MESSAGE FROM THE DEAN

As my first year as Dean of the SIUE School of Engineering comes to a close, I want to express my appreciation for our School faculty. Working collaboratively, we consistently improve the quality of education, research and service provided through our School.

The impact we have made together shows as:

• Our enrollment numbers continue to rise, demonstrating that the faith our students and their families have in our dedication to students.
• We begin educating students in our new mechatronics and robotics engineering program.
• We watch the first phase of our Student Design Center become reality as we seek further corporate support for the center.
• We transform traditional internship programs into innovation for faculty and students.
• We begin educating students in our new mechatronics and robotics engineering program.
• We see our efforts as we make a difference in the lives of students and faculty.

When we work together with a progressive mindset, the potential of our School is limitless.

Sincerely,

Cem Karacal, PhD
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ABOUT THE SCHOOL OF ENGINEERING

In 1962, the School of Engineering at SIUE was founded. The School’s mission is to provide engineering 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 that contribute to technological advancement in our fields.

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 that contribute to technological advancement in our fields.

About SIUE

SIUE awards degrees in undergraduate, graduate and doctoral programs encompassing the arts, sciences, nursing, education, health, human behavior, business and engineering. The Schools of Dental Medicine and Pharmacy award doctorate’s first professional degrees in dental medicine (DMD) and pharmacy (PharmD). Doctoral programs are available in nursing practice and educational leadership. Cooperative PhD programs in history, environmental resources and policy, engineering science, and computer science are offered with SIU Carbondale.

2016 ACT Scores

<table>
<thead>
<tr>
<th>ACT Math</th>
<th>ACT Composite</th>
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<tbody>
<tr>
<td>National Average</td>
<td>21.1</td>
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<tr>
<td>House Average</td>
<td>23.9</td>
</tr>
<tr>
<td>SIUE School of Engineering First Semester Freshmen</td>
<td>28.7 27.8</td>
</tr>
</tbody>
</table>

Undergraduate and Graduate Enrollment by Program

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

Minority and Female Undergraduate Enrollment

- Female
- Minority
SUMMER CAMP OPENS DOORS TO FUTURE ENGINEERS

Dedicated to enhancing communities through outreach and by supporting science, technology, engineering and math (STEM) initiatives, the Phillips 66 Wood River Refinery and the Monsanto Fund provided grant assistance for the School of Engineering’s annual summer camp. The grants support scholarships, supplies and instruction costs for the weeklong residential camps.

“As an industry, we need strong students from all backgrounds,” said Melissa Erker, director of government and community affairs for Phillips 66. “The earlier we can provide this type of educational experience for students, the better it is for us in the long term.”

To reach students at the pre-college level, the School has welcomed campers for more than a decade. Since 2011, approximately 300 campers from 12 states have received hands-on experiences in the world of engineering. In the past year, 17 previous campers returned to SIUE to begin their studies.

“Today’s students will be tasked with addressing global challenges like climate change and how to feed a growing population using fewer resources. Engineering skills will be key to meeting those challenges,” said Michelle Insco, Monsanto Fund program officer. “To nurture those next big ideas, it’s important that universities, nonprofits and others in the private sector work together to improve access to science resources.

“The School of Engineering opens doors to future science leaders through its annual summer camps, and the Monsanto Fund is proud to invest in talent that will drive innovation in the future.”

PARTNERSHIPS KEEPS INDUSTRY ON TRACK

With more than 150 years of experience designing heavy-haul equipment, Amsted Rail’s industry-leading innovations make it possible for railroads all over the world to haul heavier loads over greater distances with improved reliability and performance.

Heavy haulers count on Amsted Rail to perform in the world’s toughest rail environments. Amsted Rail counts on the School of Engineering.

Through a long-term partnership with Amsted Rail, the Department of Mechanical Engineering provides technical support and conducts experimental investigations.

“It’s a two-way street,” said Tom Petrunich, manager of test at Amsted Rail. “We provide SIUE students and staff meaningful industry projects. They provide us with useful test services that we typically wouldn’t be able to provide internally.”

One recently completed project, “Fatigue Verification of Train Springs,” investigated the fatigue life of suspension springs in cargo trains. This research assisted Amsted in finding the correct mechanical properties of suspension springs in trains. This can reduce the corresponding vibrations, thereby enhancing mechanical part life.

“These types of partnerships allow us to solve practical problems for local industry,” said Albert Luo, PhD, professor of mechanical and industrial engineering. “At the same time, we are helping students obtain first-hand experience from industry and learn to better communicate with engineers.”

“We’re thankful to Dr. Luo and his students for always accommodating us and working tirelessly to provide their services and support through the years,” Petrunich said.

“Amsted projects have helped me better understand industry, with real-scale equipment and real challenges. It’s enlarged my world,” Siyuan “Simon” Xing, Engineering Science doctoral student.
CREATIVITY SHOWCASED AT ROBOTICS COMPETITION

Middle and high school students engage their minds and their robots each spring at the School of Engineering’s annual Botball tournament, a regional competition coordinated through the KISS Institute for Practical Robotics. This was the 18th Botball season and the 13th year SIUE hosted the region’s tournament. “Each year, we try and define some unique, challenging tasks that allow both the novice teams and those with more experience to succeed by scoring in the competition,” said Gary Mayer, PhD, associate professor of computer science and the event organizer. The game board changes annually around a central theme, such as Mars Mission crewmember rescue and prospecting in the New Mexico desert. “As an educator, it’s a great thing to see. Everyone should be proud of what these students accomplish,” Mayer said.

STUDENTS PROVIDE UPGRADED HVAC TO AREA RESIDENTS

Residents of Beverly Farm in Godfrey have a new HVAC (heating, ventilation and air-conditioning) system in their building, courtesy of the prowess of engineering students in the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) student chapter. “Beverly Farm is an assisted living facility for the mentally challenged. We chose it because it’s an excellent organization that is helping a lot of people,” said Paul Cefaratti, president of the student branch of ASHRAE, and senior majoring in industrial engineering and minoring in mechanical engineering. “We gained invaluable engineering experience and an edge over other students hoping to receive jobs in related engineering disciplines.”

The opportunity to pioneer a Community Sustainability Project in cooperation with the St. Louis Chapter of ASHRAE came as a result of the School of Engineering having the most active ASHRAE student branch in the region. To make a more energy efficient and sustainable building, the team upgraded the entire HVAC system in the Chappee Cottage. One of 23 buildings on the property, Chappee Cottage is a women’s facility that houses approximately 25 residents. Nine student engineers took on the project with the help of professional engineer Pat O’Brien, owner of Dynamic Engineered Systems in O’Fallon, Mo. Kane Plumbing, Heating and Air Conditioning in Alton also worked as a contractor. The project was completed in May. The students presented the Community Sustainability Project at the 2016 Annual ASHRAE Conference in St. Louis. The annual conference attracts close to 1,000 industry leaders and engineers from across the world.

4+2 AGREEMENTS PROVIDE SOLID PLAN FOR COMMUNITY COLLEGE STUDENTS

The School of Engineering’s 4 + 2 programs are ideal for students starting their college journey at a community college with plans to pursue an engineering degree at a four-year university. “Beginning at a community college can be a wise decision for some students,” said Cem Karacal, PhD, dean of the School. “Our 4 + 2 agreements with community colleges create a smooth transition and give students a solid plan for earning their degree on time.”

The agreements outline specific curriculum for the first two years at community college, allowing students to efficiently progress toward completion of a bachelor’s degree in engineering, and ensuring they are well-prepared for the final two years of their engineering curricula. “The successful 4 + 2 students are as prepared as our own students for the discipline-specific courses,” Karacal said.

The School of Engineering has 4 + 2 program agreements with the following community colleges:
- Kaskaskia College, Centralia
- Lewis and Clark Community College, Godfrey
- Southwestern Illinois College, Belleville
- Rend Lake College, Ina

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The School of Engineering is also working on 3 + 2 agreements with regional liberal arts colleges for dual diploma programs.

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COOPERATIVE DOCTORAL PROGRAM EXPANDS EDUCATIONAL OPPORTUNITIES

The Cooperative PhD Program in Engineering Science, the School of Engineering is expanding high-quality educational opportunities to the doctoral level.

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The School partners with Southern Illinois University Carbondale (SIUC) to offer cooperative doctoral degrees in engineering science and computer science to highly qualified students.

Through a memorandum of understanding, SIUC designates SIUE as an approved residence center where all coursework can be completed using the School of Engineering’s state-of-the-art laboratories for research and instruction.

Among the 18 students currently enrolled in the program, research assistant Siavash Zamiran has received multiple accolades for his research projects conducted in the SIUE soil laboratory. Zamiran was the 2016 recipient of the International Association of Foundation Drilling’s (ADSC-IADFD) internationally acclaimed GeoConfluence Research Scholarship from the St. Louis chapter of the Geo-Institute of the American Society of Civil Engineers (ASCE). The scholarship will support his dissertation research, “Seismic Investigations of Retaining Wall Structures.”

Abdolreza Osouli, PhD, assistant professor of civil engineering, serves as Zamiran’s faculty advisor through the cooperative PhD program.

“With Siavash’s motivation, I have been able to direct him to excellence in all capacities of teaching, research and professional service,” Osouli said.

By offering a multitude of educational and scholarly opportunities, the cooperative PhD program is training the next generation of creative thinkers and innovators who will continue the advancement of the engineering industry.
Nidec’s slogan is ‘All for Dreams,’ Levine said. “We believe everyone has a dream for themselves and the company they work for. In the Student Design Center lab, we are supporting future engineers who have those dreams and giving them the ability to make them a reality.”

“Together with Nidec, the world’s electric motor industry leader, we are developing one of the nation’s best electrical machine and drive labs at SIUE,” said Dr. Xin Wang, assistant professor of electrical and computer engineering. “Our new lab facilities supported by Nidec will provide an intimate, hands-on learning environment, focusing on practical industrial applications.”

The School of Engineering, however, garnered Nidec’s interest with its focus on design and analysis of electrical machines and drives, automatic control, power systems, and robotics. By partnering with the School for a co-op program, Nidec provides a vital role in providing opportunities for students to practice and enhance classroom concepts. The School continually impresses Nidec with high-caliber students, many of whom go on to full-time employment with the company.

Levine gained further insight when he joined the School’s Industrial Advisory Board in 2015.

“I came away from my first board meeting impressed and excited about the vision and future of the School,” Levine said. “This is a fast-growing school with a good read on what is happening in industry.”

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More than motors: Partnership helps students turn dreams into reality

Air warms. Cars drive. Phones vibrate. Computers operate. The day begins, and throughout the course of it, most people interact with motors dozens of times without a second thought. Some people, like Greg Levine, executive vice president and general manager of Nidec Motion Control, spend their days giving them a great deal of thought: The largest motor company in the world, Nidec Motor Corporation makes motors for cell phones, cruise ships and everything in between.

“Every day we use things that rely on motion, and that reliance is only growing,” Levine said. “In very few universities in the U.S. are we investing in curriculums and labs for motor engineering.”

The Student Design Center will provide more than physical space. It will improve workflow, provide more hands-on learning and collaborative opportunities for students, and allow for better monitoring of work areas.

Various opportunities are available for individual and corporate giving, from naming opportunities to matching gifts. See the enclosed giving envelope, or give online at siue.edu/student-design-center.
FULBRIGHT PROGRAM TO FOSTER COOPERATIVE RESEARCH IN WATER MANAGEMENT

With one of the fastest growing economies, Brazil’s rapid urbanization and population growth is placing high demands on infrastructure and causing severe urban water management problems. Likewise, in the U.S., water infrastructures in many cities require the investment of billions of dollars to address their physical and environmental issues.

“Green infrastructure offers a holistic approach to solve urban water problems by integrating storm water management with landscaping,” said Jianpeng Zhou, PhD, professor of civil engineering.

Zhou has received a Fulbright U.S. Scholar grant, awarded by the U.S. Department of State and the J. William Fulbright Foreign Scholarship Board, for a research project on “Adaptive Green Infrastructure for Urban Water Management,” at the Institute of Hydraulic Research of the Federal University of Rio Grande do Sul (UFRGS). UFRGS is one of the largest federal universities in Brazil, located in the City of Porto Alegre, with more than 27,000 undergraduate and 9,300 graduate students.

Zhou will travel during spring and summer 2017 to conduct his work.

“By working with the faculty at UFRGS, I hope to establish collaboration for future joint research,” Zhou said. “Shared learning and development of adaptive green infrastructure will benefit engineering applications in both the U.S. and Brazil.”

COLLABORATIVE INVENTION TO EXPAND UNDERGRADUATE RESEARCH

Corrosion tests, solar cells, battery development, and small-scale chemical syntheses are among the applications that require a digital potentiostat. The instrument carefully controls how voltages are applied, and records the actual voltages and currents experienced by a system.

Brad Noble, PhD, associate professor of electrical and computer engineering and Mike Shaw, PhD, distinguished research professor in the Department of Chemistry, believe that the high cost of potentiostats has made them inaccessible to many potential users.

With the typical cost ranging from $6,000-$20,000 per instrument, and with more than 20 needed for an undergraduate lab, potentiostats have typically been reserved for high-end research applications. Actual electrochemical practice has been scarce at the freshman and sophomore undergraduate level, and among small start-up firms. In response, Shaw and Noble developed a sensitive, versatile, programmable and affordable potentiostat.

“We designed a ‘no frills’ potentiostat for teaching environments,” Shaw said. “The circuit was designed to minimize cost, yet still deliver high quality data for a limited range of functions suitable for the teaching lab.”

The patented design is optimized to provide the fundamentals that most researchers and educators would need at a cost consistent with the end-user’s budget, i.e. perhaps five percent of the cost of a high-end commercial instrument.

“After spending several years of research time in order to achieve a viable, inexpensive design, it is understandable why there are no comparable potentiostats on the market,” Noble said.

Noble and Shaw plan to commercialize the units so they can be incorporated into a broad range of educational settings for use by more undergraduates, high school students, and possibly home-schooled students.

“It is an honor to join the esteemed alumni of the Fulbright program. I am excited not only to broaden my research and scholarship, but also to foster increased cooperation and collaborative research in urban water management.”

Jianpeng Zhou, PhD, Professor of Civil Engineering

“With the growth of intelligent autonomous systems comes the increased need for improved energy storage. It’s more important than ever for electrical and computer engineering students to understand battery and fuel cell chemistry, and working with a potentiostat in their chemistry classes is an essential step towards developing better designs in the future.”

Brad Noble, PhD, Associate Professor of Electrical and Computer Engineering
MILLER TRACKS TRAJECTORY OF SUCCESS TO SIUE

School of Engineering alumnus Scott Miller, PE, BS civil engineering ’96, is leading a world-class team of engineers across the U.S., setting engineering design guidelines and helping to establish the direction of engineering software for MiTek USA, Inc. In 2016, the diversified, global supplier of software-engineered building products and services, promoted Miller to vice president, engineering.

Miller joined MiTek 20 years ago, even after graduating from SIUE. The opportunities and faculty members he impacted the trajectory of his success.

“Ask the SIUE career advisor to connect you with one of this year’s graduates. The staff is incredible, and they want to help you develop your career path.”

As a student, Miller was no stranger to the workforce. He entered the School as a nontraditional transfer student after attaining his associate’s degree at a community college.

“It was important to have people to trust and believe in you. The community college allowed me to gain the skills and experience I needed to be successful.”

Brad Cross, PhD, professor of civil engineering and chair of that department, was a valuable mentor to Miller. Cross was the faculty advisor when the steel bridge competition began, which Miller was involved in from the inception.

“The competitions not only provided Miller with hands-on experiences, they also gave him the opportunity to connect with area businesses to request building materials and donations to support the team. “That was a great experience, because in the workforce, you have to ask people for things,” he said.”

Since graduating, Miller has maintained his relationship to SIUE and has been a valuable mentor to other students. He is currently serving on the Industrial and Professional Advisory Council and facilitating MiTek’s annual sponsorship of senior capstone projects.

ERTC AND CIVIL ENGINEERING ALUM HAS WASTEWATER CINDERELLA STORY

As a young mother who was unsure of her career path, Rebecca Coyle enrolled at the Environmental Resources Training Center (ERTC) at SIUE.

“People don’t know about water and wastewater treatment careers,” Coyle said. “I didn’t until my brother went through ERTC in the ’80s. The nice thing about it is, when you complete the program, you are a licensed operator with the skills and experience you need to do the job.”

ERTC’s water quality control operations program consists of two semesters of water and wastewater operations training, followed by a 10-week internship at a treatment plant.

After Coyle completed the ERTC program in 1992, Metropolitan St. Louis Sewer District (MSD) hired her as an entry-level operator in wastewater treatment at the Bissell Point plant. After steadily climbing the ranks, she set her sights on becoming plant manager, but realized she could only go so far without a bachelor’s degree.

“In 1996, I went back to school to study civil engineering. I chose SIUE because it’s close to my home, and it’s a great school,” Coyle said. “I took 10 years to earn my degree. As hard as it was to juggle school with working and raising kids, it was worth it.”

Coyle was promoted to MSD plant manager just two years after earning her bachelor’s in 2006, and has since surpassed her original goal. She is now the division manager of the Bissell Point plant where she began her career 24 years ago.

“Mine is a wastewater Cinderella story. I’ve worked my way up from the bottom, and I can’t stress enough that none of that would have been possible had I not gone back to SIUE and earned my degree.”

Rebecca Coyle, BS Civil Engineering ’06

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Thomas Niedernhofer said, "Still, there never was a time for several assessments before you make a big decision. Being decisive amid death and chaos is not the day-to-day world."

"When you're presented a problem in the day-to-day world, in the relative calm of your office, you have enough time for several assessments before you make a big decision. Being decisive amid death and chaos is not easy!"