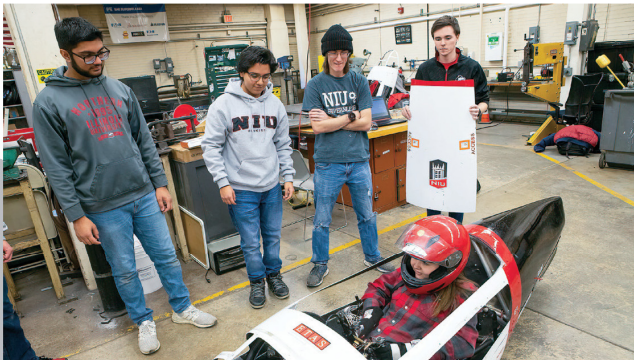


Dean's Report

2017-2021



NORTHERN ILLINOIS UNIVERSITY
**College of Engineering and
Engineering Technology**



Dear Colleagues,

It continues to be both an honor and a privilege to serve as the Dean of the College of Engineering and Engineering Technology! As I reflect on my first four plus years in this role, I am filled with a sense of pride in the accomplishments that the College has achieved throughout this time. This report showcases many of these accomplishments, all of which are a direct result of the collective and diligent efforts from our team of innovative faculty, staff, and students.

The report begins with an introduction to our Strategic Plan 2021-2026, which is the result of hard work and dedication from a team of passionate faculty who defined the mission, vision, and priorities for the college for the next five years. The report outlines many of the achievements of the College through the lens of the initiatives within the Strategic Plan.

Our national ranking continues to recognize the College as a place where students become high quality engineers and where our high quality faculty provide the learning environments that create those engineers. For the first time since the incorporation of the College in 1986, two new B.S. degree programs were added that promote multidisciplinary engineering education and meet regional and national needs. In addition, three new Ph.D. programs were created and launched for the first time in the College and features an industry-based immersive experience called the Industry Fellows Program.

We have worked to make meaningful changes to our academic advising and Advising Office to deliver "precision advising" and ensure that our students have successful pathways to graduation with a degree that allows them to pursue their passions and surpass their potential.

We have also redesigned our Senior Design Program to cross-integrate the Biomedical, Electrical, Mechanical, and Mechatronics Engineering programs for us to be able to advance an industry-realistic, interdisciplinary design experience in close partnership with industry, NIU faculty, and national laboratories. And, we created the Senior Design Demonstration Day event to showcase the innovative projects completed by our talented seniors.

During the past four years, we have also embarked on new diversity initiatives and new partnerships to ensure a better future for all, and to provide students with pathways into the exciting fields of engineering and engineering technology. We know that the future is brighter when we combine our talents and gifts from a diverse array of people and experiences.

We saw a 93% increase in our research activity and expanded our alumni engagement, where we secured a \$3.5M planned gift from an alum - the College's largest planned gift to date.

Great strides have certainly been made in the College but our greatest show of strength and resilience was evidenced during the unprecedented challenges of a global COVID-19 pandemic accompanied by significant budgetary constraints. Faced with these challenges, we leaned into our creativity and resourcefulness (as engineers do) and crafted real solutions. All faculty remained true to their vision to deliver quality education by going above and beyond to deliver their courses and experiences in a virtual setting and we witnessed our students putting forth their best efforts to stay the course toward their educational goals. We pivoted our Senior Design Demonstration Days and commencement ceremonies and collaborated to develop online virtual versions of these, so that our students could still proudly celebrate their accomplishments. We even expanded our outreach and marketing initiatives during the pandemic to assist us with enrollment sustainability. And knowing that prospective students would continue to pursue their options for higher education, we crafted virtual recruiting events to showcase our degree programs and experiential learning opportunities.

I am incredibly proud of the dedication, commitment, spirit, and ingenuity that our faculty and staff have shown! I hope you take the opportunity to review the accomplishments detailed in this report and share in my excitement. There is much that is on the horizon for this young College, including enhancing our innovative educational environments, expanding our research innovation and scholarly productivity, broadening our partnerships with industry, and strengthening our role within our communities to make life better for everyone. I am very enthusiastic about the College's bright future and I wholeheartedly look forward to the opportunity to continue to serve the College and its faculty, staff, and students!

With sincere appreciation,



Donald R. Peterson, M.S., Ph.D., FAIMBE
Dean
Professor of Mechanical Engineering



Strategic Plan 2021-2026

As a result of a faculty-led task force, the College of Engineering and Engineering Technology has a new five-year strategic plan, including a revision to its mission, vision, and core values. This strategic plan would not have been possible without the dedication and leadership of the faculty on the task force, and the dedication and passion of all the faculty and staff who participated in the process of structuring and developing this exciting plan. The plan formally launched in the Fall of 2021 and proudly aligns with the university's mission, vision, and values, as well as the university goals.

VISION STATEMENT

To be the premier choice for a diverse body of students who aspire to be engineering innovators and leaders for the betterment of the world.

MISSION STATEMENT

Provide engineering excellence in education, research, scholarly activities, and impactful engagement with industry, government, and communities.

CORE VALUES

Education - Provide excellence in engineering and technology education and provide experiential and scholarship opportunities for students to bridge theory with practice.

Research and Scholarly Activities - Sustain innovation and promote translational research and cultivate collaboration with industry partners.

Diversity, Equity, and Inclusion - Build on transparency and shared governance, promote equity, participation, and belonging, and promote professional ethical conduct.

Outreach and Engagement - Strive to generate employability and internships, provide continuing education for professionals, enhance existing, and develop new, global partnerships, and, ultimately, serve society and our communities including industry, government, military.

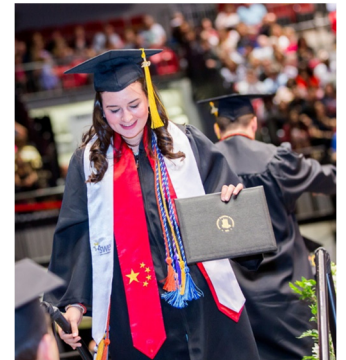
Recognitions

U.S. NEWS & WORLD REPORT

CEET has increased in ranking over the past four years and remains within **the top third of undergraduate engineering programs** across the 239 engineering programs at institutions where the terminal degree in engineering is a bachelor's or master's degree.

LATINO LEADERS MAGAZINE

Named one of the **four best schools in the US in 2020 for Latino and Latina students** to hone their skills in technology and will help them have greater opportunities in the future.



ACCREDITATION

Our accreditation informs external entities that students from our programs have solid educational foundations and are capable of leading the way in innovation, emerging technologies, and in anticipating the welfare and safety needs of the public.

Accreditation Board for Engineering and Technology (ABET)

- Electrical Engineering (since 1988)
- Electrical Engineering Technology (since 2003)
- Industrial and Systems Engineering (since 1988)
- Manufacturing Engineering Technology (since 2003)
- Mechanical Engineering (since 1988)



Association of Technology, Management and Applied Engineering (ATMAE)

- Engineering Technology Management (since 1998)
- Industrial Management and Technology Emphases (since 1998)
 - o Design and Production, Special Technical Studies, Electronics Technology, Environmental Safety and Health

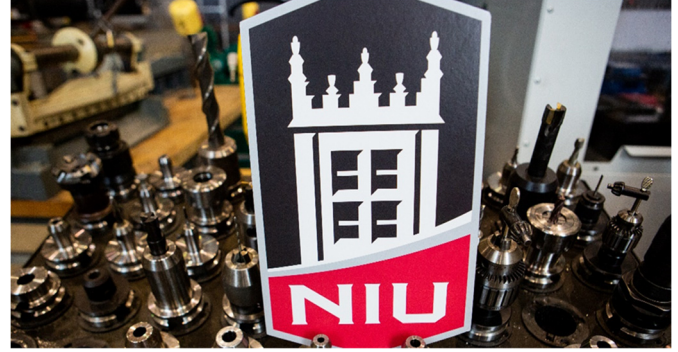


College of Engineering and Engineering Technology

The **youngest college** on campus (incorporated in 1986) was established as a practice-based college. Students are well prepared for a successful career when they enter the global workforce as the college **teaches students to innovate, solve real-world problems, and make a difference** through expert faculty, state-of-the-art laboratories, and numerous partnerships with industry. CEET has a **rapidly growing alumni base** (> 12,000) with approximately 80% living and working within the Northern Illinois region.

6 BACHELOR OF SCIENCE (B.S.) DEGREE PROGRAMS

- Biomedical Engineering
- Electrical Engineering
- Engineering Technology
- Industrial and Systems Engineering
- Mechanical Engineering
- Mechatronics Engineering



5 MASTER OF SCIENCE (M.S.) DEGREE PROGRAMS

- Electrical Engineering
- Engineering Management (in-person or online)
- Industrial Management and Technology (online)
- Industrial and Systems Engineering
- Mechanical Engineering



3 DOCTOR OF PHILOSOPHY (PH.D.) DEGREE PROGRAMS

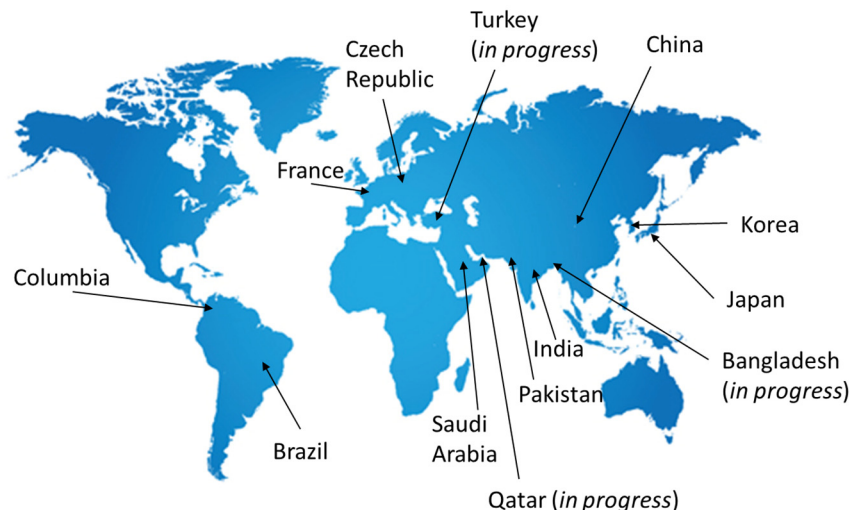
- Electrical Engineering
- Industrial and Systems Engineering
- Mechanical Engineering

13 GRADUATE CERTIFICATES ACROSS 3 DEPARTMENTS

- Electrical Engineering - Digital Image Processing, Digital Signal Processing, Digital Systems, Industrial Control, Semiconductor Devices, Semiconductor Fabrication, VLSI Design
- Engineering Technology - Environmental Health and Safety, Facilities Management
- Industrial and Systems Engineering - Integrated Manufacturing Systems, Lean Six Sigma, Logistics, Quality Control

ARTICULATION AGREEMENTS

- With **22 regional community colleges** for undergraduate degree programs and with **10 countries** for its undergraduate and graduate degree programs, as well as agreements in progress with 3 new countries.



UNDERGRADUATE ACADEMIC AFFAIRS, OUTREACH, AND DIVERSITY

Over the last four years, the College made organizational changes necessary to meet the needs and challenges associated with student enrollment and student success, with new roles for a more coordinated interface with students and prospective students, as well as close working relationships with overlapping university initiatives.

- The position of Undergraduate Associate Dean was transformed in 2018 into the **Associate Dean, Undergraduate Academic Affairs, Outreach, and Diversity (UAAOD)** to become explicitly responsive to the CEET mission and vision by leading and engaging in activities and initiatives to strategically manage enrollment, outreach, advising, curricular innovation, accreditation, and diversity, equity, and inclusion.
- A new **Director of Outreach and Diversity position was created in 2019 along with** transforming the position of Assistant Director of Student Diversity into the **Coordinator of Retention and Diversity**, where both focus on internal and external activities pertaining to recruitment, student success, and diversity.

OUTREACH, MARKETING, AND COMMUNICATIONS

A new **Director of Marketing and Communications** was placed in April 2019 to increase brand awareness and execute strategies using traditional and newly created promotional activities.

College outreach and marketing work closely together to execute strategies to recruit, convert, and retain students, and work closely with other NIU colleges for best practices.

- Developed a dynamic and strategic **Recruitment Dashboard** to track applications, admits, and commits using Slate that is reviewed and discussed weekly.
- 100+ unique articles published and shared over various mediums since April 2019 (-75 between 2017 and 2018).
- 15+ unique videos produced and shared over various mediums since April 2019.
- Created **The Engineering Hour**, which is an ongoing Monday through Friday evening video chat hotline.
- Launched an **Educator Resources** webpage that contains various engineering modules for use by high school and community college faculty within their curricula and instruction.
- Created **CEET Open Houses** and **Monthly Info Nights** – Open Houses are held on Saturdays for in-person events and various weekday evenings for Info Nights.

Outreach and Marketing conducted a major pivot in March 2020 in response to COVID-19 restrictions by leveraging digital and virtual outreach activities, as well as strategized for their ongoing use in college and program promotion in coming years, especially for recruiting students well outside of the Northern Illinois region.

- **CEET in Virtual Reality** - Launched an interactive virtual reality tour of the Engineering Building, Still Hall, and Still Gym (go.niu.edu/CEETlabtour) to allow prospective students and visitors to view our innovative laboratories and facilities, when they could not visit them in person.
- **Virtual Recruitment Events** - All virtual formats of open houses, undergraduate and graduate info nights, and personalized virtual reality tours of the college.

Our diversity recruitment strategy includes efforts to increase awareness of CEET in inner-city Chicago schools and the school systems in the Chicagoland suburbs. While CEET's student demographic percentages either meet or exceed industry averages (see Enrollment Diversity), we believe that we can continue to significantly grow our diversity of underrepresented minorities and women.



Preparing the Next Generation of Innovators

NEW DEGREE PROGRAMS

The future of undergraduate and graduate engineering education lies within diverse and multi-disciplinary experiences and preparedness. **Five new faculty-developed undergraduate and graduate degree programs** were developed to meet regional and national needs.

- **Bachelor of Science in Biomedical Engineering (BME)** was formally launched Fall 2019 and has 85 students as of Fall 2021 (75 in Fall 2020).
 - o In Fall 2021, 41% are female (36% Fall 2020) and 51% are from an underrepresented minority (51% Fall 2020).
- **Bachelor of Science in Mechatronics Engineering (MCTR)** launched Fall 2019 and has 80 students as of Fall 2021 (56 in Fall 2020).
 - o In Fall 2021, 16% are female (18% Fall 2020) and 38% are from an underrepresented minority (32% Fall 2020).
 - o The MCTR program is the only B.S. program at a public institution in Illinois and in most Midwest states.
- Both BME and MCTR Programs now offer a unique five-year accelerated B.S./M.S. degree pathway in partnership with Electrical Engineering, Industrial and Systems Engineering, and Mechanical Engineering, offering students the ability to further diversify their engineering educational experience beyond the undergraduate level.
- **Doctor of Philosophy in Electrical Engineering (ELE)** was launched in Fall 2020 and has 1 student as of Fall 2021.
- **Doctor of Philosophy in Industrial and Systems Engineering (ISYE)** was launched in Fall 2020 and has 2 students as of Fall 2021.
- **Doctor of Philosophy in Mechanical Engineering (MEE)** was launched in Fall 2020 and has 2 students as of Fall 2021.

INDUSTRY FELLOWS PROGRAM (IFP)

The IFP a unique opportunity for Ph.D. engineering candidates applying doctoral-level engineering solutions to contemporary industrial challenges at actual worksites. Fellows complete an industry-specific dissertation at actual worksites under the mentorship of industrial and academic mentors. From advanced design and application to manufacturing and supply chains, Fellows learn and execute skills, methods, and tools to accelerate cutting-edge, real-world innovation within industry.

- Based on the IFP, the Dean of CEET was invited to participate in the national Engineering Deans Institute (EDI) of the American Society of Engineering Education (ASEE) in 2019 to organize, present, and co-chair, a session on "*Graduate Student Training and Alternate Career Pathways*".

INDUSTRY-BASED M.S. DEGREES

Continuing to building on a decade long educational partnership with **Navistar**, two separate cohorts of 37 Navistar engineers received their M.S. degree in Mechanical Engineering in an M.S. program exclusively offered onsite at the company location in Naperville during the period of 2017 to 2021.

- A new cohort of 35 Navistar engineers will start their M.S. degree in Mechanical Engineering in Fall 2022.
- The program will be expanded to include an new M.S. program in Electrical Engineering with an inaugural cohort of 35 Navistar engineers starting in Spring 2022.



NIU ENGINEERING AT ROCK VALLEY COLLEGE (NIU@RVC)

Initiated in 2016, the **NIU@RVC program** is a collaboration between NIU, Rock Valley College, and Rockford industry partners to foster local engineering talent. Students take the first two years of courses at RVC and transition into courses taught by CEET faculty on the RVC campus. Industry partners offer scholarships, mentorship, internships, job opportunities, and connect students to professional experiences and networks to align them and industry for success.

- In 2017, The University Economic Development Association (UEDA) awarded the program and its collective partners the **Award of Excellence for Talent and Place Development** for this community-based, industry-integrated engineering program that marks a new level of collaboration between higher education and industry to address looming engineering talent shortages.



NIU & RVC

ENGINEERING OUR FUTURE
(be)tter together

PRECISION ADVISING

The CEET advising office provides an advising experience that is focused on facilitating successful engineering degree pathways and on overall student success, especially in support of the university's Strategic Enrollment Management (SEM) plan. The precision advising structure remains critical not only for the success of our students, but for our accreditation.

- In 2018, the CEET advising office was expanded from two Program Advisors to include a new **Director of Advising** and two additional **Program Advisors**, each specializing in supporting engineering and engineering technology students.
 - o Each Program Advisor works closely with freshman, sophomores, and transfer students until students reach their math milestone of a C or better in Math 230 (Calculus II) or, for Engineering Technology majors, earn a C or better in Math 155 (Trigonometry) and at least 60 credit hours toward their degree pathway.
 - o Each Program Advisor is dedicated to a particular engineering program to facilitate a more meaningful academic experience for students based on their selected major.
 - o Advisors help students navigate engineering degree requirements (e.g., complex prerequisite and co-requisite requirements), explore minors and alternative majors, assist with switching majors, and connect students to the university's academic, career, and student support resources.
 - o After milestones are reached, Advisors transition students to Faculty Advisors within their engineering degree program for upper-level course advising and discipline-specific mentorship and guidance.



CEET LEARNING CENTER

The CEET Learning Center is closely overseen by the CEET advising office and provides a positive learning environment that includes tutoring as well as group study. The Learning Center maintains dedicated space where students can get assistance from engineering student tutors and have a quiet place to study and/or work with study groups.

CEET ENGAGEMENT DAY

In Spring 2021, the college established Fridays as "Engagement Day" following a 4-day academic schedule with some lower division engineering courses and most upper division engineering courses offered on a two-day, (i.e., Monday-Wednesday or Tuesday-Thursday) schedule.

- Enhances the college's culture of engagement and allows students to: participate in research, pursue independent studies, other hands-on activities or augmented learning, work on design projects for design courses, work as an intern at a company one day a week during the semester.
- An important step towards equity and inclusion in the college as it provides "protected" time for engagement opportunities, especially for students who may find that course schedules, and/or evening and weekend responsibilities, present engagement challenges.

STUDENT ORGANIZATIONS

Student Organizations provide extracurricular support of student interests, social needs, and professional development.



15 Student Chapters of Professional Societies

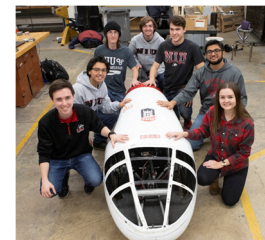
- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- American Society of Safety Professionals (ASSP)
- Biomedical Engineering Society (BMES)
- Engineering World Health (EWH) (*currently forming*)
- Engineers Without Borders
- Institute of Electrical and Electronics Engineers (IEEE)
- Institute of Industrial and Systems Engineering (IISE)
- Leadership in Energy and Environmental Design (LEED)
- National Society of Black Engineers (NSBE)
- Society of Automotive and Aerospace Engineers (SAE)
- Society of Hispanic Professional Engineers (SHPE)
- Society of Manufacturing Engineers (SME)
- Society of Plastics Engineers (SPE)
- Society of Women Engineers (SWE)

3 Engineering Honors Societies

- Alpha Pi Mu - American Honor Society for Industrial and Systems Engineering
- Eta Kappa Nu Kappa Delta - International Honor Society of the Institute of Electrical and Electronics Engineers
- Pi Tau Sigma - International Honor Society for Mechanical Engineering

7 Student Competition Teams

- Formula SAE Racing Team
- Mars Rover Team
- Baja SAE Team
- Robotics Club
- SAE Supermileage Team
- SAE Aero Design Team (*currently dormant*)
- SAE Clean Snowmobile Team (*currently dormant*)



Recent Success and Recognition

- **Robotics Team** recently placed 1st in the *Midwestern Robotics Design Competition* for two consecutive years.
- **SAE Supermileage** Team won the *Endurance Award*, placed 1st in the *Internal Combustion Engine Prototype Competition*, and finished 2nd overall in the *2019 International Competition*.
- The **Student Chapter of the Institute of Industrial and Systems Engineers** (IISE) earned the *National IISE Award for Most Innovative Chapter Event* in 2019 and was awarded the *2017 Chapter Recognition Gold Award*.

Fostering a Diverse, Experiential Environment

INTERDISCIPLINARY SENIOR DESIGN PROGRAM

The CEET capstone experience (a.k.a., senior design) is the pinnacle learning experience in an engineering student's undergraduate education and represents the hallmark of success for seniors. The senior design program was redesigned in 2018 to directly link and cross-integrate the Biomedical Engineering, Electrical Engineering, Mechanical Engineering, and Mechatronics Engineering programs to seamlessly promote industry-realistic, interdisciplinary student teams that partner with industry, other NIU colleges, and national laboratories to solve complex engineering design challenges. Under the mentorship of faculty and industry professionals, the experience students gain is comprehensive and reflects all aspects of engineering design and industry practice, including how professionals communicate ideas, how intellectual property impacts day-to-day engineering operations, and how ethics influences engineering decisions. Problem solving for open-ended, complex and, often, an incompletely defined system, is the ultimate challenge faced within this experience and, in its successful completion, the design is often viewed as a student's first professional achievement.

- The new approach to the Program has generated nearly \$500,000 in industry sponsorship, with the funding used to support the Program and to ensure that students are learning cutting-edge practices and are well prepared for future careers in research, industry, or as innovative entrepreneurs or practitioners. Funding has been used to create a new **CEET Senior Design Studio** with dedicated space for student teams to discover, create, innovate, and become an entrepreneur.
- The Program has not only placed many students in positions with its industry partners, but also brought more than \$700,000 to faculty in the form of new research contracts from industry, national laboratories, and, recently, an NSF DUE grant on enhancing design teamwork experiences in undergraduate engineering.



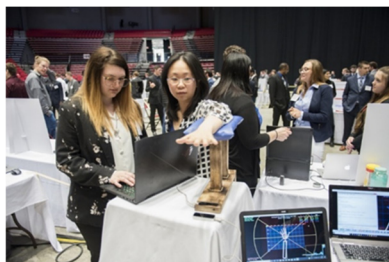
TRULY AN INTERDISCIPLINARY EXPERIENCE

The Interdisciplinary Senior Design Program continues to grow in its interdisciplinarity as it partners with other colleges and disciplines to embrace professionally-diverse influences and practices in developing successful solutions for clients and experiences for our students.

- **College of Visual and Performing Arts** - Students from the **School of Art and Design** have joined various teams over the past two years (and in this year) and brought significant industrial design enhancements to projects.
- **College of Business** - in 2020, a team of senior design students working on a medical device project for an entrepreneur collaborated with a team of business students from the **Experiential Learning Center** (ELC), who developed the business and marketing aspects device design for the client.
- Students in the COB **MBA Program** continue to work with some of our senior design projects to develop business and marketing strategies as a component in one of their MBA courses.

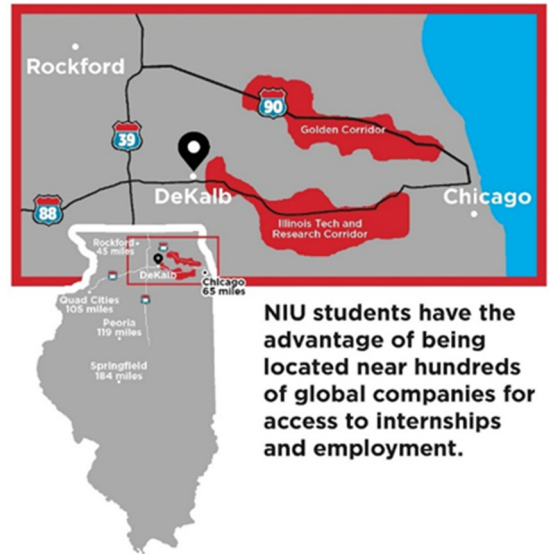
SENIOR DESIGN DEMONSTRATION DAY

The CEET Senior Design Program for all degree programs culminates in an expo-style event at the end of the academic year, which is open to the public to view and interact with the innovative projects and project teams. The Demo Day event is also used by the college as a recruitment exercise - for new students and for new industry partners. The inaugural Demo Day was held in May of 2019 at the NIU Convocation Center and saw over 400 students from three community colleges, four high schools, and two middle schools. Due to COVID implications, the Demo Days for 2020 and 2021 were held virtually and still provided the opportunity for many prospective students and company partners to visit with the project teams.



EXCLUSIVE JOB AND INTERNSHIP FAIRS AND CAREER SUPPORT

The college is committed to student success before and after graduation and provides many opportunities to connect students and graduates with employers who need their skills. Students have access to job search systems and other resources to jump-start their careers. The college holds job and internship fairs each Fall and Spring to bring employers together with CEET and students.

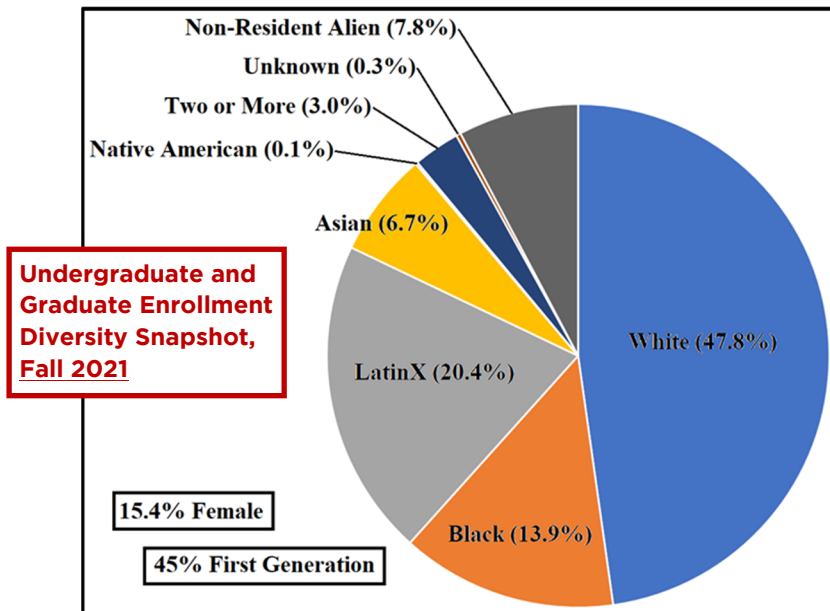


"NIU is a great pipeline for employees for Collins Aerospace. The quality of the students from NIU always continues to impress. As an alumnus of NIU, class of 1994, I have seen the investment in the CEET, which improves the quality of education of the students and prepares them for future success. NIU is a hidden gem in northern Illinois. I would encourage local industries to get involved with the CEET program at NIU. It provides a great pipeline of talented future employees."

- Chris Griffiths, Executive Director of Engineering, Collins Aerospace (2021)

ENROLLMENT DIVERSITY

In CEET, we recognize that our strength emerges from the diversity of our faculty, staff, and students. We know that when we bring together a variety of backgrounds, beliefs, opinions, and life experiences along with inter-disciplinary engineering knowledge and skills, we strive to coalesce the creativity required to solve the most complex challenges. CEET is proud of its growing diversity as the college is about access to engineering education and about reaching out to historically underserved populations to join the CEET community.



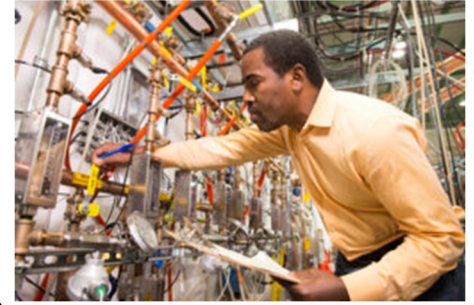
GROWTH IN DIVERSITY

- The snapshot for **Fall of 2020**, was:
 - 49.7% White
 - 14.6% Female
 - 11.8% Black
 - 18.6% LatinX
 - 7.2% Asian
 - 9.1% Non-resident Alien
 - 0.1% Native American
 - 3.4% Two or More
 - 0.2% Unknown

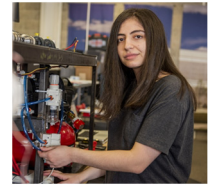
EDUCATIONAL PARTNERSHIPS

Educational Partnerships are essential for training the future engineering innovator. CEET continues to develop our portfolio of external partnerships that have overlap with many aspects of our college and align with aspects of our Strategic Plan. This partnership, and other like partnerships under development, is important to the College and highlights its ability as a respected engineering workforce provider and, with our growing diversity in the College, a diverse engineering workforce provider.

Fermi National Accelerator Laboratory ASPIRE Program - A partnership was recently developed between CEET, the Division of Research and Innovative Partnerships (RIPS), and Fermi National Accelerator Laboratory (FNAL) to create the FNAL ASPIRE (Accelerator Science Program to Increase Representation in Engineering) Program, which provides immersive learning experiences to B.S. and M.S. engineering students who are historically and contemporarily underrepresented in particle accelerator engineering, including Black, LatinX, Indigenous identities, and women. CEET is proud to be the initial partner with FNAL on this important initiative before the expansion to other Midwest engineering colleges.



Collins Aerospace - As a result of our strategy, Collins Aerospace recently committed to an annual contribution of \$50,000 to support the college's DEI programming, senior design, and discretionary funding. The partnership initiative will increase the level of engagement between the company and students while expanding the resources and career networking opportunities between Collins and NIU. The funding will support the college's student chapters of the National Society of Black Engineers (NSBE), the Society of Hispanic Professional Engineers (SHPE), and the Society for Women Engineers (SWE).



CEET ENGINEERING AND TECHNOLOGY ALUMNI SOCIETY (ETAS)

ETAS provides ways for CEET alumni to give back, build their networks, and stay connected after graduation, as well as offering opportunities to:

- Participate in the senior design programs,
- Mentor students in the Mentorship Program,
- Participate in peer mentoring with fellow alumni,
- Make connections at homecoming and other college and university events,
- Support scholarships and awards.

The ETAS Challenge Coin - The ETAS presents each CEET graduate with an engraved "challenge coin". The coin is a symbol of student accomplishment in CEET and represents an invitation to stay connected through ETAS. Over the past four years, the college worked closely with ETAS to increase the visibility of the coin and its message for new alumni to remain engaged with the college.



Innovative Research and Collaborative Links

CEET continues to strive to grow and maintain a productive and innovative research environment. In Fiscal Year 2021, the college experienced a significant increase in the research productivity of faculty serving as sole Principal Investigators (PI) - a **93% increase** compared to the four prior fiscal years. When considering faculty serving as PI or co-PI in awards with other NIU faculty, the college experienced a 95% increase (i.e., \$3.4M in FY21 compared to \$1.74M in FY20). Increases in research activity impacts our students at all levels - from undergraduate to graduate - by expanding experiential opportunities and training.

FY17	FY18	FY19	FY20	FY21	FY20 to FY21
\$1.04M	\$1.07M	\$1.00M	\$1.05M	\$2.03M	93% Increase

INTERNAL AND EXTERNAL PARTNERSHIPS

Internal and External Partnerships are key ingredient in the college's reinforcement of **collaborative links** and are another key ingredient for the success of our students and faculty.

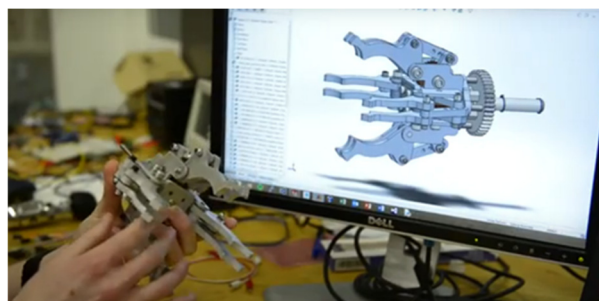
NICADD - In a close collaboration with Division of Research and Innovative Partnerships (RIPS), the college partnered with the Northern Illinois Center for Accelerator and Detector Development (NICADD) to create a transdisciplinary faculty position that bridges physics with engineering.

Hanover Research - In a close collaboration with Division of Research and Innovative Partnerships (RIPS), the college partnered with Hanover Research, a well-known firm dedicated to develop grantseeking capacity for many notable universities throughout the US. In this partnership, eight faculty recently received in-depth grantsmanship training, including structuring top-notch competitive proposals for federal or state agencies, foundations, or industry. Twelve proposals totaling \$4.87M were submitted to federal agencies. One recent outcome was a very prestigious NIH Early Career Award for Dr. Mohammad Moghimi, an Assistant Professor in Electrical Engineering, for his work entitled "Evaluation of Micro-Epidermal Actuators on Flexible Substrate for Noninvasive, Pediatric-Friendly Conductive Hearing Aid". Based on the initial success of this partnership, the college has renewed its contract with Hanover Research in Fall 2021 with eight more faculty now within the grantsmanship academy. Also based on CEET's initial success, the College of Education established a new partnership with Hanover in the Fall 2021.



APLU / NIST Pilot Grant Program - Another important external partnership is a result of a recent pilot grant received from APLU and NIST under their initiative to leverage universities to advance manufacturing innovation through the Manufacturing Extension Partnership (MEP) network. The MEP entity for the State of Illinois is the Illinois Manufacturing Excellence Center or IMEC. CEET partnered with IMEC on this pilot initiative to advance manufacturing innovation in Illinois by developing a framework to position small- to medium-sized manufacturers (SMMs) in the State to play a leading role in advancing Industry 4.0 technologies and practices, where Industry 4.0 is the ongoing automation of traditional manufacturing and industrial practices using smart technologies (e.g., IoT, AI, machine learning, cloud and edge computing, analytics, etc.). The Interdisciplinary Senior Design Program is a key element of this framework as student teams work with manufacturers directly to develop practical Industry 4.0 solutions for their manufacturing needs and environments, including the adoption and sustainability of the technologies by the small- to medium-size manufacturers. CEET is one of only three awarded for this pilot grant in the U.S.

NIU Engineering Senior Design and Sauk Valley Community College - Finding skilled engineers remains an ongoing challenge for Illinois manufacturers and labor shortages are expected to worsen through 2025. In 2021, a collaboration between CEET, Sauk Valley Community College (SVCC), and Whiteside County Economic Development (WCED) was formed to engage teams of senior engineering students to solve real-world challenges that manufacturers in Whiteside County are facing. The region's economic development organizations and higher education institutions hope to narrow the labor gap by leveraging the CEET multi-disciplinary Senior Design Program. With funding provided by SVCC and WCED, Bonnell Industries of Dixon, IL, was provided with \$5,000 toward the sponsorship a Senior Design project that supports an innovative short-term engineering project for the 62-year-old local manufacturer of snow removal trucks and road maintenance equipment. Students get a real-world engineering experience, while the manufacturer gets real-world engineering work accomplished and the opportunity to hire the students who worked for them on the project.



Advancement

ALUMNI CONNECTIONS

In the past two years, CEET connected with more than 100 alumni in collaboration with Foundation staff to qualify, cultivate, and solicit major gifts. In 2021 alone, more than 30 alumni in leadership positions at major manufacturers in Illinois and across the country were engaged about support and advancement of the college.

PLANNED GIVING

CEET recently obtained its largest planned gift (\$3.5M) in support of recruitment scholarships for high-achieving students into the college's programs.

NEW SCHOLARSHIPS

CEET has 17 scholarships that provide financial support to engineering students, with five new scholarships added and/or launched within the past four years.

- TD Scholarship
- Mullick Family Scholarship
- Kendrick Scholarship for Excellence in Engineering
- Earl Hansen Scholarship
- Carter Scholars Program
- ISYE International Student Scholarship



CORPORATE ENGAGEMENT

In 2021, created a new paradigm for corporate engagement within the college by defining industry needs and aligning the college's corporate engagement to these needs. The new paradigm involves matching CEET skills and services with company needs and providing a menu of options for companies to custom tailor their engagement with the college. One example of this approach has been recently executed with Collins Aerospace (see Educational Partnerships).

Challenges

Budget Resources - CEET has experienced substantial budget cuts since FY18 and, when compared to FY18, the FY22 budget has been reduced by 10% (or ~ \$750,000). Throughout the reductions, the college has worked to develop approaches to ensure that funds are used as strategically as is possible to minimize negative impacts on faculty and student success.

Human Resources - Limited resources have present a challenge in trying to sustain the level of faculty and staff present in the college in the Fall of 2017. Over the past four years, the college has endured the loss of eight faculty members, three instructors, and one chair due to retirements, resignations, and untimely passings and, to date, these positions have not been refilled. Departments and faculty have done an outstanding job minimizing any adverse impacts on our student experience and ultimate success. In addition, the college also lost staff members due to retirements and resignations. Without an ability to fill all vacancies, the college responded by shifting some existing staff positions into roles that optimized the workload distribution and administrative support for the college units. Like faculty, the remaining staff have also done an outstanding job in providing support to our faculty, students, and programs.

A Recent Decline in Overall Enrollment - The college has experienced a decline in undergraduate and graduate enrollment since Fall of 2017. While a lack of adequate math and physics readiness adversely impacts enrollment management at the undergraduate level, unavailability of financial support, especially in a midst of a global pandemic, undermines international student recruitment at the graduate level. The decline in undergraduate enrollment is also partially an outcome of an increase in the four-year, five-year, and six-year graduation rates for undergraduate students, which is indicative of the positive impact the CEET Advising Office has made. The four-year graduation rate is up 42% from 2013 and 70% from 2010, while the five-year rate is up 18% from 2012 and 43% from 2010 and the six-year rate is up 56% from 2011 and 2010. Additionally over the past four fiscal years (i.e., FY18-FY21), the total number of degrees awarded in CEET was 1,366 with a four-year average of 334 (sd of 30.3). This is an increase compared to the previous four fiscal years (i.e., FY14-FY17), where the total number of degrees awarded was 1,040 with a four-year average of 260 (sd of 41). Enrollment is anticipated to stabilize and increase with the efforts of CEET Outreach and Marketing started in FY20 (see Outreach, Marketing, and Communications).

Revenue Generation - The college and college units must continue to develop initiatives that will generate new sources of revenue to support and sustain programs, such as resources generated from sustained research and contracts, sponsorship of the Senior Design Programs, the Lean Six Sigma workshops offered by the Department of Industrial and Systems Engineering, deeper corporate engagement and partnerships, etc.

Looking Ahead

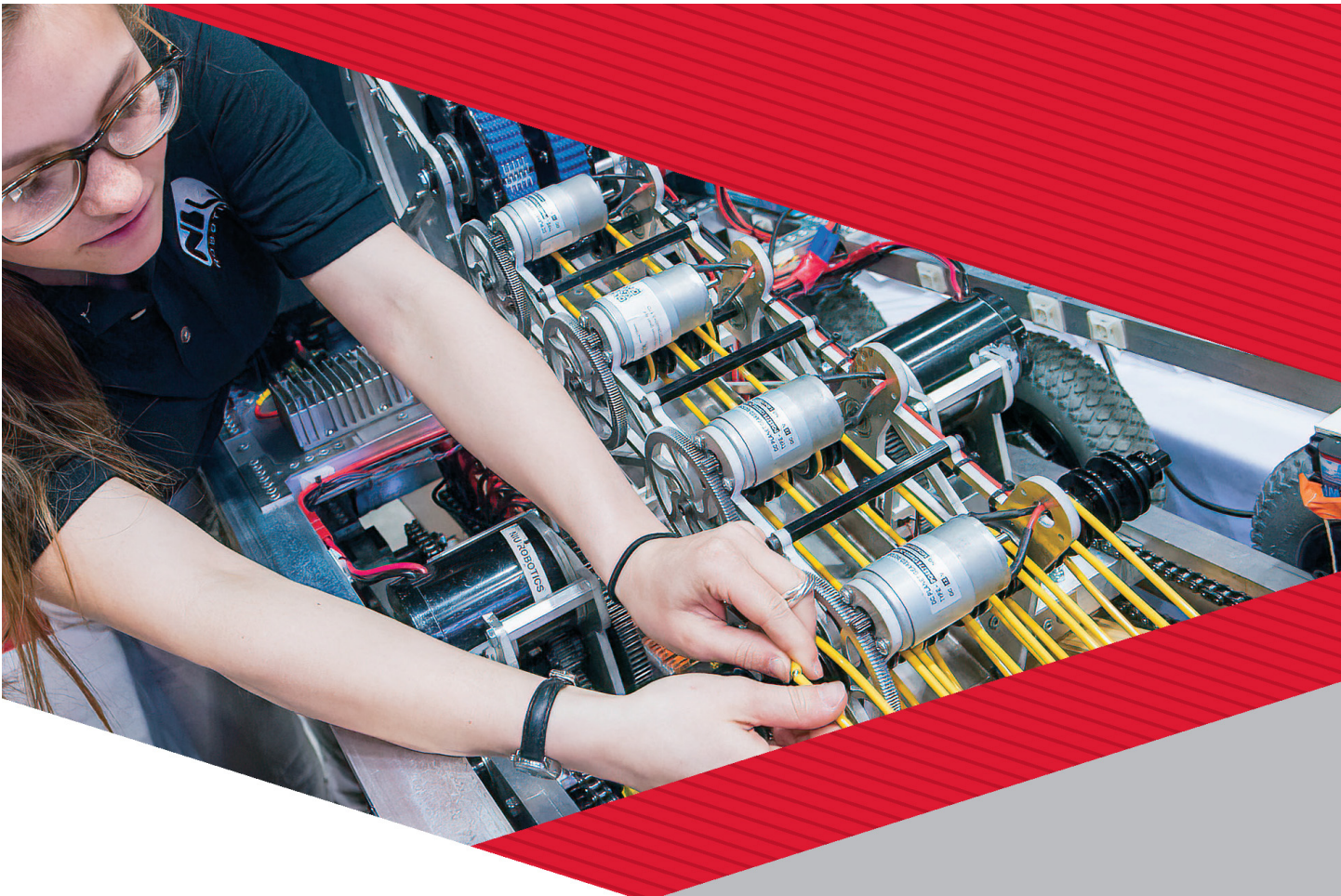
The new Strategic Plan highlights three Priority areas for us to target as the college advances into the next several years.

- Under the **first priority**, we will foster an educational environment that promotes diverse experiential learning, with the goal of creating an innovative educational environment that promotes success unique to each incoming student by offering a flexible curriculum with solid foundational coursework, an industry-supported innovation center, a variety of co-curricular programming and external activities, and state-of-the-art laboratories, classrooms, and technologies.
- Under the **second priority**, we will enhance and continue to support relevant and innovative research through scholarly activity, with the goal of increasing the research and scholarly productivity of our faculty and students.
- Under the **third priority**, we will reinforce, and continue to create, our collaborative links with the industry and the community, with the goal of fostering collaboration with industry, alumni, and communities - for students and faculty to engage actively in opportunities to advance learning, professional preparedness, and research and development.

We continue to engage in curricular initiatives as we strive to provide access to engineering education and access to experiential learning opportunities for every student. Some of the aspects that we will continue to target include:

- Working to **close equity gaps** by building multicultural competence in faculty and instructors to be culturally responsive and by a thoughtful review of our materials and activities that form the basis of our instruction, including how and why gaps may exist and what we may do to overcome them.
- Working to make the **pedagogical practices** of faculty and instructors more effective and impactful, as well as working to enhance the mentoring that is available to them. This involves identifying and developing tool sets for their access and implementation, the use of workshops, workgroups, and skill-building exercises, and facilitating a mentoring program that makes accomplished mentors from within the university, as well as from other institutions, accessible to our faculty and instructors.
- Enhance our **student engagement and empowerment** as we continue to work to facilitate a community of belonging in engineering.
 - As an example, we continue to work closely with our student affinity groups (NSBE, SHPE, SWE), who formed a student-led diversity committee and are passionate about advancing the awareness and mentorship of students, faculty, and staff. They have outlined a series of "TED"-like talks from regional and national figures on various topics (from particular topics in engineering, to topics on DEI in engineering) that they will host on campus and will make these talks available campus-wide. These students are also very passionate about playing a significant role in increasing the number of women and students of color in their college and at their university. They are executing a plan to engage prospective students from regional high schools and middle schools and from their high school or community college alma maters. In addition, they have identified social and cross-cultural networking and engagement events such as the Cultural Ball (formerly the Diversity Ball), where students from many cultures and experiences will come together for an evening of community and socializing, and Culture Nights, which will be a monthly event where students can share their culture's food and traditions.





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