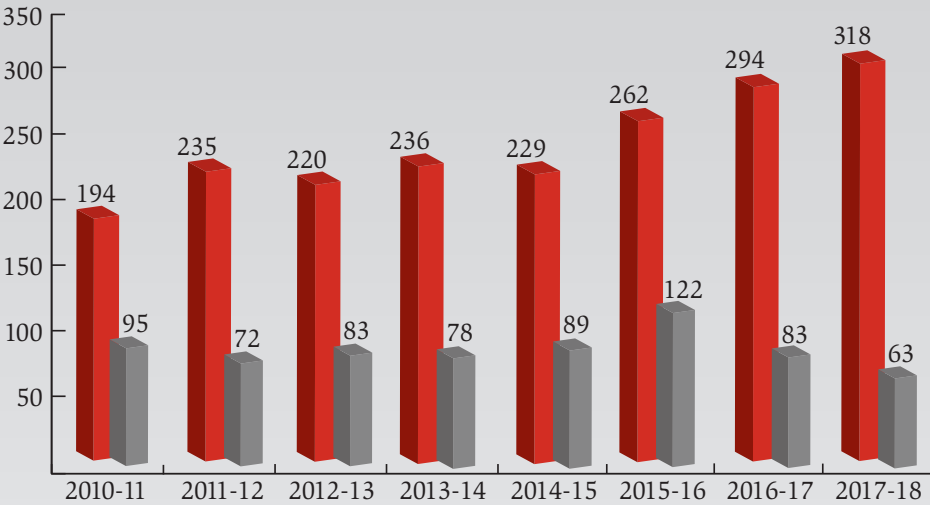
Minority and Female Undergraduate Enrollment

■ Female ■ Minority



Graduation

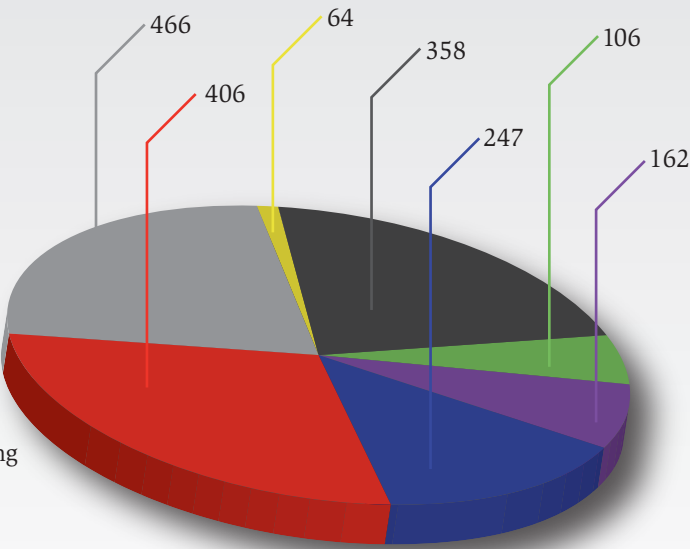
■ Undergraduate ■ Graduate



Undergraduate and Graduate Enrollment by Program

Undergraduate	364	Graduate	33	Cooperative PhD	9
	439		24		3
	64		NA		NA
	296		61		1
	106		NA		NA
	124		38		NA
	200		46		1

- Mechanical Engineering
- Computer Science
- Mechatronics and Robotics Engineering
- Electrical and Computer Engineering
- Construction Management
- Industrial Engineering
- Civil Engineering





IT TAKES A ROCKET SCIENTIST: STUDENTS HAVING A BLAST IN NEW ORGANIZATION

Inspired by the success of SpaceX, the private American aerospace manufacturer and space transportation services company, School of Engineering students formed a new organization dedicated to designing, building and flying rockets.

Founding president Egemen Erten, BS industrial engineering '18, from Edirne, Turkey, and vice president Franklyn Hernandez, senior electrical engineering major, from Middletown, Del., launched Cougar Rockets in the fall semester. The two share a belief that the goal of a successful engineer is to create, build, design and innovate to make a difference.

With high speeds, dazzling altitudes, sleek aerodynamics and fiery launches, rocketry holds broad appeal. Charter members of the organization include 33 students from mechanical engineering, civil engineering, computer engineering, electrical engineering, industrial engineering, finance and physics. The organization is open to all SIUE students.

“Students will experience teamwork while applying their technical backgrounds to real systems,” Erten said. “Those holding leadership positions will also learn management skills and planning.”

“Initially, the Cougar Rockets team will build a rocket with off-the-shelf components, and they will progressively

increase the amount of student-researched and student-developed systems included in subsequent rockets,” said Michael Denn, PhD, instructor in the Department of Mechanical and Industrial Engineering, and faculty advisor for the team.

Cougar Rockets’ long-term plan is to participate in the 2020 Intercollegiate Rocket Engineering Competition. This competition consists of launching a rocket with an 8.8-pound payload and target altitudes of 10,000-30,000 feet above ground level.

“This is considered high-powered rocketry (HPR), which is defined by the size and thrust of the rockets,” Denn said. “Some of the team members will earn National Association of Rocketry certifications in order to purchase HPR motors and ensure they are complying with safety codes.”

Erten, who is pursuing his master’s in mechanical engineering, also wants to see the group bring about lasting impact on the School.

► “I wanted to make a difference and give others the opportunity to work on something new. By creating this organization, I hope to generate academic interest in rocket design,” Erten said.



AUTONOMOUS ROBOTICS CLUB PROMOTES CREATIVITY AND LEARNING

The School of Engineering’s Autonomous Robotics Club (ARC) encourages creativity, learning and involvement, regardless of students’ experience with robotics. More than 20 ARC members, with varying engineering backgrounds, expand their knowledge through meetings, presentations, competitions and hands-on learning.

ARC co-chair Jacob Novosad, a junior computer science major from Edwardsville, said members benefit by participating in multidisciplinary design teams and working on complex systems with students who are majoring in different engineering disciplines.

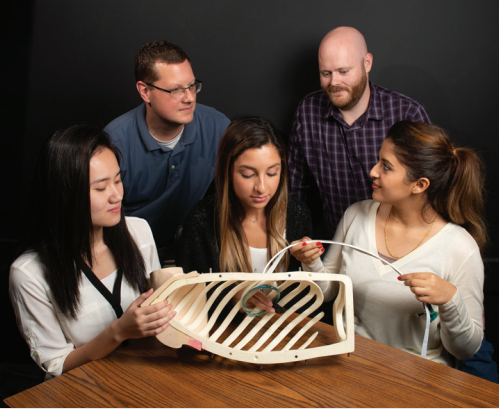
“For example, a computer science student needs to learn what type of electrical signal and what type of data a low-level board will send, and that’s something they would work on with an electrical engineering major,” Novosad said. “Another benefit is the outreach opportunities and chances to volunteer to help further robotics education in the younger crowd. I enjoy outreach for younger kids, because they get super excited about robots.”

One such event is the group’s annual involvement at Worden Elementary School, located in Worden, Ill., where they discuss robotics and provide demonstrations to fifth graders at the school’s Space Day event.

“I’ve never seen a group as engaged and responsive as the students at Worden Elementary last spring,” Novosad said. “They offered creative answers and solutions. Their excitement was a great reminder to never be afraid to voice your opinion or idea, because even if it isn’t a practical answer, it may lead to a creative solution.”



TEAM COLLABORATES ON NEW SYSTEM FOR VIDEO-ASSISTED THORACIC SURGERIES



Video-assisted thoracic surgeries (VATS) allow surgeons to see the thoracic cavity and the instruments being used by inserting a small video camera called a thoracoscope through a small incision. This minimally invasive surgery eliminates the need for large incisions, which require greater patient recovery time. VATS may be conducted to diagnose and treat a variety of conditions involving the chest, including lung reduction due to cancer.

In 2017, Tim York, PhD, assistant professor in the Department of Electrical and Computer Engineering; Traves Crabtree, MD, professor in the SIU Department of Surgery; and electrical and computer engineering graduate student, Mitch McKay, BS '15, began collaborating to create a new system and technique for VATS. The project was funded through an SIU School of Medicine/SIUE Collaboration Support Grant.

The interdisciplinary team aims to develop a system that allows multiple, small cameras to fit inside a single incision between two ribs. Once inside, the cameras are capable of panning, tilting and following the surgeon’s instruments.

“We had built a proof-of-concept prototype, but there was an alternate design based on pneumatics and hydraulics to provide the pan and tilt functions,” York said.

York suggested development of the alternate design as a potential senior project to students Maram Almutairi of Edwardsville; Kelsey Nguyen of Troy, Ill.; and Shayla Townsend of Florissant, Mo.

“The students worked hard all spring and summer to develop a prototype, which is a pneumatic, joystick-driven method of panning and tilting the camera,” York said. “They integrated the joystick control into the code Mitch had already developed to do the automatic instrument tracking for the project. They did a great job, and I was very fortunate to have them work on the project.”

SCHOOL DEVELOPING DUAL DIPLOMA PROGRAM WITH CHINESE INSTITUTE



“One of the first programs we are offering is a mechatronics and robotics engineering cooperative bachelor’s program,” said Kegin Gu, PhD, distinguished research professor of mechanical engineering, PhD program director, and director of new program development. “Students can study at CIT for three semesters, and come to SIUE for two years, then return to CIT for one semester, earning a degree from both universities.”

Gu believes the relationship with CIT is desirable because the university is located in a culturally rich, industrialized region of China, and there is substantial demand for students to earn a degree from a U.S. institution. CIT is a provincial public university, which is characterized by polytechnic, application-oriented technology and teacher education. It is located in the center of the Yangtze River Delta.

A School of Engineering faculty member will teach a class at CIT in summer 2019, and the first cohort of CIT students attending SIUE will begin spring 2020.

► “A relationship with CIT will contribute substantially to the diversity and international exposure of the SIUE student population, and create opportunities for SIUE students and faculty members to gain international experience,” Gu said.

PROGRAM MIXES STUDENTS WITH MENTORS

To connect current students with alumni and community professionals, the SIUE Career Development Center and Alumni Association have created the SIUE Mentor Program. A School of Engineering Mentor Mixer was held in October.

Kevin Nesselhauf, BS construction management '08, MBA '13, serves on the SIUE Alumni Association Board of Directors and is the immediate past president. He has taken the lead role in developing mentor mixer events.

“Small group activities are the best approach for creating mentor relationships,” Nesselhauf said. “To this end, we had participants with similar engineering interests sit in groups of six to eight people and tackle a small project together.”

The group projects encouraged students and alumni to collaborate on building a plastic army figurine launcher. Each team was given the same materials and 10 minutes to design and build a mechanism. After the groups had the opportunity to launch, discussion ensued on takeaways.

► “I enjoyed the group activity most,” said Tiana Sherman, junior industrial engineering major from Washington, Ill. “However, the unstructured moments open for free discussion between the mentor and students were most beneficial. I gained valuable advice regarding interviewing and job searching.”

The event also included the following guest speakers to discuss the current state and future role of autonomous vehicles in personal and commercial transportation:

- Alonzo Byrd, assistant vice president, public affairs, of Enterprise Holdings Inc. in St. Louis. Byrd, BS mass communications '81, develops and executes strategic corporate public policy initiatives.
- Tom Blair, district engineer at Missouri Department of Transportation. Blair leads the development and delivery of innovative transportation solutions.

Nesselhauf said the School intends to hold mentor program events on at least an annual basis.



ERTC WELCOMES MAAS AS NEW DIRECTOR



Since 1977, the Environmental Resource Training Center (ERTC) at SIUE has been equipping students with the job skills and resources needed to thrive in the water industry. It offers specialized courses for both entry-level personnel who are preparing for a career in drinking water and wastewater treatment systems, and those already employed in such systems seeking additional education. In addition, the ERTC offers courses for licensed plumbers in cross-connection control or backflow prevention.

Matthew Maas joined ERTC in August 2017 as the new director after serving as operations manager for California American Water in Sacramento, Calif., and more than a decade of service to Missouri American Water.

► “As an employee of Missouri American Water, I was always extremely impressed with the new hires trained through the ERTC,” Maas said. “The success of the program and the opportunity to play an integral role in the training of future water and wastewater operators made the position highly attractive.”

“Matt’s experience in the water industry, from technical know-how to planning and managing large-scale operations, is a terrific asset for the ERTC,” said Cem Karacal, PhD, dean of the SIUE School of Engineering.

Maas, who hold a bachelor’s in biology from Coastal Carolina University, anticipates that retirements in the industry will create strong demand for certified water treatment operators over the next five years.

“The unique combination of classroom and hands-on training provided by the ERTC will position students to take advantage of those openings,” he said.

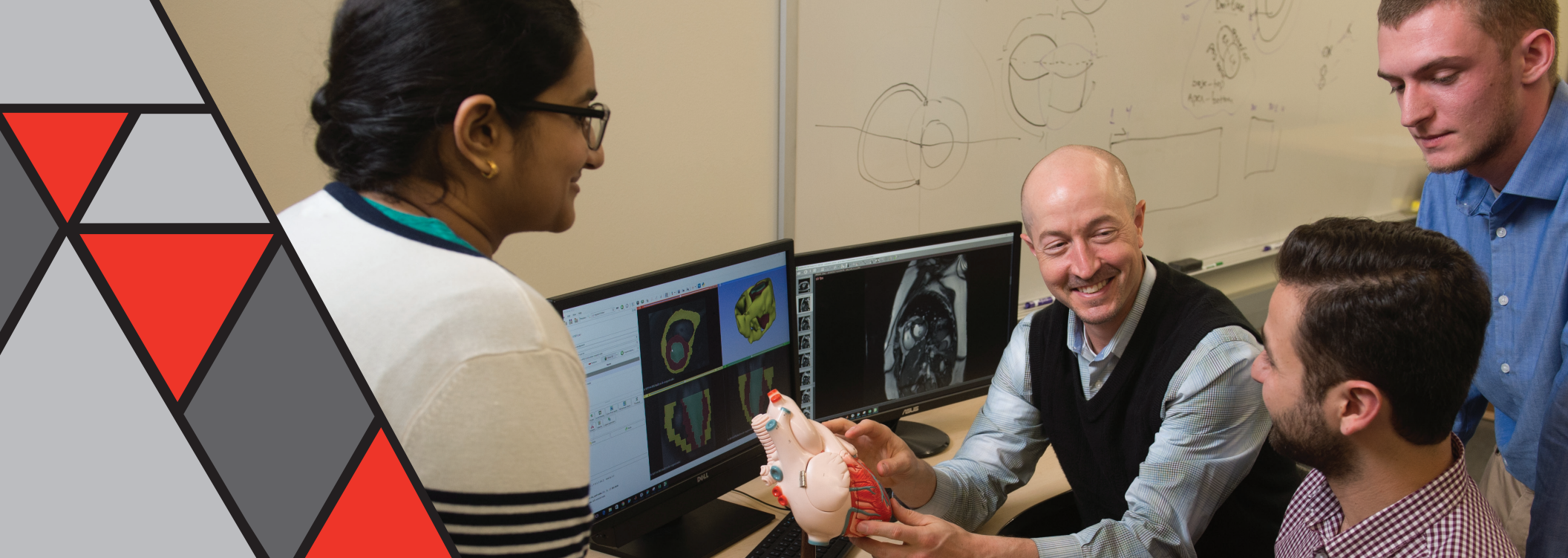
Maas also believes the ERTC’s assets, combined with knowledgeable staff, create excellent opportunities for growth and collaboration both inside and outside the University. This year, ERTC worked with the Department of Chemistry, the Department of Biological Sciences and the NCERC at SIUE on projects such as pharmaceuticals in the water, algal growth, watershed management and legionella testing.

Externally, new business relationships were established in Chicago and St. Louis that provided paid internships for ERTC students. The ERTC also added new speaking engagements and conferences to promote the program.

The ERTC is designated by the Illinois Environmental Protection Agency (IEPA) as the center for training of water and wastewater operators in the state of Illinois. In November, the IEPA renewed a \$1.23 million grant with the ERTC to support training programs and infrastructure upgrades at the center.

“Through the years, the ERTC has established a strong presence in Illinois that has positioned us for growth,” Maas said. “By reaching out to companies and regulatory agencies in surrounding states, the ERTC plans to establish a regional and national presence, as well.”





INTERDISCIPLINARY TEAM RESEARCHES SYSTEM TO ANALYZE CARDIAC RISK

Heart disease is the leading cause of death in the United States, and the School of Engineering is leading research to develop a new system to identify risk of cardiac events. An American Heart Association grant supports the research, which is being led by Jon Klingensmith, PhD, assistant professor of electrical and computer engineering. Klingensmith’s primary background is in ultrasound signal processing and coronary imaging.

Closely collaborating on the project is Maria Fernandez del Valle, PhD, an expert on obesity and the use of intervention to affect the deposits of fat around internal organs. Fernandez del Valle is an assistant professor of exercise science in the School of Education, Health and Human Behavior. Also contributing to the research with his 3D modeling expertise is H. Felix Lee, PhD, professor of industrial engineering.

The team is developing a cost-effective system that could be widely deployed for accurate volumetric measurement of epicardial adipose tissue (EAT). EAT, the layer of fat surrounding the heart that is in direct contact with the coronary arteries, can have a significant impact on the development and progression of coronary artery disease. Reducing the volume of EAT can improve a patient’s cardiovascular risk profile. The research team proposes a powerful, innovative system for analysis. Three-dimensional modeling will be used on previously acquired MRI data. The EAT will be identified with ultrasound and then merged with the 3D model to create a volume measurement.

“While magnetic resonance imaging (MRI) has been the primary tool for precise body fat measurement, an ultrasound-based system would be more accessible, safer, in real-time and less expensive,” Klingensmith said. “This could make measurement of cardiac fat a standard diagnostic test for risk of heart attack.”

The novel model could be used beyond hospitals, such as in weight-loss clinics and other facilities with properly trained personnel, to increase its accessibility and, thus, its benefits.

“This volumetric model will be useful not only to assess the effects of different types of exercise, but also other strategies such as diet, drugs, bariatric surgery and more,” Fernandez del Valle said. “The impact of this project is significant, as results have the potential to change exercise recommendations for weight and fat loss, cardiovascular risk management, and cardiac health.”

Graduate students from the Schools of Engineering and Education, Health and Human Behavior, and undergraduate students studying exercise science are playing an integral role in the research.

► “This is a unique opportunity for students that will enhance their academic experience,” Klingensmith said. “By being involved in this interdisciplinary work, our student researchers will participate in an applied-learning setting, gain opportunities to establish a network by making corporate connections, and develop interpersonal skills.”

APPLIED RESEARCH CONNECTS HYDROLOGY AND ECOSYSTEM



Rohan Benjankar, PhD, assistant professor in the Department of Civil Engineering, studies the interactions between hydrology and the ecosystem. Water resource management practices, as well as man-made structures such as dams or diversions, can negatively impact ecosystems, including fish and wildlife habitat and vegetation.

Two of his studies, recently funded by the U.S. Bureau of Reclamation and the U.S. Forest Service, are in collaboration with the University of Idaho. Three full-time SIUE graduate students are also involved in Benjankar’s research, which looks at watershed scale.

► “We travel to rivers in Illinois and Idaho,” Benjankar said. “Focusing on research, students learn how and what data to collect and analyze to solve water resources management issues.”

One study is the result of a 2013 wildfire that burned out riparian vegetation, such as cottonwood and willow trees, along the South Fork Boise River in Idaho.

Modeling can predict where cottonwood trees would be naturally recruited. If conditions are not suitable for natural recruitment, the question becomes where to plant in order to restore the riparian ecosystem. The answer lies in Benjankar’s spatially-distributed hydroecological model to simulate cottonwood seedling recruitment along rivers, which has been published in the *Journal of Environmental Management*.

Benjankar’s second project studies the impact of water diversion from streams for farming on salmonid habitat and the possibility of restoration using high-resolution, meter-scale hydraulic and fish habitat models along the Lemhi River in Idaho.

“We cannot eliminate all the human impact on the natural ecosystem,” Benjankar said. “But research may help minimize that impact.”

RESEARCHERS RECEIVE FUNDING TO ADVANCE TELEPRESENCE ROBOT

Put simply, a telepresence robot being created at SIUE functions like “walking Skype.” And, while the end goal is simplicity for users in a classroom setting, the critical thinking and technological design and development involved in its creation are complex.

The Wailian Education Group, now WeEducation Group, Inc., supported the robot research and development with private funding.

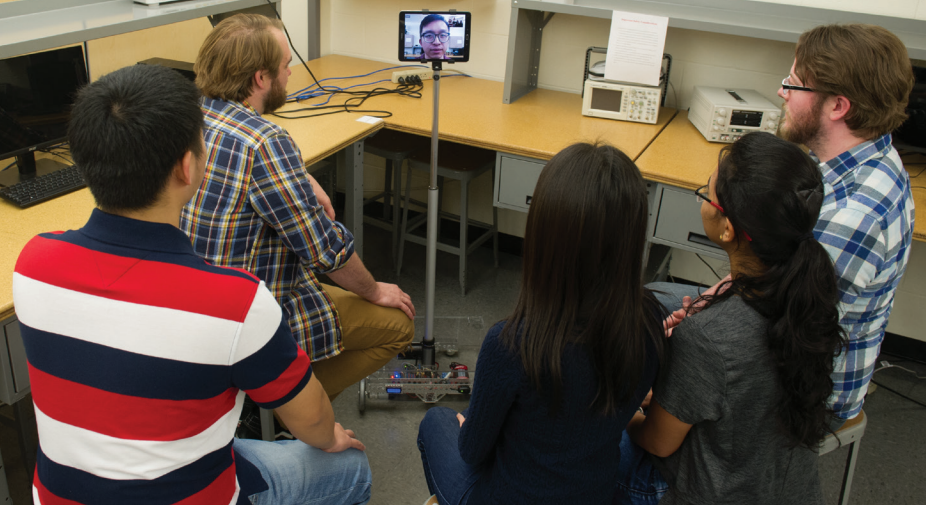
The project is under the direction of Mingshao Zhang, PhD, assistant professor in the Department of Mechanical and Industrial Engineering, along with his team of graduate and undergraduate research students. The team is adding advanced capabilities to their prototype, ensuring their telepresence robot outcompetes others on the market.

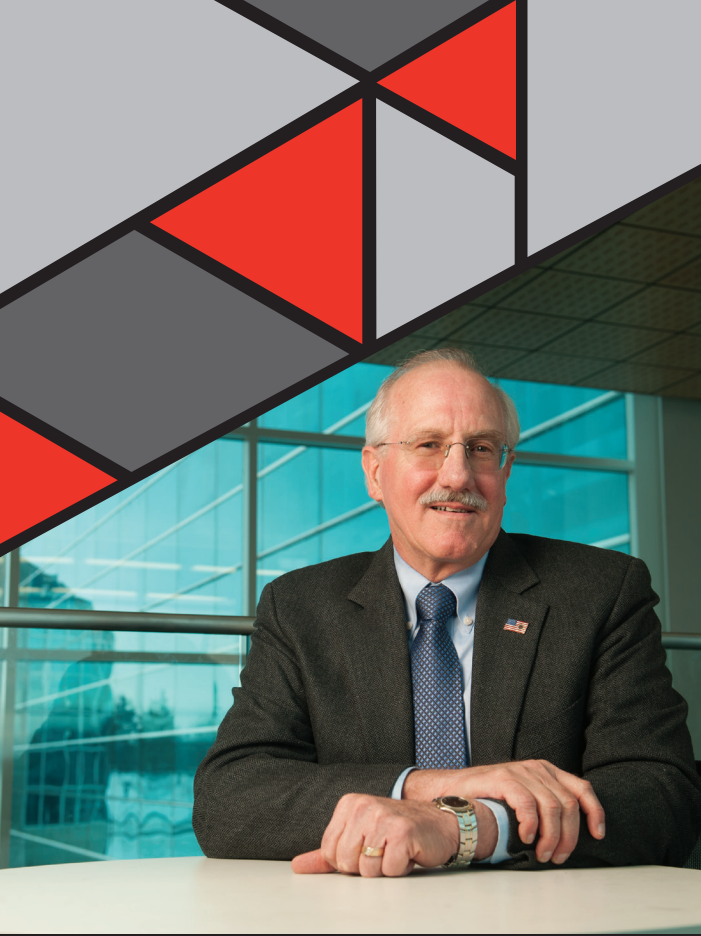
“This telepresence robot will be used in educational settings and will allow instructors to teach remotely. The robot will assist with the social interaction necessary to effectively lead a classroom,” Zhang said. “Instructors could use this technology to reach students in underdeveloped areas, for example, with just an iOS or Android application.”

In phase two, new functions are being added to the robot to minimize the effort of instructors by creating a fluid, natural interaction process with students. The advancements include speech recognition, classroom mapping and the ability to interact with existing classroom technology, such as a projector.

According to Zhang, the platform offers an innovative way to fulfill instructional needs and support positive learning outcomes.

► “The technology can bring powerful, effective teaching to areas that may be otherwise inaccessible,” Zhang said.





ALUMNI DONORS COMPLETE STUDENT DESIGN CENTER

Generous gifts from two of the School of Engineering’s largest supporters ensured completion of the School’s state-of-the-art Student Design Center (SDC). This final phase of construction on the 14,000-square-foot facility is scheduled for completion in spring 2019 and includes additional design lab/innovation space, offices and a large conference room on the building’s second floor. The first floor, completed in September 2017, provides project team workspaces, prototyping workspace, a 3D printing and electronics lab, and workspaces for competition teams that encourage collaboration and interaction among students.

“The advancement of the School is propelled by the incredible contributions and faithful support of distinguished alumni,” said Cem Karacal, PhD, dean of the School of Engineering. “Their support helps us excel in educating future technology leaders.”

Ed Grady

Civil engineering alumnus Ed Grady, BS ’72, demonstrated his support of the SDC and laid the foundation for its success by initially contributing \$300,000, the first private donation toward the project. Through a recent, additional \$400,000 gift, Grady acquired interior naming rights of the second floor. Rooms will be named after him, and at his request, after Alfred Korn, PhD, and Harry Duffey, PhD, pioneering emeriti professors of civil engineering.

“Dr. Korn and Dr. Duffey were two of the people, along with others, who proved the value and viability of the School of Engineering,” Grady said. “Both were key in my personal success at SIUE. They pushed and encouraged me when things were tough and were engaged in my learning experience.”

Grady has high hopes for SIUE engineering students and believes the SDC will elevate the School as a premier educational institution across the nation. He also graciously donated \$300,000 to create two endowed scholarships that will support entrepreneurship among engineering professionals.

The Fowler Family

The Fowler family donated \$1.25 million, the largest single cash investment in the School’s history. Subsequently, the SIU Board of Trustees approved Fowler Student Design Center as the new building name.

“SIUE is important to our family, and we are proud to support it in any way we can,” said Jonathan Fowler, vice president of Edwardsville-based J.F. Electric, who earned a bachelor’s in electrical engineering in 2010. “The Fowler Student Design Center improves the educational environment by providing the space and resources students need to become successful technological leaders with vital communication, leadership and team-building skills.”

The Fowler family is a longtime supporter of the University, witnessing its rapid advancement, as well as the School’s growth as a regional destination.

► "Our students are already known for complementing their command of theory with hands-on competency," said Cem Karacal, PhD, dean of the School.



DEAN'S SOCIETY FOSTERS PARTNERSHIP

The School of Engineering’s vision is to be in partnership with faculty, students, staff, alumni and other industry professionals, working together to provide the highest quality education and maintain innovative resources that support the technical growth and economic development of this region.

To that end, the Dean’s Society was developed to recognize donors who wish to make an investment in this vision. With an annual gift of \$1,000 or more, donors will be invited to become members.

“Such generous gifts affirm our donors’ beliefs in the value of a quality education for current and succeeding generations of our students,” said Cem Karacal, PhD, dean of the School. “The goal is to foster giving that makes a difference in the education of our students.”

Gifts may be directed to be used where most needed at the discretion of the dean, or restricted to a specific department, program or project, such as student scholarships or senior design project awards.

Membership in the Dean’s Society is open to alumni, friends, parents, faculty, staff, retirees and industry professionals. In return, members receive:

- Invitations to special School and University events, including the Annual Dean’s Recognition and Networking Event
- Acknowledgement in the Honor Roll of Donors among the University’s leading contributors
- Receipt of the School of Engineering quarterly newsletter

For more information on the Dean’s Society, contact the School at 618-650-2541.



NEW FUNDING PRIORITIES FOCUS ON STUDENTS

As the Fowler Student Design Center construction comes to completion, the School of Engineering is establishing new funding priorities with a focus on raising \$1.5 million in student scholarships.

“Our students are at the forefront of everything we do,” said Cem Karacal, dean of the School. “Scholarships are an essential component of education and can dramatically impact a student’s educational experience.”

► “The School of Engineering’s alumni, partners and friends understand the importance of scholarships and have an outstanding record of generosity,” Karacal said. “We look forward to their continued support of our students.”

Other giving goals are as follows:

- \$1.5 million for a new Fowler Student Design Center Activity Endowment
- \$1.5 million facilities renovations
- \$2.5 million in support of endowed programs to foster the work of department chairs, as well as professorships and fellowships

Naming opportunities are available to honor and thank donors for their support. To contribute, use the enclosed envelope or visit siue.edu/engineering/give.

ENGINEERING HACKATHON FOSTERS CREATION AND COLLABORATION

In its third year, the School of Engineering’s eHacks competition has allowed approximately 200 college students from around the region to produce unique, marketable and intuitive devices, mobile applications or computer programs.

At the 36-hour competition, known as a hackathon, engineers and recruiters from St. Louis' leading tech companies served as the event’s judges and networked with students.

This year’s event challenged close to 90 participants to build something new with software and computer hardware.

The winning team from SIUE’s College of Arts and Sciences created a mobile graffiti app, artDrop. Eli Ball, a senior studying computer science, helped organize this year’s competition.

“Planning the competition is a year-round event,” Ball said. “As a volunteer, it forces you to step back and figure out how to host an event that encourages every participant to make their best project.”

Ball and two fellow School of Engineering students won the 2017 eHacks competition with their creative application, Photo Code, a system of educational tools used to teach core programming concepts and skills to kids with no programming experience.

SIUE computer science sophomores Zach Anderson and John Bentley took first place in the inaugural competition for their project, Handy. The interactive sign language tutor used a Leap Motion controller device supplied by one of the event’s sponsors, Major League Hacking.

Anderson currently is pursuing his master’s in computer science at SIUE. Since his 2016 eHacks win, he has helped organize the 2017 and 2018 eHacks events.

“It is a real testament to the value our participants see in eHacks that they return as volunteers to make the experience available to others,” said Dennis Bouvier, PhD, associate professor of computer science and faculty advisor for the hackathon. “We couldn’t have this event without them.”

The competition quickly outgrew its first home on the SIUE campus and moved to the downtown St. Louis’ T-REX Innovation Center in 2017.

“T-REX is a great place for eHacks. It offers a co-working space with a high-speed computer network and allows students to see where business start-ups happen,” Bouvier said.

The fourth annual eHacks competition will take place March 8-10, 2019, at T-REX.

ENGINEERING STUDENTS SECURE TOP TWO SPOTS IN "THEOTHER40" BUSINESS COMPETITION

School of Engineering seniors Dylan Mueth, of Waterloo, Ill., and Eli Ball, of Rockford, Ill., stunned judges with their business plans and earned first and second place at SIUE’s eighth annual “TheOther40” Competition.

Hosted by the School of Business, “TheOther40” Business Plan Competition allows SIUE students the opportunity to take a business idea through stages needed to launch a product or service. Participants have access to business resources and develop entrepreneurial skills over the three-month process. “TheOther40” derives its name from data that shows approximately 60 percent of startups fail within five years. The program’s goal is to find, engage and support “the other 40” percent.

Dylan Mueth, a civil engineering major, captured first place and won \$5,000 to fund his start-up, VAST Produce. Given the global water crisis and demand for food, along with the explosive world population, VAST Produce aims to market a sustainable, aquaponics system for local growers of fish and produce.

► “Aquaculture, the growing of fish, and hydroponics, the soilless growing of fruits and vegetables, have been around for centuries, but the combination of the two is relatively new,” Mueth said. “This combination allows the two systems to gain the nutrients needed from each other.”

VAST Produce’s uniquely designed aquaponics grow towers will use one-tenth less water and require a fraction of the space as traditional growing techniques. The system will initially be designed for the production of tilapia and lettuce, and marketed to local restaurants and grocery stores.

Ball, a computer science major, won second place with his pitch for Midway Spark. The start-up looks to push the limits of human-machine interaction by creating interactive digital systems that use speech, emotions and virtual characters to build engaging experiences. The core technology is re-trainable for different uses and can be deployed to phones, mobile apps and websites.

Ball pushed his entrepreneurial skills further and entered Saint Louis University’s Pitch & Catch Investor Pitch Deck Competition held at Busch Stadium in downtown St. Louis. At the event, Ball introduced a voice-activated virtual tour guide for zoos that

interacts with guests. The software can replace ineffective signs with an engaging and educational virtual tour guide.

Upon graduation, Ball hopes to turn Midway Spark into a full-fledged business and pursue graduate studies in artificial intelligences and machine learning. Ball encourages other people to develop creative solutions to life's problems.

► “We see problems every day. Some are big and we have no idea how to tackle them, but most are small quirks that get on our nerves,” Ball said. “If you see something that could be better, there is no reason that you cannot come up with a solution.”



ALUMNI AMONG RISING STARS OF THEIR FIELDS

Each year, the *St. Louis Business Journal* celebrates a group of rising stars in their respective fields, who have been nominated among hundreds of their peers. Known as the “40 Under 40,” the honorees are featured in the publication and celebrated at an awards dinner.

Since the *Journal* began publishing the list in 1995, School of Engineering alumni have been strongly represented. The following are recent recipients of the award.



Mike Marchal, BS Construction Management '94
President, Holland Construction Services
2012 "40 Under 40"



Matthew J. Pfund, BS Construction Management '96
Senior Vice President, Tarlton Corporation
2013 "40 Under 40"



Aaron Detmer, BS Mechanical Engineering '03
Mechanical Engineer, Woolpert Engineering
2014 "40 Under 40"



Ryan Freeman, BS Mechanical Engineering '01
Vice President of Operations, McCarthy Building Companies, Inc.
2015 "40 Under 40"



Tolga Tanriseven, MS Computer Engineering '03
Founder and CEO, GirlsAskGuys, LLC
2015 "40 Under 40"



William Stahlman, BS Civil Engineering '05
Director of Engineering and Construction,
America's Central Port
2017 "40 Under 40"



Jonathan Fowler, MS Electrical Engineering '10
Vice President, J.F. Electric
2018 "40 Under 40"



Devin Gates, BS Construction Management '10
Project Manager, Paric Corporation
2018 "40 Under 40"



Ryan Poettker, BS Construction Management '05
Vice President of Project Management,
Poettker Construction Company
2018 "40 Under 40"

HEISE INDUCTED INTO ALUMNI HALL OF FAME

SIUE honored the School of Engineering's Angela L. Heise, BS computer science '96, at the Alumni Hall of Fame ceremony in September.

Heise is president of the Civil Group at Leidos in Reston, Va. She is responsible for providing solutions to U.S. Cabinet-level civil agencies and major elements of the public and private sectors across the globe. Since 2016, she has led the 10,000-person, \$3.6 billion business focusing on information technology and cybersecurity, air traffic automation, energy and the environment, federal infrastructure and logistics, and transportation security.

“Female representation in computer science and other engineering fields continues to lag behind,” said Cem Karacal, PhD, dean of the School of Engineering. “Our School, and the field of engineering, is lifted by the achievements of alumnae such as Angela. The number of people she has worked with and magnitude of projects she has managed are strong indicators of her skills.”

Heise previously worked at Lockheed Martin for 19 years, where she was vice president of commercial markets. She is also an alumna of Harvard Business School's Advanced Management Program.

Despite being one of only two females in her computer science classes at SIUE, Heise said her professors gave her the gift of feeling nothing but equal and empowered.

“I want to thank SIUE for that gift, because it meant I entered the professional world not knowing any differently,” Heise said. “It meant that every job that I took, I raised my hand and I always used my voice.

“For the 10,000-person company I have the distinct privilege of representing every day, I give employees the same sense of inclusion and encourage them to use their voices to make the world better.”

Heise is committed to promoting STEM career options, particularly among young girls and minorities. Her strong foundation of ethics and integrity guide her in all she does, ensuring that she always treats people with kindness and respect.

Heise was recently named to Washington Exec's Top 25 Executives to Watch, in what has been dubbed “The Year of the Transformational Leader.” She also was recognized in 2013 as one of *Federal Computing Week's* Top 100 Executives and in 2012 as one of *Aviation Week's* Top 40 Under 40.





ADVISORY BOARD MEMBER SPOTLIGHTS

Jim Heinz

BS Construction Management '83
Vice President, MC Hotel Construction
School of Engineering Advisory Board

Why do you serve on this board?

The construction management degree I received from SIUE allowed me access to a very rewarding career. From the beginning, I have felt a great deal of gratitude for the education I received at SIUE and wanted to pay the School back in the best way I could.

What are the School's best strengths? How does the School benefit this region?

The engineering education at SIUE is excellent. I would argue that the education the students get is just as strong, if not stronger, than what is offered at other universities. The cost of the education also makes it a great value for students of all walks of life. The School continues to raise the bar and attract top students from across the region.

What challenges is your industry currently facing?

Shortage of labor is our biggest problem. Young people do not view the trades as an attractive career. Much of the skilled labor force is retiring and not being replaced by younger workers. SIUE is educating the future construction leaders who are going to be tasked with solving this problem.



Vicki LaRose

BS Civil Engineering '90
President, Civil Design, Inc.
Civil Engineering Industrial and Professional Advisory Council (IPAC), School of Engineering Advisory Board

Describe your relationship with the SIUE School of Engineering.

I have been involved with the IPAC for several years. I helped fundraise for the new Student Design Center. Our company has hosted several senior design classes, and we have had many interns from the School.

Why do you serve on these boards?

It is a way to give back to the School that shaped my career and the person I am today. I love going back on campus and interacting with the students who will be our industry's future.

How has the School addressed the challenges the industry is currently facing?

The School of Engineering has listened to the needs of industry and worked together with other schools to offer the classes needed to respond to our needs.

Daniel Crain

BS Industrial Engineering '07, MS Industrial Engineering '14
Director of Operations, Henkel Corporation
Industrial Engineering Advisory Board

Describe your involvement with the SIUE School of Engineering.

Since I earned my bachelor's, I have recruited and mentored multiple students. As an employer, I have provided real-world opportunities for senior design projects. These projects give students the opportunity to apply the theories, knowledge and skills they have learned and developed at SIUE to real industry problems.

Why do you serve on this board?

It is my privilege to serve the School and its students. SIUE is not just about the curriculum. It is the culture, the students and the faculty that truly make the difference. This is my opportunity to be a part of the culture that makes SIUE an amazing institution.

What challenges is your industry currently facing?

Companies are under a lot of pressure to find new ways of producing goods with higher quality in a sustainable manner. Companies are looking for technical leaders to help solve these complex problems. The industrial engineering program offers students the knowledge to solve these problems by blending traditional engineering skills with Lean Six Sigma methodologies to create highly technical leaders to successfully apply fundamental changes to manufacturing.

See the complete list of board and council members at siue.edu/engineering-advisory-board.



FRIENDS OF ENGINEERING DONOR LIST

The faculty, staff and students of the School of Engineering extend sincere appreciation to our alumni, friends, corporate partners, foundations and organizations who contributed to the School in fiscal year 2018. We are grateful for your investment. On behalf of everyone at the School, thank you or making a difference in the lives of our future engineers, computer scientists and construction managers.

Sincerely,
Cem Karacal, Dean, School of Engineering

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PASSION FOR LEARNING AND ENGINEERING LEAD TO KORTE'S SUPPORT

“Always give them more than expected.”

It’s a philosophy Ralph Korte, BS business ’68, stands behind, and one that has fortified the success of The Korte Company, which he founded in 1958. Today, The Korte Company is a nationally recognized industry leader with more than 1,800 jobs completed across the nation and an annual construction volume of \$250 million.

“I’ve been blessed with good success and health,” Korte said. “I truly believe my company could not be where it is today but for my degree in business from SIUE.”

Korte has contributed over \$1 million to the SIUE Schools of Business and Engineering, and to the University as a whole. He led fundraising efforts for Ralph Korte Stadium, an Olympic-quality track and field facility at SIUE; funded the Ralph and Donna Korte Alumni Wing at SIUE’s Birger Hall; and has established and served on boards and committees providing leadership and inspiration as SIUE has grown.

After returning from the Korean War, Korte began studying at SIUE in 1959 to take advantage of the G.I. Bill compensation benefits. He attended tuition-free classes by night while building his construction business by day.

“I charged my customers \$2.50 an hour, and I could make \$2.35 an hour by sitting in the classroom and learning,” Korte said. “I started taking courses in business. The professors recognized that I had my own business and made it a point to engage with me, which made it all quite interesting.”

Taking two evening classes a week, Korte earned his degree in nine years. Had SIUE offered an engineering program at the time, he likely would have pursued an engineering degree instead. His passion for the industry has tied him closely to the School of Engineering since its establishment.

“Of all the ways I’ve been involved at SIUE, what I’m proudest of is leading the effort to implement the construction management program,” he said. “It took three years to develop and get approved. Now it’s known nationwide in the construction industry.”

In 2008, to honor Korte’s career and retirement, The Korte Company established the Ralph F. Korte Scholarship Endowment for Construction Management.

“Ralph has been one of the School of Engineering’s best advocates for many years,” said Cem Karacal, PhD, dean of the School. “With his passion for learning and helping others, he consistently has gone above and beyond to ensure our School is developing leaders in the construction industry.”



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