

UConn | SCHOOL OF ENGINEERING

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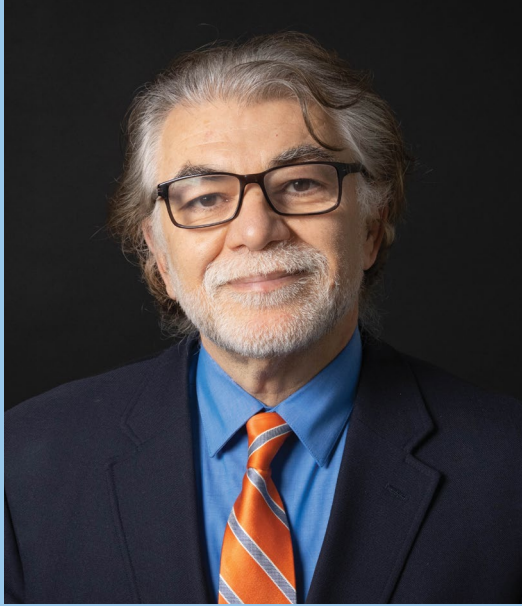
UConn School of Engineering Annual Report 2022-2023

The University of Connecticut (UConn) School of Engineering (SoE) Annual Report is produced by the Engineering Communications Team based on information provided by the deans, department heads, unit directors, and support staff. Special thanks to the SoE Communications, research development, and administrative team members that helped put the final report together.

On the cover: UConn Formula SAE is a student run organization with the goal of designing, manufacturing, and racing a Formula-Style car competitively. UConn Formula SAE offers its members a real world engineering and business management experience. Each component of the car is designed and assembled by students. Photo by Benjamin Starr.

uconncontact.uconn.edu/organization/uconnfsae

MESSAGE FROM THE DEAN



Kazem Kazerounian
DEAN

As I write this message, I am starting my final year as the dean of the SoE. Next August I will finish my second 5-year term as the dean (after 12 years) and it is with mixed feelings that I have decided to transition back to my faculty role and not seek another term as the dean. Yet, as I look ahead to the next 12 months, it promises to be one of the most productive years of my tenure. On the institutional front, both the University leadership and the Board of Trustees are in receipt of our proposal to elevate the School to College status. Simultaneously, we are in the process of the formation of at least two new research centers in the School. You can expect to learn more details from me about these changes in the coming weeks and months. Finally, I will embark on a nationwide tour to visit with friends and alumni of the School one last time as dean. This will be an opportunity to provide updates on the state of the School, as well as share the exciting future plans with everyone. So, you may find me knocking on your door one of these days.

Within the SoE, above all else, we remain committed to our students. Our Vergnano Institute for Inclusion continues to make inroads in offering a welcoming environment for incoming and current students. Our industry partners also realize the benefit of a diverse and inclusive university. Our development team ushered in diversity, equity and inclusion scholarships from Cigna and Belimo. More than 25 students will be supported with financial assistance totaling \$1 million. Within the School, our undergraduate team continues to invest the support needed in young engineers to solidly launch their college experience. Our teaching faculty continue to be creative and efficient, bringing the School to a precipice of immense growth. We are poised, and hopeful, for increased investment from the university. Our departments are seeing unparalleled growth within the higher education industry. For example, our Computer Science and Engineering enrollment has more than quadrupled in the last 10 years. In fact, our total enrollment has grown over 83 percent since the beginning of the Next Generation state initiative. Enrollment for the Fall 2022 semester totaled 3,541. We have increased partnerships with the School of Business, the College of

continued on next page



Liberal Arts and Sciences, the Neag School of Education, the School of Fine Arts and other interdisciplinary units. The impact does not end at commencement; our School educates over half of Connecticut's engineers.

Our research faculty top \$71 million in total research expenditures this year. The average research expenditure per faculty member approaches \$.5 million. Top research awards this year included nearly \$10 million for the Connecticut Transportation Safety Research Center's strategic plan, sponsored by the Department of Transportation and the Federal Highway Association. Our National Institute for Undersea Vehicle Technology secured another \$3.7 million for current and future vehicle research. As you will see in this report, our research and teaching faculty are innovators and entrepreneurs eager to make change. This path has not been without obstacles, however, and we still see continued challenges such as a lack of growth in faculty and staff populations. Our graduate student applications have decreased, likely still as a consequence of the coronavirus. But despite these challenges, we continue to think outside-the-box and rise triumphantly. The 2023-24 fiscal year budget process was a Herculean effort, and we thank the Board of Trustees for its commitment to employees' retirement expenses and student financial aid. We continue to advocate for our employees, as our planned growth and increased student support will not be possible without additional bench strength. And, finally, we remain committed to increasing our graduate student recruitment efforts, as our students continue to conduct industry-leading research for the greater good. As our winning men's basketball players know, we achieve when we work as a team. I am forever grateful for the support I feel from our faculty and staff, our advisory board, industry partners and my fellow deans. Throughout the University, our growth would not be possible without the support from our President Radenka Maric, the Provost and her staff, the Board of Trustees, and our talented partners across this institution.

I consider myself incredibly fortunate to serve as your Dean of the SoE for one final year. I am proud of everything our faculty, staff and students have accomplished in this past academic year. We move into the future with our heads held high, with a dream in mind and a plan to achieve it. Let us hold tight to our mission, move the School forward to new heights, and serve Connecticut's economy with diligence and determination.

Kazem Kazerounian
DEAN

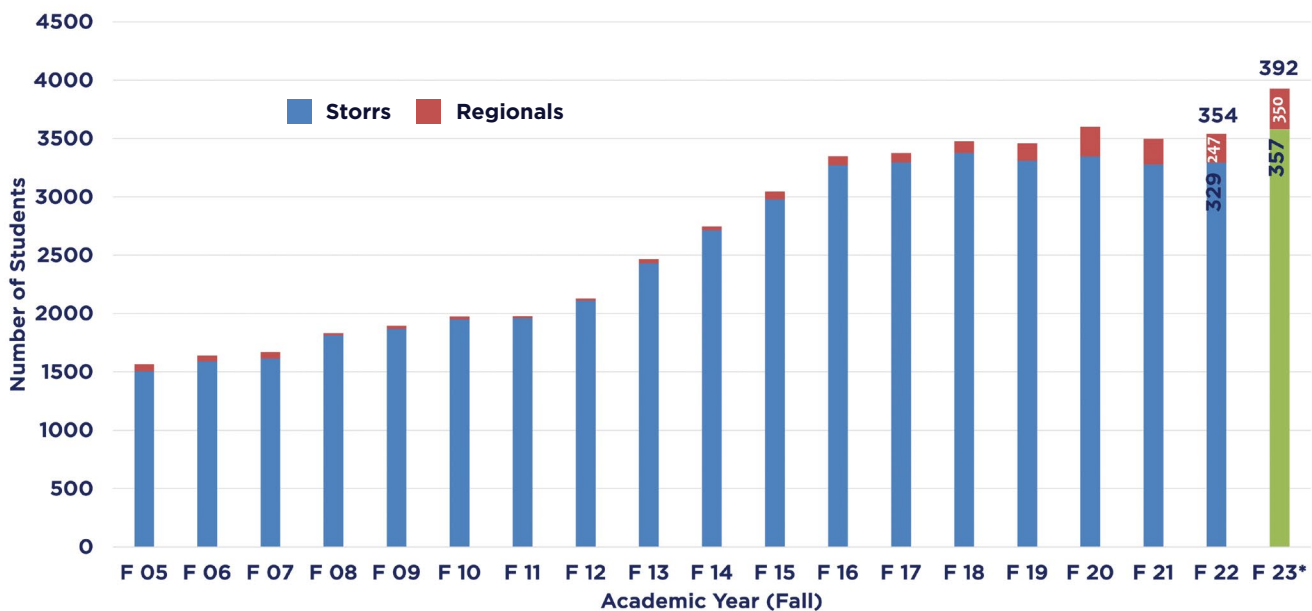
UNDERGRADUATE EDUCATION

Enrollment Growth

The ambitious targets mandated by the state's Next Generation CT legislation have driven significant growth at the SoE over the past decade. Enrollment has increased by more than 65% since 2012. The SoE continues to respond to the needs and demands of both our students as well as the state, adding three new majors over the past three years—Multidisciplinary Engineering (MDE) in 2021, Robotics Engineering in 2022, and now, Data Science and Engineering (DSE) beginning in 2023.

Enrollment for the Fall 2022 semester totaled 3,541, with 3,294 of those students at Storrs and 247 students at regional campuses. The quality of our students continues to rise. Admitted incoming freshmen had an average SAT score of 1355. Our Computer Science and Engineering Department has seen extraordinary demand and growth in the last three years. Growth across departments has not been uniform and SoE leadership is working to address the challenge of maintaining current enrollment levels and developing services and programs to enhance the student experience. To meet current enrollment demands, the SoE has been reallocating resources and encouraging department heads to collaborate with faculty at regional campuses and leverage opportunities to offer remote courses across campuses.

Total UG Enrollment: School of Engineering
Source: OIR/ASEE Survey & Registrar's Office



Engineering on Regional Campuses

Four-Year Computer Science Program at the Stamford Campus

The four-year Computer Science Program at the Stamford campus, launched in Fall 2017, offers students the ability to complete their entire four-year degree at the Stamford campus. The program continues to make the curriculum widely available to Connecticut's information technology sectors, including finance and insurance. Students can pursue the Software Design and Development concentration, Unspecialized concentration, in addition to the newly formalized Software Development for Mobile Computing concentration. With a significant jump in enrollment predicted for Fall 2023 - (Fall 2022 computing major admits were 45 students; Fall 2023 has 82 paid deposits) - SoE continues to make staffing at the Stamford campus a priority for AY2023-2024, including both faculty and advising resources.

UNDERGRADUATE EDUCATION

First-Year Engineering Curriculum at Regional Campuses

The SoE enrollment remains stable at the regional campuses. There continues to be a high demand for engineering at all four regional campuses, and the school continues to offer the first-year engineering curriculum at all of UConn's regional campuses. The partnership established with campus stakeholders enables the SoE to offer coursework beyond the first-year curriculum at regional campuses. The expansion of second-year engineering coursework, including a laboratory course, has allowed students to continue at their regional campus through their fourth semester for most majors. School leadership recognizes the need to align specific engineering programs at regional campuses while balancing the strategic goals and resource costs at those campuses and the SoE. As a particular highlight, this year, the Hartford campus in partnership with the SoE was awarded a \$2.8M federal award for "Community Computer Science Workshops" to expose local, in-need high school students to computer science. The Hartford campus ENGR 1166 instructor, Adrian Weidmann, also successfully held a First-Year Design Expo for Hartford campus students that paralleled the event held at the Storrs campus.

Regional Campus Support Network Initiative

Engineering faculty at regional campuses continue to offer more flipped classes and online lectures at regional campuses, increasing accessibility to students. At the annual regional campus engineering summit hosted by the SoE in summer 2022, campus partners gathered to assess programmatic needs and student outcomes to enhance the regional campus engineering experience. This includes a plan to expand the peer mentor program to regional campuses for Fall 2023.

Advising

Academic advising was recognized as a top strength in Engineering's most recent ABET accreditation evaluation. Faculty and staff advisors collaborate to welcome and orient new students to campus, help educate students about academic planning and policies, support students' holistic development, and mentor students about Engineering career pathways.

During the AY2022-2023, Engineering Advising continued to advance the President's student success mission in exciting ways. New student orientation activities resumed in-person operations for the first time since summer 2019 and the professional staff advising team welcomed students on their "Engineering Odyssey." The advising team also successfully increased our School's first-year retention rates utilizing new data dashboards created by the Provost's Office and ITS. Additionally, members of the team received an Undergraduate Mini-Grant Award to fund trainings and workshops for the Engineering Peer Mentors, who will soon support Engineering students at all regional campuses as well as Storrs. Funding was also secured to create an updated Engineering Advising website with helpful information, tools, and resources for students and faculty advisors. Finally, the advising team collaborated with UConn's Higher Education and Student Affairs (HESA) program to assess current support for campus change students and is implementing additional student support based on data-informed recommendations.



Hartford and Storrs Campuses First-Year Design Expo



UNDERGRADUATE EDUCATION

Multidisciplinary Engineering Degree

The Multidisciplinary Engineering (MDE) program welcomed its second cohort of students beginning Fall 2022, while also admitting the first group of internal admits to the program. The first graduating class is anticipated for spring 2024 with two students pursuing the Industrial Design specialization and two students pursuing an Individualized specialization. MDE is a degree path that enables students to work across fields in pursuit of a broadly-skilled engineering degree. Grounded in engineering fundamentals from multiple majors, MDE provides students with the flexibility to pair an engineering degree with other interests and majors at the University. Several joint programs with partners from around the University were formalized, allowing for area elective coursework to be selected by continuing students in a transparent manner.

MDE continues to offer four specializations with University partners; Industrial Design, Entertainment Engineering, Human Rights and Sustainability, and an Individualized specialization. A proposal process was established for students pursuing an Individualized specialization, which includes careful planning with a professional advisor and approval by the MDE faculty advisory board. This process ensures coursework is selected to promote a deep investigation of an area of study that will be meaningful for future career endeavors.

Additional opportunities for partnerships in MDE are being explored by the SoE with interested parties around the University.

International Engineering Program

The school's International Engineering Program offers an unparalleled experience for students looking to become global engineers. By spending a year abroad, students benefit from the combination of a strong engineering program and immersion into a foreign language and culture. This life-changing program prepares graduates for rewarding and diverse engineering careers around the world. The SoE is also home to a variety of international students seeking cross-cultural interactions with students of many nationalities and backgrounds. Typically, International Engineering students graduate within five years and earn two degrees – a B.S. in an engineering discipline and a B.A. in French (Technopole), German (EuroTech), or Spanish (ESP). With COVID-19 continuing to recede globally, the opportunity for programming abroad will continue to grow. In Fall 2023, the SoE will welcome guests from the Baden-Wuerttemberg – Connecticut Partnership, members of the German Consulate, as well as other institutional partners to celebrate the 30th anniversary of the EuroTech program.



DUAL DEGREE STUDENTS ABROAD

As part of the International Engineering Program, students spend a year in several countries, where they work for some of the largest brands in the world, including Bosch, Porsche, and Merck.

Dual degree students (Engineering/Language) studying abroad in France, Spain, and Germany for AY2022-2023:

5

France

1

Spain

3

Germany

UNDERGRADUATE EDUCATION

Engineering House Learning Community

Every year, the SoE invites approximately 100 first-year and 50 second-year students to join the Engineering House Learning Community (EHLC). EHLC is meant to provide a sense of community for students across engineering majors while offering specialized academic and experiential educational opportunities. First-year students engage in group and experiential learning projects, such as engineering and building modified pinewood derby cars, creating an informational interview packet with contacts in industry, and other activities at labs and other relevant sites on and off campus. Additionally, student leaders plan and run events to help students meet friends, navigate the University, and explore their majors. The EHLC student leadership team creates and modifies several on-going annual events and provides students with regular updates on daily and weekly activities taking place on campus and in the community.

EHLC sophomores participate in a program that introduces them to the year-long Senior Design process. In an observational role, students are paired with current Senior Design teams as interns to gain a better understanding of project design requirements, engineering design-builds, and how to work with industry partners. EHLC sophomores also participate in relevant design-process trainings, networking workshops, and presentations on resources and research methods. In Fall 2023, EHLC sophomores will engage in a year-long service-learning project through a nationally recognized program titled “Go Baby Go.” The project pairs engineering students with families of children who have physical challenges to design a modified toy ride-on car to provide low-tech power mobility for their child. The project will be supervised by student leaders in the learning community and staff members in the Office of Experiential Education.

Cornerstone Initiative: First-Year Experience and Design Lab

In Spring 2023, the ENGR 1166: Foundations of Engineering course was chosen as one of the inaugural classes to be taught in the new Science I active learning classroom to encourage students to participate in hands-on lecture activities and team-based projects.

BME Assistant Professor in Residence Fayekah Assanah, leads a multidisciplinary group of faculty who make up the core of the ENGR 1166 team. The instructional team partnered with the UConn Indoor Air Quality Initiative, a joint effort between the UConn School of Education, Engineering, Nursing, Medicine, and UConn Health, to successfully build more than 100 Corsi-Rosenthal Boxes (CR-Boxes). CR-Boxes are DIY, low-cost air filtration devices to offer accessible public health interventions to reduce the risk of COVID-19 and other respiratory diseases. Building these boxes in the Cornerstone Design Lab served as part of a service-learning project early in the semester for all 1166 students.

UConn regional campuses at Hartford and Avery Point also joined this effort. These boxes were donated to the Macdonough School in Middletown, CT for classroom use as well as Ojakian Commons in Simsbury, CT an independent apartment community for people with multiple sclerosis. Students in 1166 also worked on open-ended design projects in the Cornerstone Design Lab for the remainder of the semester. The students’ projects and posters were showcased at the First-Year Design Expo, held on April 28 in the Student Union Ballroom.



ENGR 1166: Foundations of Engineering



UNDERGRADUATE EDUCATION

Student Professional Development

Career fairs are a SoE staple and help our undergraduate students connect to internships with companies that expose them to the engineering workplace and help them develop professional skills. The Office of Experiential Education also hosted two workshops on personal branding this academic year, and have promoted various career-oriented events and workshops, including a regular drop-in program with the School's career development director. In addition, the SoE created a Career Readiness Checklist found under the Careers tab on <https://undergrad.engr.uconn.edu>.

Additional career development support is provided through the Cooperative Education (Co-op) and Senior Design programs. Co-ops offer an extended learning experience in industry beyond the traditional summer internship and often result in a job offer after graduation. The Co-op program caters to students who are seeking professional work experience while maintaining affiliation as a UConn student in lieu of taking traditional coursework for a semester or academic year. Senior Design is a program requiring graduating engineering students to complete a year-long design project, typically performed in teams of three to four students and in collaboration with an industry or government sponsor.

School of Engineering Majors and Exploring Engineering ACES Students AY2022-2023

Major	AVYPT	HRTFD	STMFD	STORRS	WTBY	TOTAL	2 nd Majors
Biomedical Engineering	1	0	2	373	1	377	
Biomedical Engineering (2nd Major)	0	0	0	1	0	1	1
Chemical Engineering	1	1	3	224	3	232	
Chemical Engineering (2nd Major)	0	0	0	2	0	2	2
Civil Engineering	1	1	11	260	8	281	
Civil Engineering (2nd Major)	0	0	0	7	0	7	7
Computer Engineering	0	0	9	72	1	82	
Computer Engineering (2nd Major)	0	0	0	10	0	10	10
Computer Science	2	0	99	697	8	806	
Computer Science (2nd Major)	0	0	0	2	0	2	2
Computer Science and Engineering	2	0	15	321	5	343	
Comp. Sci. & Engineering (2nd Major)	0	0	0	2	0	2	2
Electrical Engineering	5	1	10	220	7	243	
Electrical Engineering (2nd Major)	0	0	0	10	0	10	10
Engineering Physics	0	0	1	32	0	33	
Environmental Engineering	1	0	2	107	1	111	
Management and Engineering for Manufacturing	0	0	3	133	4	140	
Materials Science and Engineering	0	0	1	68	0	69	
Materials Sci. & Eng. (2nd Major)	0	0	0	2	0	2	2
Mechanical Engineering	11	3	10	710	6	740	
Mechanical Engineering (2nd Major)	0	0	0	5	0	5	5
Multidisciplinary Engineering	1	0	2	39	1	43	
Robotics Engineering	0	0	1	10	0	11	
Undecided	0	0	2	22	0	24	
TOTALS	25	6	171	3329	45	3576	41
TOTALS Without 2nd Majors	25	6	171	3294	45	3541	
MAJOR	AVYPT	HRTFD	STMFD	STORRS	WTBY	TOTAL	
Exploring Engineering (ACES)	1	8	8	175	63	255	

GRADUATE EDUCATION

Overview

Graduate education is at the heart of nearly everything we do at the SoE. Graduate students directly perform much of the research work that leads to new discoveries and innovation; graduate students are also directly involved in undergraduate education, community engagement, and mentoring life-transformative educational experiences. Our graduate students come from across the country and world and embody the full range of diversity including racial, ethnic, cultural, neuro, sex, gender, LGBTQ+, and intersectional dimensions. Our graduate students have led our school in responding to racial injustice and changing the way we recruit, support, and celebrate diversity in our community to advance equity and inclusion in our educational, research, and outreach mission.

In support of our remarkable graduate students, the SoE continues to invest in a variety of initiatives to grow and improve the number, quality, and diversity of our student population and to enhance the training, support, experience, and outcomes for our graduate students to ensure they will thrive in a variety of settings including academia and industry. Leading initiatives for M.S. and Ph.D. students in AY2022-2023 are a team of dedicated faculty and staff including the graduate directors of all the departments and programs as well as Professor and Associate Dean for Research and Graduate Education Leslie Shor; Associate Professor and Director of Graduate Studies Xinyu Zhao; Director of Graduate Outreach and Diversity Aida Ghiaei; and Program Assistant for Engineering Graduate Programs Nusaybah Quasem.

Major Initiatives

Recruitment Initiatives

In the past few years, we emphasized diversity in our recruiting efforts in part by steadily building our presence at regional and national events hosted by diversity-serving engineering organizations for black (NSBE), Chicano and native American (SACNAS), Hispanic (SHPE), female (SWE), and LGBTQ+ (o-STEM) students. In Fall 2022, we participated in recruiting events at the GEM (Getting Ready for Advanced Degrees) consortium annual conference in Arizona. GEM consortium is a unique and powerful connection to a national network of universities and employers (corporations and national laboratories). GEM connects highly-qualified students from underrepresented groups to STEM graduate programs with much-needed financial support that is often the deciding factor in pursuing graduate education.

In the Spring 2023, a team consisting of Aida Ghiaei, Assistant Research Professor in Civil and Environmental Engineering Davis Chacon-Hurtado, and Ph.D. Candidate in Material Science and Engineering Luis Ortiz, had the opportunity to visit several universities and present about the graduate programs and current research positions available at UConn. The visits included the University of Puerto Rico Mayaguez, the University of Puerto Rico Humacao, the University of Ana G. Mendes Gurabo, and the Polytechnic University of Puerto Rico. During the trip, the team participated in a job fair held at the University of Puerto Rico Mayaguez, where they had the chance to engage with faculty and students and share information about UConn's graduate programs and research opportunities. The trip was successful in initiating new collaborations among faculty members and increasing awareness among students who applied for summer research positions at UConn. Additionally, a few students who applied and were admitted to start their Ph.D. programs at UConn in Fall 2023 learned about our programs through our presentations. Overall, the trip provided an excellent opportunity to not only promote UConn's graduate programs and research opportunities, but to establish new connections and network with peers at other universities.

GRADUATE EDUCATION

Fellowships to Offset the Cost of Graduate Assistantships

In the past few years, we focused on developing philanthropic-based graduate fellowships or training grant fellowships to offset the cost of graduate education for tuition-paying graduate students or for principal investigators. In total, 37 students earned GE fellowships and 3 students earned GEM fellowships. (Our students receive many other fellowships directly not reported here.)

Student Transition and Wellness

We continue to improve graduate students' experience and wellness by fostering community building following the COVID-19 pandemic. At the beginning of both the fall and spring semesters, the SoE hosted ice cream socials to welcome new and returning graduate students to campus. Both social events were attended by more than 100 students and have become a popular experience. A summer institute for international students was hosted in June 2022, which aimed to ease the transition of international students into American life. Two to three webinars were held monthly and all newly admitted students were invited. Mostly international students attended the webinars to get prepared for their life in the U.S. and UConn. A one-credit first-year experience class was taught in Fall 2022 and Spring 2023, open to both international and domestic graduate students, to further facilitate the transition into their graduate life. Ten students registered in Fall 2022 and another 10 students registered in the Fall 2023 session.



GE FELLOWSHIP

For the AY2022-2023, we continued to improve the GE Fellowship terms after the complete renovation in AY2021-2022. We continued to solicit the fellowship nomination in the following three categories: the Next-Gen Scholar, Inclusion and Equity, and GE Excellence, to expand our outreach for talented prospective Ph.D. candidates and recognize excellence of current graduate students. The goal of the reformed GE Fellowship program is to entice outstanding students, to establish long-term recruiting relationships with underrepresented institutions (HBCUs, HSIs, international institutions that are less represented), to recognize exceptional service to the department, school, university, and professional societies, and to prevent premature leave of excellent graduate students without completing their degree. Faculty advisors can nominate one student for each of the first two categories and students self-nominate themselves for the last. For AY2023-2024, the committee awarded 13 Next Gen, eight Inclusion and Equity, and 16 Excellence awards, which is a further expansion from last year's awards.

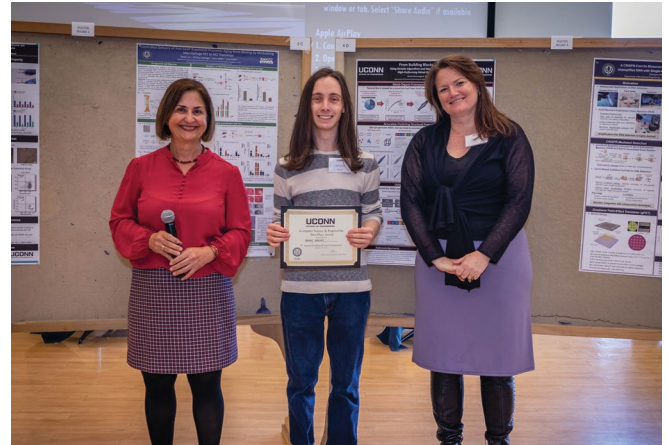
GRADUATE EDUCATION

Challenges

Recruiting: In May 2022, we instrumented a survey to assess the general situation of graduate recruiting in the School. Every SoE department participated in this survey, with their consensus answers provided by their respective graduate directors. The survey indicated that quality of Ph.D. students as well as funding resources (especially unrestricted funding such as TA lines that can help mitigate recruiting uncertainty) are two critical factors that limit the growth of the research programs within SoE. In particular, the consensus is that the ranking of UConn as a university, followed by the ranking of the individual department and reputation of faculty members, plays an important role in attracting quality graduate students, which urgently needs the leadership's attention and continuous effort. In the short-term, digital marketing is highly recommended by most departments as a remedy to reach the audience that are not aware of UConn's strong research presence. Word of mouth and maintaining a strong relation with institutions that have a history of sending graduate students to us have also seen success. Lastly, recruiting our own undergraduate students is recommended as an effective recruiting strategy. This recruiting route also helps alleviate our urgent need of domestic students for participating International Traffic in Arms Regulations (ITAR) and export-controlled research.

The SoE community has diverse needs and priorities in terms of graduate recruiting. For example, strong international students are usually preferred when export control and ITAR are not involved, while strong domestic students are urgently needed by national security related programs. Different initiatives are required to improve recruitment within the two groups. The Deanery team will prioritize digital marketing in 2023, while continually working at existing initiatives targeting our own undergraduate students and other diverse student groups.

Professional Skills: One of the persistent challenges facing our graduating M.S. and Ph.D. students is that they struggle to keep pace with the increasing emphasis placed by employers on leadership, interpersonal, and communication skills. SoE has undertaken major initiatives focused on addressing these challenges, as described on the following page.



GRADUATE POSTER COMPETITION

Blake Gaines (middle), competition winner from Computer Science and Engineering, posed with Aida Ghiaei (left) and Leslie Shor (right) during SAGE poster competition in March 2023.

Capping off our recruiting season was the SoE visitation event. This year, we combined our graduate visitation event with our annual poster competition where 100 posters were presented across engineering disciplines. This provided an incredible opportunity for prospective students to become engaged with current graduate students, ask questions and see the dynamics first-hand. We received very positive feedback from all attendees and will continue this format in the future.

GRADUATE EDUCATION

Professional Skills Course Series

For AY2022-2023, we offered a variety of professional development courses and workshops. In Fall 2022, 13 students enrolled in ENGR 5410: Scientific Communications. Through this course, students learned about important presentation skills and how to effectively communicate their research to a variety of audiences on various platforms. This course was led by Assistant Professor in Residence in the BME department Fayekah Assanah.

A cohort of 17 students also enrolled in the ENGR 5420: Engineering Internships and Careers in Industry course. Students were taught about personal branding, effective resume design, and learned the skills to identify and apply for industry internship positions or fellowship opportunities in national labs. Through this course, students had the opportunity to meet and work with guest lecturers across UConn, from the Office of the National Scholarships and Fellowships, the Center for Career Development, and the International Student and Scholar Services. This course was organized and taught by a collective effort between Fayekah Assanah; Aida Ghiaei, director of graduate outreach and diversity; Theodore Menounos, assistant director of career readiness competencies; and Nusaybah Quasem, SoE program assistant for graduate programs.

In ENGR 5300: First-Year Experience, led by Aida Ghiaei, students enrolled to learn about the support and opportunities UConn provides for students to thrive academically and personally. This course was offered in fall and spring, and 10 students registered for this class each semester. Currently, the team is planning the transition of the ENGR 5300 course as a permanent course.

In the Spring 2023 semester, eight students enrolled in the ENGR 5430: Teaching Engineering-Communication and Pedagogy course led by Fayekah Assanah. In this class, students learned the skills to design and develop a course. This course is also approved by the Graduate Certificate in College Instruction (GCCCI) as an elective for their program. We also offered two workshops: 1) Effective Negotiation for Women Graduate Students in STEM to teach students how to get to a “yes” during negotiations in everyday life, and 2) SoE 3MT to offer hands-on practice for students to compete in the 3MT Competition. All these courses are part of a series of permanent courses offered continually to engineering graduate students. We also developed a website showcasing all these courses: <https://s.uconn.edu/engr-professional-development> for details and student access to register.

JULIAN NORATO

In April 2023, Julian Norato, associate professor of mechanical engineering and director of graduate studies, facilitated a gathering at the SoE with students and faculty from Universidad Nacional de Colombia (UNAL), including their dean of engineering Maria Alejandra Guzmán Pardo. They were invited to have high-level communication with the SoE



leadership team and interacted with faculty of Colombian origin. We identified three viable ways of collaboration, including exploration of student mobility and internship opportunities for Engineering Spanish Program students, exploration of faculty-led study abroad

opportunities, and establishment of mutually beneficial collaborative areas of research and field work between departments and individual faculty members. The Office of Global Affairs quickly drafted an agreement of collaboration following their visit to facilitate further interactions. This successful interaction is one of the first steps towards our strategic target of enticing quality students from South America.

GRADUATE EDUCATION

Collaboration with Local Industrial Partners

Connecticut is home to many aerospace companies. Extraordinary demand and high wages for talented engineers is diverting young talent into the marketplace and away from both higher-level degrees and advanced aerospace research. Meanwhile, local industrial partners, such as Raytheon Technologies Research Center (RTRC), need a steady stream of Ph.D. students qualified to work on export-controlled research and other Department of Defense projects. During AY2022-2023, a proposal to establish “The Security Scholars Program” has been discussed and drafted. The goal is to recruit and educate Ph.D. students with expertise tailored for RTRC, Pratt & Whitney, Collins Aerospace, and General Dynamics Electric Boat that leverages UConn SoE’s existing pool of students and attracts additional talent from schools around the country. Once agreed upon, we expect the scholarship program to mutually benefit both UConn and our local industrial partners in terms of research collaboration, talent retention and recruitment.

Student Demographics

881	Graduate students
257	Female
410	International

Degrees Conferred AY2022-2023

51	MEng
132	M.S.
64	Ph.D.

Student Support

268	Research Assistantships (RA)
78	Teaching Assistantships (TA)
267	Graduate Fellowships
103	Half RA and Half TA



GRADUATE STUDENT ICE CREAM SOCIAL

Social events are held throughout the year to help students engage with each other and the campus.

CENTER FOR ADVANCED ENGINEERING EDUCATION

Center for Advanced Engineering Education (Formerly Professional Education)

Formerly known as the Professional Education Program, there has been steady growth and continuous implementation of diverse programmatic offerings. With bandwidth having been in alignment with a UConn center, the program is now the Center for Advanced Engineering Education (CAEE).

Delivering credit and non-credit programs, CAEE encompasses interactive and flexible programming offered in a wide variety of delivery modalities allowing balance that makes it possible for working professionals to achieve career goals. Depending on what educational advancement path a student is following, they have the option to be online synchronous, asynchronous, or in person. Taught by SoE faculty and key industry experts, CAEE programs are designed to help individuals and industry partners gain the knowledge and skills to master technical and business challenges.

Community Demographics

Our student base consists of individuals seeking educational advancement (credit or non-credit options available) or industry partnerships designed to deliver customized educational advancement (credit or non-credit options available) to a designated group of employees.

Given the variety of programming and flexible delivery modalities, we support a diverse student demographic:

- Graduate students seeking a Master of Engineering degree or Graduate Engineering Certificate
- Industry students and corporate partners who wish to expand their knowledge base to benefit their careers and businesses
- Non-degree seeking students interested in advancing their knowledge of specific engineering subjects and/or wanting to get a sense of a graduate course load before applying by taking a class
- International students interested in the flexibility of virtual learning that enables them to keep working full or part-time
- Industry partners with specific employee educational and knowledge-based needs
- Professionals seeking non-credit opportunities looking to upskill, apply knowledge at work and advance their careers

Strategy

During the AY2022-2023, CAEE team engaged in the following strategic activities supporting the center's growth and revenue generation trajectory:

- Regular advisory board meetings, consisting of members from the following organizations: Carrier University, Eversource Energy, GE Vernova-Steam Power Americas, General Dynamics Electric Boat, Langan Engineering & Environmental Services, Lockheed Martin, Medtronic, Mokavia Aerospace, Pfizer, Inc., Pratt & Whitney, The Bromford Group, and Unilever
- Extensive digital presence through social media marketing and continual expansion of online course offerings (66 online courses have been developed to date). Webinars, email campaigns, consistent LinkedIn engagement, newsletters, career fairs, virtual and in-person networking sessions, open house activities, and virtual and in-person lunch and learn sessions were executed to attract industry participants
- Ensuring excellence in curriculum through a collaborative partnership with the Center of Excellence for Teaching and Learning (CETL) with program support and in the development of new programs
- Ongoing collaboration directly with the SoE departments, career services, development team, alumni relations, Senior Design leadership, the Innovation Partnership Building (IPB) business development manager, as well as UConn colleagues in other schools and colleges, to build industry partnerships

CENTER FOR ADVANCED ENGINEERING EDUCATION

Strategy (continued)

- 2023 *U.S. News & World Report* rank improvement moving from 47th to 37th in Best Online Master's in Engineering Program
- Hired a full-time Program Director (Winter 2022) to aid in the expansion of the Center's programming
- Hired a Business Development Officer (Spring 2022) to aid in the promotion of the Center's programs to industry partners
- The launch of the Excellence in Engineering Communication Program (EEC), partnering with University resources to address the needs of industry

Programs

- Master of Engineering (MENG) Degree
- Advanced Graduate Engineering Certificates
- Graduate Courses (Non-Degree)
- Industry Programs and Trainings (Non-Credit)
- Bootcamps through UConn/EdX partnership (Non-Credit)
- Excellence in Engineering Communication Program (Non-Credit)

Graduate Program Offerings (Credit-based)

Master of Engineering Concentrations

- Advanced Manufacturing for Energy Systems
- Advanced Systems Engineering
- Biomedical Engineering (Clinical Engineering and Biomechanics Engineering)
- Chemical Engineering
- Civil Engineering (Structural Engineering)
- Computer Science and Engineering
- Data Science
- Electrical and Computer Engineering
- Environmental Engineering
- General Engineering
- Manufacturing Engineering
- Materials Science and Engineering
- Mechanical Engineering (Systems, Mechanical, Thermal, and Fluid Sciences)

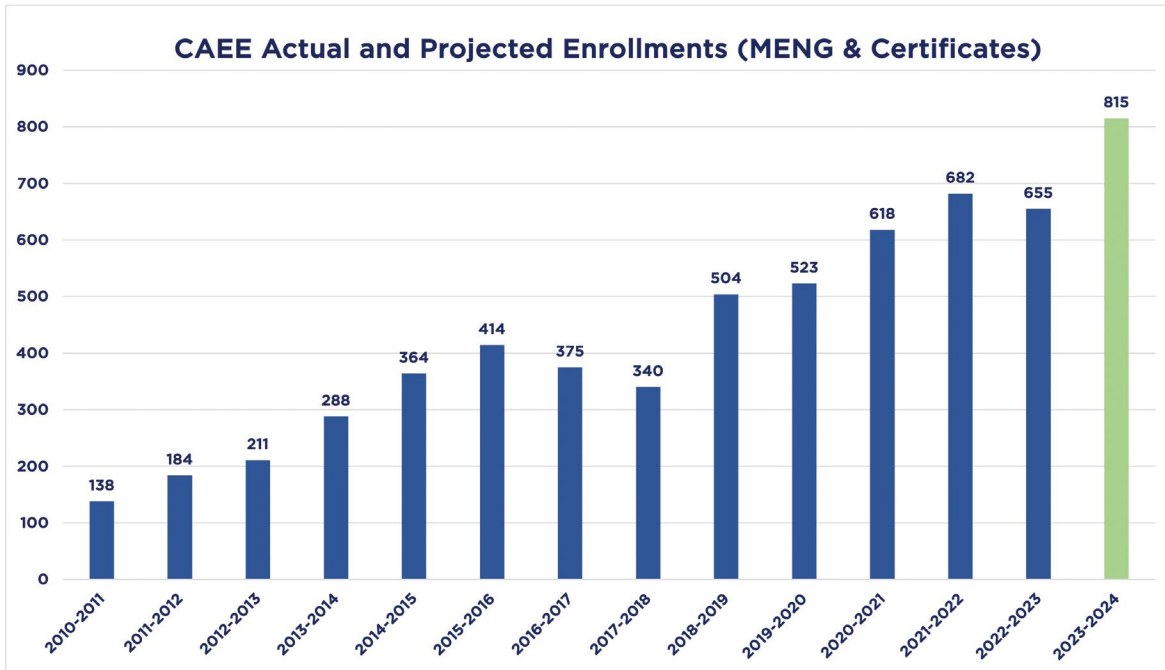
Advanced Graduate Engineering Certificates

- Advanced Materials Characterization
- Advanced Systems Engineering
- Bridge Engineering
- Composites
- Contaminated Site Remediation
- Engineering Data Science
- Oceanographic Science and Technology
- Power Engineering
- Power Grid Modernization
- Process Engineering

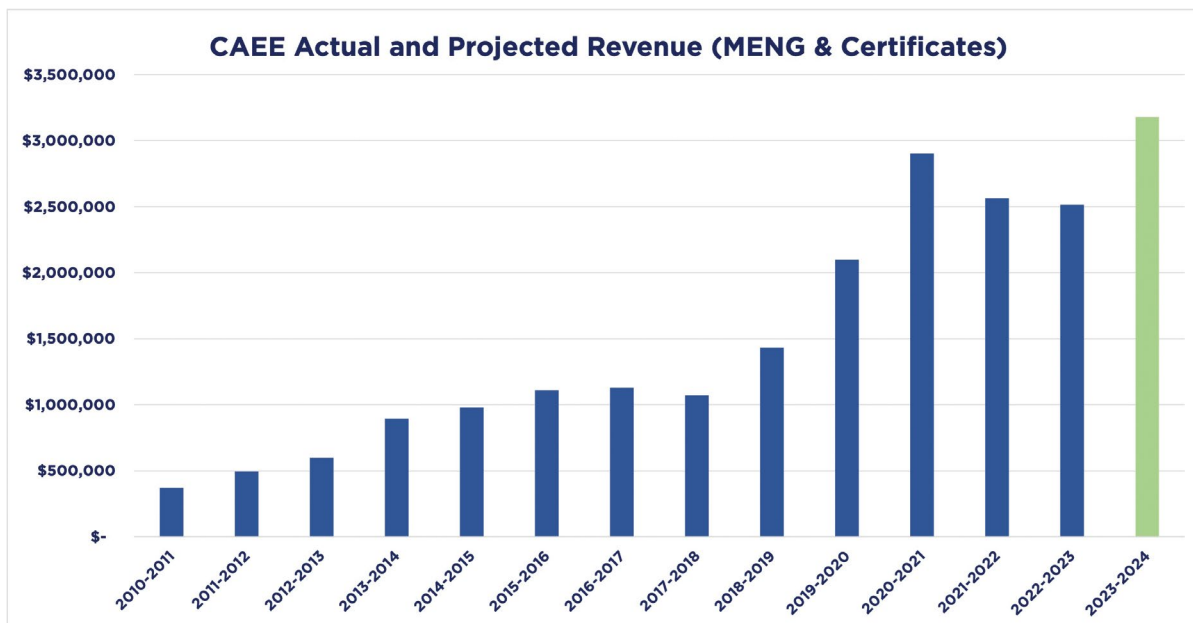
CENTER FOR ADVANCED ENGINEERING EDUCATION

Enrollment and Revenue for MENG and Certificates (Credit Programs)

As a result of these efforts and according to preliminary registration data, enrollment for the CAEE is projected to increase continuously during AY2023-2024, as follows:



Revenues for the CAEE are expected to continuously increase during AY2023-2024, as follows:



CENTER FOR ADVANCED ENGINEERING EDUCATION

International Partnerships (Credit-Based Programs)

In partnership with UConn's Office of Global Affairs and Anglo Educational Services (AES), CAEE launched a Master of Engineering (MENG) program offering students from around the world the opportunity to choose from a concentration in either Data Science or Advanced Systems Engineering. Students will have the opportunity to complete their degree online while participating in a London-based paid internship matched with an industry partner best suited to their focus area. This program launched in Summer 2023.

UConn & EdX Partnership Boot Camps (Non-Credit Program)

In partnership with EdX, the virtual Cybersecurity Boot Camp launched in May 2022 as another boot camp offering in addition to the virtual Coding Boot Camp. Each boot camp is a 24-week program, providing the fundamental knowledge, skills and abilities needed to enter the multidisciplinary field of cybersecurity and coding. Theory and practical application labs are combined to achieve proficiency in industry-standard tools and techniques.

Since the program's 2019 inception, SoE has received a total of \$1,171,780 in revenue. Out of this revenue, \$234,356 has gone back to the University for central cost recovery and \$937,424 has stayed with the SoE.

Revenue generated for SoE in AY2022-2023 was \$451,509. Out of this revenue, \$90,302 has gone back to the University for central cost recovery and \$361,207 has stayed with the SoE.

Based on the demand from industry and individuals looking to upskill in technology, the following are additional Boot Camps that are planned to launch Spring 2024:

- The UConn & EdX Partnership: AI Micro Boot Camp (Pilot)
- The UConn & EdX Partnership: UX/UI Boot Camp

Customized Training & Development (Non-Credit Programs)

The CAEE team is available to work with industry and faculty throughout the customization and design process to build and deliver cutting-edge training and educational opportunities for business. These partnerships seek to provide a variety of knowledge-building solutions for the challenges facing the engineering industry today. Designed to accommodate working professionals and industry demands, our programming is focused on flexibility and convenience offering a variety of delivery modality options.

An example of these services includes a current partnership with one of Connecticut's leading aerospace and defense companies. Faculty from UConn's Pratt & Whitney Institute for Advanced Systems Engineering, alongside industry leaders, are teaming to create a non-credit short course. Delivery is scheduled to begin Fall 2023.

CENTER FOR ADVANCED ENGINEERING EDUCATION

CAEE is actively engaged with industry on several programs anticipated to be launched in AY2023-2024.

Excellence in Engineering Communication Program (Non-Credit)

One of a kind, the Excellence in Engineering Communication Program (EEC), led by Rory McGloin, is designed to support engineering industries providing customized comprehensive communication. This program provides organizations access to contemporary training and development programs that will have a direct influence on the success of their organization as a byproduct of the efficiency and effectiveness of their employees' communication and leadership.

Program Objectives:

- Deliver customized training and development programming within a range of professional communication topics and skills.
- Collaborate with industry partners to develop industry-specific communication programs to provide engineers with practical, real-world experience in technical communication.
- Leverage existing platforms that offer resources, templates, guidelines, and interactive tools to assist engineers in developing effective communications.
- Conduct research on communication training and development to garner insights into contemporary trends and to move the field forward in innovative ways.
- Coordinate thought leadership symposiums featuring renowned communicators, industry experts, and organizational leaders to provide insights into emerging trends and share their experiences.



RORY MCGLOIN

Professor Rory McGloin, assistant director of communications and program development for the UConn School of Business, is an award-winning business communication professional. McGloin's career in higher education spans more than 17 years, including engagements with over 10,000 learners to date and 35 peer-reviewed publications. In addition, McGloin serves as the associate director of communication programming and development for SoE's CAEE, as well as serving as the associate director of entrepreneurial communication and research with the Connecticut Center for Entrepreneurship and Innovation (CCEI). McGloin's current research is focused on the process of training and development, examining the influence of individual identities and values on perceptions of a program's impact.

FACULTY

Faculty Recruitment

The number of tenured and tenure track (T/TT) faculty in the SoE has stayed relatively constant in the last few years with only modest increases in the last three years. A total of nine T/TT faculty positions have been added since 2014, bringing the total to 148. To accommodate the dramatic increase in the undergraduate enrollment, we have developed a cadre of passionate faculty focused on teaching (assistant/associate/ full professors in residence). These positions are considered permanent (without tenure) after a seven-year probationary period. Individuals in these positions are largely recruited in national searches and are required to attend training and continuously work with UConn's Center for Excellence in Teaching and Learning (CETL) to improve their teaching skills. We have also developed rigorous standards for annual evaluations and promotions for our teaching faculty.

Challenges

As with the last few years, our biggest challenges with supporting and retaining faculty have centered around salary compression and a lack of growth in our T/TT faculty lines over the past decade.

When it comes to faculty salary, our compensation has typically been below national averages, causing some of our senior faculty to seriously look at competitive offers from other institutions. While the Provost's Office has been able to slow down some of the departures through a retention fund, other institutions have become increasingly aggressive with their offers. As those competitor offers increase in size, it will become more difficult to retain our best and brightest.

With the implementation of Next Generation CT during the former Governor Malloy administration, the School was tasked with exponentially increasing our student population, which hasn't led to the requisite increase in faculty to accommodate that. University leadership has placed an increased focus on research initiatives, as evidenced by FY2023 research expenditures topping \$71 million. Without more faculty, this puts insurmountable stress on the current faculty and departments, who have already been submitting grant proposals at a very high level. Increased faculty lines, a competitive compensation structure, and a greater aggressiveness and strategy on faculty retention will lead to more success for the overall mission of the University.

CATO T. LAURENCIN, M.D.

Cato T. Laurencin, University Professor and CEO of The Cato T. Laurencin Institute for Regenerative Engineering at UConn has been elected to the National Academy of Medicine Council, the Academy's governing and oversight body, for a three-year term beginning July 2023. The National Academy



of Medicine is an independent, trusted advisor to the nation. Election to membership in the National Academy of Medicine is considered one of the highest honors in the field. Laurencin is the first surgeon elected to membership in all four of the U.S. National Academies: The National

Academy of Sciences, the National Academy of Engineering, the National Academy of Medicine, and the National Academy of Inventors.

Faculty Data Fall 2022

DEPT.	T/TT	TEACHING
BME	13	7
CBE	18	2
CEE	23	5
CSE	28	9
ECE	26	1
INTD	0	1
ME	25	10
MSE	15	1
TOTAL	148	36

FACULTY

Faculty Retention

Engineering is a competitive field, and faculty flux is the rule rather than the exception. We have focused on creating a positive environment and offering faculty support in research development and teaching skills. The table to the right shows the trend for the SoE faculty attrition (not including retirement) in the past nine years. Fall 2021 and Fall 2022 both show a change of only two T/TT faculty.

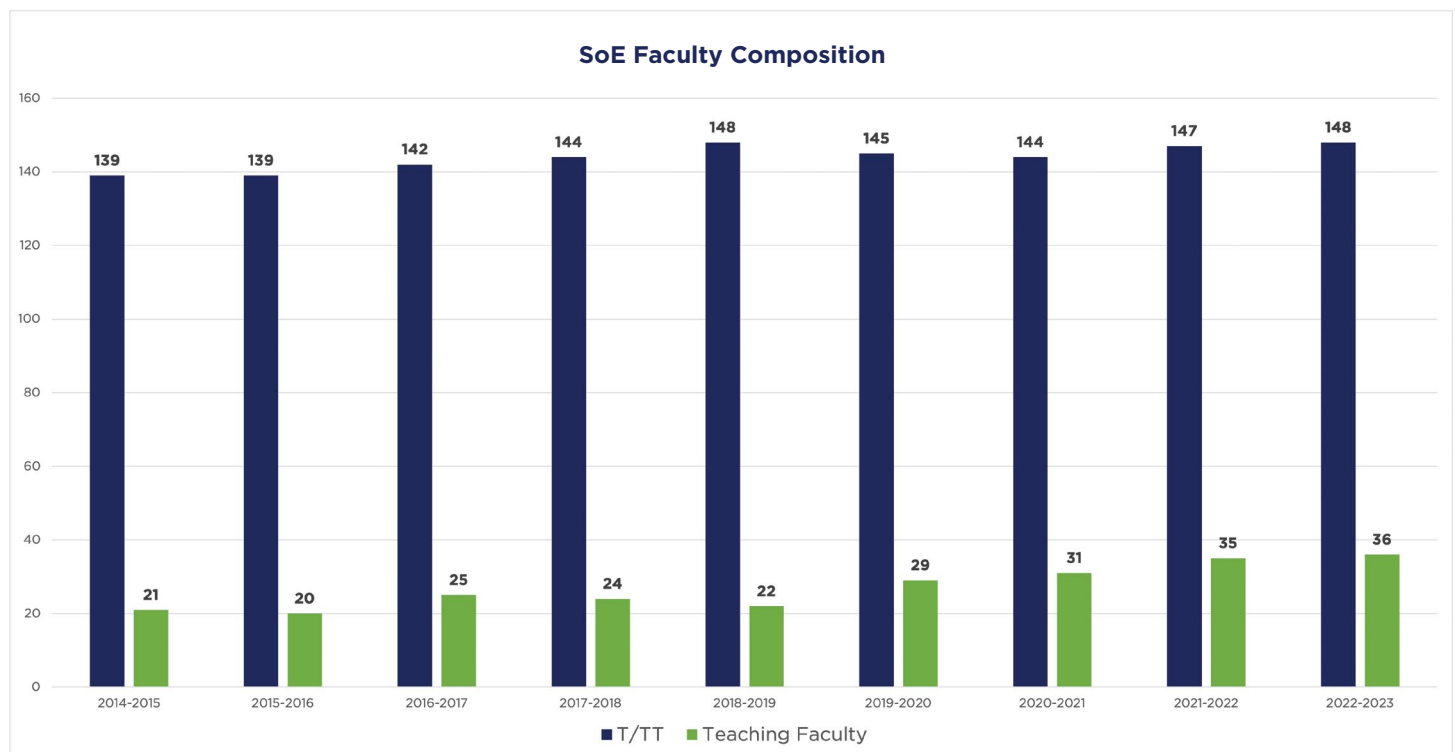
Selected Faculty Achievements

The SoE faculty are many times recognized for outstanding achievements in research, teaching, and for singular contributions to their disciplines. The School promotes scholarship first and foremost by recruiting and retaining the highest caliber faculty. The SoE works to recognize its faculty by systematically recommending them for honors and awards that acknowledge the impact of their contributions to science and society. Our faculty actively advance knowledge in a broad spectrum of fields and raise the visibility of UConn through their many professional activities and appointments, as seen on the next page.

Funded Professorships

20 Term Professorships
7 Named Professorships
18 Endowed Professorships

Year	Fall Attrition T/TT Faculty
2014	5
2015	2
2016	4
2017	3
2018	5
2019	6
2020	5
2021	2
2022	2



FACULTY

Summary of Scholarly Activity in AY2022-2023

The scholarship metrics reported here for the most recent academic year show our faculty to be active at levels equal to the best universities in the country.

- 352 Journal Publications
- 281 Conference Publications
- 18 Patents Issued
- 67 Editorships of Major Journals
- 221 Associate Editorships
- 2 Professors of Practice who are members of the National Academy of Engineering
- 1 Member, National Academy of Medicine; National Academy of Science, National Academy of Engineering

Honors and Awards

We have talented and accomplished faculty who have been recognized for their achievements through many prestigious awards and recognitions, and a selection of these recognitions are captured in this section.

A Selection of 2022-2023 Recognitions Across the SoE:

- 2022 Petit Family Foundation Women in Science Leadership Award, Marisa Chrysochoou, CEE
- 2022 IEEE AESS Pioneer Award, Yaakov Bar-Shalom, ECE
- 2023 AAUP Service Excellence Award, John Chandy, ECE
- 2023 AAUP Excellence in Research and Creativity: Early Career Award, Junbo Zhao, ECE
- 2023 AAUP Excellence in Research and Creativity: Early Career Award, Yi Zhang, BME
- 2023 American Chemical Society Priestly Medal, Cato Laurencin, BME
- 2023 International Phononics Society Young Investigator Award, Osama Bilal, ME

Connecticut Academy of Science & Engineering (CASE) is Connecticut's premier organization recognizing achievements in science and engineering. CASE identifies and studies issues and technological advances that are of concern to the people of Connecticut, and provides unbiased, expert advice on science and technology-related issues to state government and other Connecticut institutions. There are currently 57 UConn School of Engineering faculty that are members of CASE.

2023 SoE CASE Inductees:

- Amir Herzberg, Computer Science and Engineering
- Arash Zaghi, Civil and Environmental Engineering
- Syam Nukavarapu, Materials Science and Engineering
- Dong-Guk Shin, Computer Science and Engineering
- Ali Tamayol, Biomedical Engineering
- Peter Willett, Electrical and Computer Engineering

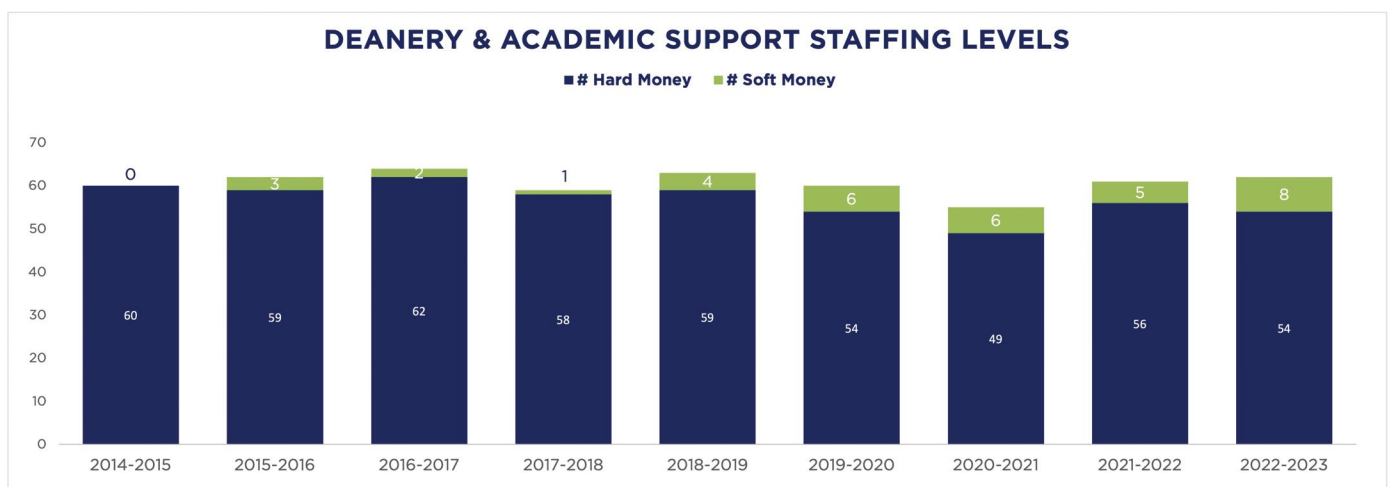
NSF CAREER Winners:

- Derek Aguiar, Computer Science and Engineering
- Suining He, Computer Science and Engineering
- Yi Zhang, Biomedical Engineering
- Yuanyuan Zhu, Materials Science and Engineering

STAFFING

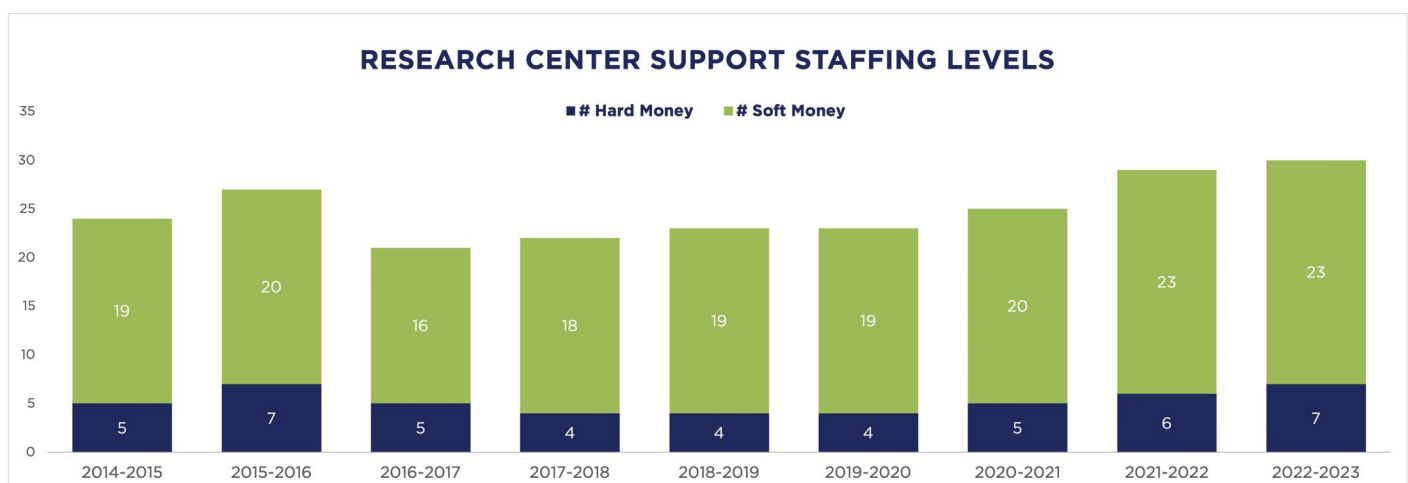
Staffing Levels

School-wide budgetary constraints have continued to result in a shortage of the SoE support staff. Despite continual growth in the number of students and in the scale of our research enterprise, the staff size has remained inadequate for SoE support needs. A notable exception is the number of professional undergraduate advisors that had previously increased from zero to seven in AY2013-2014 in response to a deficiency identified in an external ABET review in 2012. As an example, there has been extreme growth in our Computer Science and Engineering Department, where back in 2012 the student population was 314 students versus 1,038 students in 2022, along with expected further extreme growth by several hundred each subsequent year, and still virtually the same amount of staff support. Overall, we believe the SoE continues to operate on an extremely lean staff size considering the growth trajectory.



Research Support Staff

The University's assistance for the SoE research support staff has been quite marginal (see chart below). The support staff in the research centers are mainly supported by external grants and in most cases are project specific. In general, we consider the staff size in the SoE to continue to be an impediment to further growth in our research, industry engagement, and educational mission. The SoE's staff is well below current metrics for Research 1 institutions.



VERGNANO INSTITUTE FOR INCLUSION

The Vergnano Institute for Inclusion (VII) is a proactive and adaptive organization with distributed governance that will nurture and sustain an anti-racist and anti-discriminatory culture. VII will be a resource for SoE and the communities we serve to empower people from all backgrounds. Inspired by the strength of diversity and inclusion, we will be an equity-minded community where engineers innovate and change the world for the better. VII was established through a generous gift to the school by UConn alumni Mark and Betsy Vergnano in 2021. Our ecosystem aims to support undergraduate and graduate students, faculty and staff, K-12 students and teachers, industry partners, and alumni.

Towards supporting students, VII has allocated resources for Homeroom, a space designed to provide tutoring, coaching, advice, or community connections primarily for first-generation students, or students who identify as Black, Hispanic, or Indigenous. Students can access this in person at Storrs, or virtually from any campus or location. VII has funded and supported nine equity-focused organizations to attend their national or regional conferences, e.g., sending 14 undergraduate and five graduate students to attend the National Society of Black Engineers Convention in Kansas City. VII also holds office hours every other Friday at the Stamford campus.

Towards supporting faculty and staff, VII offers the Inclusive JET (Justice, Equity, and Transformation) as a yearlong commitment towards anti-racist and inclusive practices in the SoE. Examples from this year's projects include: supporting departmental committee efforts on understanding climate, policies, and practices; redesigning a course syllabus to broaden engineering source knowledge beyond historically white or Eurocentric education sources. VII also partners with UConn faculty in writing grants and implementing their grants' outreach or broader impact components.



VERGNANO INSTITUTE FOR INCLUSION LEADERSHIP

Mark Vergnano, retired CEO and Chairman of the Board, The Chemours Company and Stephany Santos, Executive Director of Vergnano Institute for Inclusion, Assistant Professor in Residence in Biomedical Engineering.

VERGNANO INSTITUTE FOR INCLUSION

Towards supporting K-12 students and teachers, VII offers several day conferences and residential programs. All have returned to being fully in-person at the Storrs campus. In an effort to increase access, particularly for resource-limited school districts, VII was able to provide funding for bussing to attend our equity-focused programs. VII has received funding from Synchrony Financial, Pratt & Whitney, Henkel, and Lockheed Martin to minimize or eliminate participant costs, and support programmatic and student staffing. All our day conferences (Multiply Your Options, Engineering Your Future, Sisters in STEM, Queer Science) are offered at no cost to participants. All our summer camps (Explore Engineering, SPARK) offer full or partial program fee waivers based on financial need. VII also collaborates with several faculty who have grants, such as Lexi Hain and the NIUVT grant, which supports SPARK, Explore Engineering, and daVinci (for teachers).

Towards supporting industry partners and alumni, we invite alumni to serve as mentors for current undergraduate and graduate students, and to return as speakers or volunteers for various VII events. Examples include alumni returning to engage in a Society of Women Engineers (SWE) general body meeting, as well as presenters in the Multiply Your Options conference. VII has successfully matched undergraduate students with internship opportunities shared by industry partners and alumni, and we aim to better formalize the matching or connection process in the future for increased access. VII industry partners have also committed to supporting selected students for long-term success through our Industry Scholars program, where selected students receive renewable scholarships up to four years, multiple industry mentors, designated internships, and intentional community building.



2022-2023 ACCOMPLISHMENTS

- Facilitated an in-person industry tour to Legrand with bussing from Storrs and Stamford, open to all students in the SoE, and designed for connections for first-generation students, or students who identify as Black, Hispanic, or Indigenous. We also partnered with Schola²rs House for this event.
- Organized impactful and meaningful conferences for eighth grade females* (Multiply Your Options), eighth grade Black, Hispanic, or Indigenous males* (Engineering Your Future) tenth grade Black, Hispanic, or Indigenous females* (Sisters in STEM), and LGBTQIA+ high school students (Queer Science) for 490 students across the state.
*These programs are inclusive of non-binary and gender-fluid individuals.
- Connected equity-focused engineering student organizations (Engineering Ambassadors, National Society of Black Engineers, Society of Asian Scientists and Engineers, Society of Hispanic Professional Engineers, Society of Women Engineers) and student leaders from the SPARK summer camp, to host the Pre-Engineering Program for middle school students on Saturday mornings in the spring semester.
- Created an equity-focused Promise Bowl within our Regional Science Bowl to promote access and connection for diverse schools/teams to engage in the Science Bowl competition, as well as culturally-relevant programming and tours, and guidance on applying to college.
- Co-created additional industry scholars programs with Cigna and Belimo that provide multi-year support for \$10,000 per student per year, plus mentoring and internship opportunities.

INTERDISCIPLINARY INITIATIVES

NursEng Innovation Center

The New NursEng Innovation Center

Approved in Summer 2023, the University's NursEng Innovation Center will advance healthcare, workforce, and economic development through interdisciplinary collaborations between nursing and engineering that promote innovations in health technology.



Engineers are trained to solve problems and create solutions. They have the technical knowledge, skills, and abilities to actualize new technologies. By partnering with nurses and healthcare professionals, who have deep contextual knowledge of on-site problems and needs, we can ensure that our engineering innovations are user-centric and designed for unmet healthcare needs.

The Center is under the co-direction of Tiffany Kelley, Ph.D., MBA, RN-BC, Visiting Professor and Director of the School of Nursing's Healthcare Innovation Online Graduate Certificate Program and Leila Daneshmandi, Ph.D., Assistant Professor in Residence in Innovation and Entrepreneurship and Director of the Entrepreneurship Hub (eHub) in the SoE.

The four focal areas of the new Center are research, education, community engagement, and technology transfer. In its initial phase, NursEng includes the creation of joint educational programs for students and seed grants for collaborative research among faculty.



The NursEng Innovation Center is not the first instance of collaboration between the two Schools. Researchers affiliated with the School of Nursing's Center for Advancement in Managing Pain belong to both Schools and are actively involved in shared training and research activities. Several interdisciplinary teams have also submitted grant applications for collaborative projects. School of Nursing associate professor Ruth Lucas, Ph.D., RNC, CLS, worked with Engineering faculty to design her Breastfeeding Diagnostic Device, which measures infants' sucking during breastfeeding. Several undergraduate students have joined together recently as well. Ellen Quintana '21 (NUR) worked with engineering students to design the now-patented ReduSeal glove waste reduction system.

The creation of the center was inspired by a bequest from James Belmont '86 (ENG), who wanted to demonstrate his appreciation for his UConn education and that of his sister, Gail Belmont-Harwood '81 (NUR). Belmont's support for the NursEng Program Support Fund stems from the siblings' understanding that best practices in innovation development indicate the need for end users to be involved in the design of new products.

For more information, please visit the new website: nurseng.center.uconn.edu

INTERDISCIPLINARY INITIATIVES

Krenicki Arts and Engineering Institute

The Institute continues to be the nexus to bridge talent, educational programs, funding, and research opportunities in classes and degrees to merge the arts and engineering fields of study. During AY2022-2023, it had a formal opening with donors visiting its physical location. The Institute has expanded the number of classes in Multidisciplinary Engineering in Industrial Design and in Entertainment Engineering and presented a paper at the ASEE 2023 Annual Conference & Exposition, with the title "Broadening Engineering Formation: Lessons Learned from Multidisciplinary Engineering degree at the University of Connecticut."

This academic year the Institute funded six Krenicki scholarships worth \$5,000 each, three from the SoE and three from the School of Fine Arts. It was also able to support valuable research by Krenicki scholar Cameron Slocum, honors student Nicole Wong, and graduate student Sabrina Uva, for her Accelerate UConn project, for phases I and II. It also funded the purchase of material for graduate students Rahul Koonathara and Gokul Krishnan, who are developing Shadow Puppetry and Machine Learning, with a STEAM grant.

The Institute sponsored and gave lectures at the Annual Women in Making Forum 2023, and opened its doors to hear the lecturers at the Women in Design Conference, and the ID Technique Deep Dive 2022, both organized by the Industrial Designers Society of America, IDSA. It also sent one of its professors to the Stage Machine Design Competition, at Purdue University. It also conducted its annual Spacesuit Design Competition, and the Cosmic Catapult Commute Challenge. These are two Saturday events in Spring and Fall that promote teamwork, using design skills, healthy competition and the development of a design brief.

The Institute also sent one of its co-directors to the Worcester Polytechnic Institute's annual Project Based Learning summer camp in June 2022, along with a team of six other faculty members from the SoE and the School of Fine Arts. It also actively helped in the submittal of a grant to assist graduate students access STEM Ph.D. programs. The Institute was also awarded a micro-grant to rewrite a class to benefit Biomedical Engineering, which will incorporate a robust creative learning module. It also afforded project-based learning opportunities in many of its classes, with a laser manufacturer, with local historic Chamberlin Mill, with the CT Transportation Research Center, and with other companies that participate in the Senior Design in Mechanical Engineering.

Additionally, the Krenicki Arts and Engineering Institute added a new administrative position, and continued purchasing equipment for 3D printing, laser cutting, and visualization in virtual reality. It also continued its efforts to obtain materials to populate its materials library.



John and Donna Krenicki visit with students.



INTERDISCIPLINARY INITIATIVES

Technical Assistance for Brownfields Program (TAB)

In May 2023, U.S. Environmental Protection Agency (EPA) announced an additional \$5M award to UConn to expand the scope of TAB services in the region. First awarded in 2021, the mission of the UConn TAB is to assist municipalities, regional planning organization and non-profit organizations across the six New England states with the investigation, clean-up and redevelopment of abandoned, polluted sites, also known as brownfields. UConn TAB is led by Marisa Chrysochoou. It also provides continuing education, networking and community engagement support to stakeholders and communities. This is accomplished through direct assistance from TAB personnel, but also through service learning by engaging UConn students across a wide range of disciplines.

In AY2022-2023, 31 students from 12 majors participated in the fall semester course ENVE/ENVS/EVST 3110: Brownfield Redevelopment, working with the Town of Burrillville, RI; Town of Killingly, CT; Town of Bethany, CT; Town of Athol, MA; Montachusett Regional Planning Commission, MA; Town of Hopkinton, RI; City of Waterbury, CT; Northeast Vermont Development Association, VT; City of Rockingham, VT; and City of New London, CT. The students prepared grant proposals to the EPA to support brownfield characterization and redevelopment. In the spring semester, 14 students worked with 13 municipalities (Middleborough, MA; Winchester, NH; Killingly, CT; Northern Middlesex Council of Governments; Watertown, CT; Avon, MA; Milton, MA; Derby, CT; Foxborough, MA; Dalton, MA; Norwich, CT; Rockingham, VT; Caribou, ME) on 13 different projects. The students prepared four brownfields inventories with methodologies for site prioritization, six analyses of redevelopment alternatives, and three record reviews and data gap analysis.

The program serves communities to promote civic and environmental justice, pursue renewable energy and clean water and air projects, foster workforce development, and help fulfill UConn's critical mission as a land grant university.

MARISA CHRYSOCHOOU



Professor Marisa Chrysochoou was a 2022 Award Honoree at the Connecticut Science Center Gala. This year's celebration highlighted the Connecticut Science Center's role in cultivating a STEM-Engaged community of students, families, teachers and professionals.

Chrysochoou was one of three recipients who received The Petit Family Foundation Women in Science Leadership Award.

To see more, please visit the Connecticut Science Gala's website:

<https://ctsciencecenter.org/support/annual-gala/>

INTERDISCIPLINARY INITIATIVES

Engineering for Human Rights Initiative

The Engineering for Human Rights Initiative (EHRI) is a joint venture between the SoE and the Gladstein Family Human Rights Institute. The Initiative has over 60 faculty members from various disciplines who are working together in different clusters on research, curricular offerings, and engaging policymakers, industry partners, and non-governmental organizations (NGOs) to promote the integration of human rights, environmental and social sustainability with engineering. The Initiative focuses on six research areas: 1) Water, Health & Food Security; 2) Product Design, Manufacturing, and Supply Chain Management; 3) Community Planning, Resilience, and Justice for a Changing Environment; 4) Engineering Education and Accessibility Rights; 5) Engineering Substances and Process Sustainability; and 6) Cybersecurity, Privacy, and Human Vulnerability. This year, the Initiative has hired a Ph.D. student as the First Engineering for Human Rights Student Fellow to work on the creation of a transportation equity metric and collaborate in our research, educational, and outreach efforts.

As an example of research efforts, the Community Planning, Resilience, and Justice for a Changing Environment cluster has received two awards for their research efforts. One award was given as part of UConn's Justice, Equity, Diversity, and Inclusion (JEDI) Research Initiative, and the other as part of the U.S. EPA's Environmental Justice Thriving Communities Technical Assistance Centers Program (one of 17 centers nationwide). Our faculty's journal articles and book chapters are also contributing to the definition of engineering for human rights education.

Similarly, the Engineering for Human Rights faculty attended the two-day GRIP Workshop hosted by CLEAN EARTH in response to the upcoming DOE call on Smart Grid Grants, "Bill-Grid Resilience and Innovation Partnerships (GRIP)." Many faculty were integral to the Community Resilience pillar of this workshop. They continued to lead in developing the framework for integrating communities and measuring the impact of renewable energy interventions in vulnerable communities. Other research articles cover areas of transportation and wealth distribution to discussions on health from critical perspectives.

This year, we organized various extension and outreach events that aimed to establish UConn's pioneering role in the engineering and human rights field. For example, faculty from the Initiative participated in a workshop organized by Boston University and the Committee on Human Rights of the U.S. National Academies of Sciences. Similarly, we organized a seminar at the University of Puerto Rico in Mayaguez, where students had the opportunity to engage in a case study discussing the application of engineering ethics and human rights to engineering work. Faculty from the Initiative also participated in a workshop in Germany as part of the Connecticut/Baden-Württemberg Human Rights Research Consortium. Locally, the Initiative collaborated in events such as "Explore Engineering Program," targeted towards exposing sophomore and junior high school students to pathways in engineering education. Similarly, in collaboration with the Krenicki Institute, faculty and our fellow presented as part of the ENGR 1000 course.

In terms of community outreach, the Initiative hosted a hybrid event with the participation of community members, energy advocates, students, and interested faculty from across the state. The discussion centered on the economics of energy justice amidst the transition to clean energy, including education and extension, accessibility, and equity dimensions. This event was a step toward building university-community partnerships for research and collaboration in renewable energy, affordable transportation, and equitable access to emerging technologies for Connecticut residents. In the same thematic area, in partnership with the Economic & Social Rights Program, we hosted a hybrid event where the discussion centered on the need for a framework for evaluating the human rights dimensions of the lifecycle of components needed for electric vehicles and the complexity of measuring human right fulfillment. Lastly, the Initiative hosted a breakout session at the international conference "Evolving Landscapes of Human Rights."

SPONSORED RESEARCH

The SoE research enterprise encompasses an expanding federal research portfolio, state-funded research and service initiatives, and major industrial partnerships – many of which undergird the UConn Tech Park (Innovation Partnership Building). Many projects are interdisciplinary and engage students and faculty across the university. The SoE's scholarship, education, and outreach missions all depend on a vibrant research portfolio.

SoE Research Development Strategy

To expand the research opportunities available to our faculty and students, the SoE has implemented a four-fold research development strategy, as follows:

New Faculty Development via CAREER: New faculty are often accomplished researchers and authors, but they have not always had deep experience in the skills required for winning research grants. New SoE faculty are provided special training and support through our CAREER proposal development workshops. This full-year program provides beginning faculty with a step-by-step roadmap and support for learning through doing as they develop their application for the NSF CAREER award, the most prestigious grant program for young faculty recognized by all schools of engineering nationwide. With SoE CAREER support, faculty not only win awards, setting them up to be leaders in their field in the years to come, they also learn proposal writing skills that are transferable to other agencies and programs.

Focus on Mission-Driven Agencies: UConn's local industry network and major funded initiatives such as the National Institute for Undersea Vehicle Technology (NIUVT) and the Air Force Research Laboratory (AFRL) put UConn in a strong position to win funding from certain mission-driven agencies. Our strategy for continued success is to align new programs with our existing structural advantages; to cultivate, initiate, and pursue contacts and advocacy with program managers and agency personnel; to work with the Office of Governmental Relations to gain access to diverse funding streams; and to assist faculty that are new to UConn by establishing personal connections. In addition to supporting our research programs, these efforts also align the School's unique capabilities and State of Connecticut priorities to help enhance the economy and jobs across the state.

Industry Partnerships and Economic Development: Research has the greatest impact when it connects with industry and society. UConn SoE works closely with industry partners to build a robust applied research portfolio and capabilities for the benefit of our students and research programs, as well as local industry, economy, and the high-tech job market in the state. A portfolio of diverse interaction opportunities, including capstone design projects, reduced-overhead exploratory grants, and major research projects help to establish confidence and form long-term strategic industry partnerships. These partnerships also position UConn to win major national awards created to support industry-relevant research. Our efforts in this area proceed primarily through the Tech Park's centers and institutes as a gateway for industry engagement throughout UConn.

Selectively Pursue Major New Initiatives: New major funding programs are always being released, but faculty at our peer institutions are also keen to win these major awards, resulting in fierce competition. Only seldom does an individual faculty member with their expertise have the time, vision, and commitment needed to recognize a major multi-disciplinary opportunity, form the right team, and create a winning program on time without dedicated support. SoE Research Development and the research leadership team meet frequently to track progress of major engineering research proposals under development and step in if they need support. The team also identifies key funding opportunities, helps to catalyze the team formation and brainstorming process, monitors progress through the process, and brings in additional support as needed to enhance the probability of a winning outcome.

SPONSORED RESEARCH

Research Development Support for Faculty

Currently, the SoE's research development strategy is led by the School's three Associate Deans and Assistant Dean and is supported by the Research Development team:

Emmanouil Anagnostou, Interim Associate Dean is also the Interim Executive Director of the UConn Tech Park, which is home to several engineering centers and Institutes, including the Eversource Energy Center, where he is Executive Director. He has been a strategic leader in University offshore wind efforts. He supports research development for manufacturing, energy, electronics, data/information via mission driven agencies like the DOD, DOE, Army, Navy, Air Force, and NASA. He also supports industry-related projects such as IUCRC, INTERN supplements and small business programs (SBIR/STTR, CTSBDC).

Daniel Burkey, Associate Dean supports research operations through the Engineering Education Center. He supports pedagogy and diversity, equity and inclusion proposal management and research strategies for agencies like NSF, and focuses on programs for undergrad education, e.g., LSAMP, SSTEM, and REU/RET. He also oversees the undergraduate advisement team.

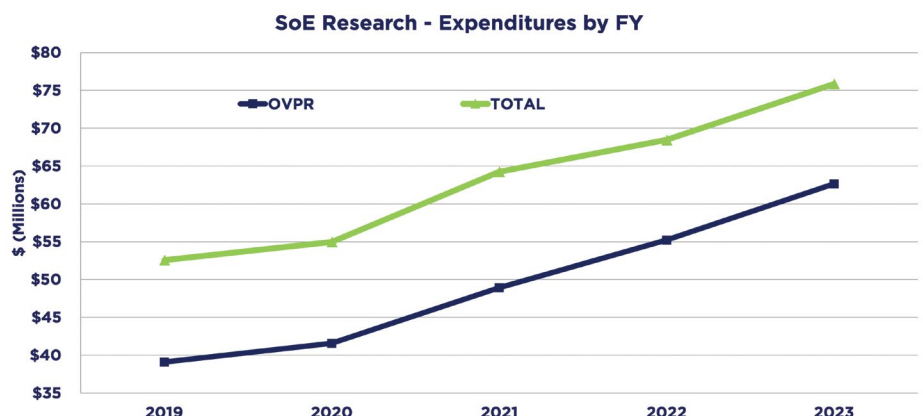
Kylene Perras, Assistant Dean is focused on transportation, manufacturing, defense and research infrastructure via agencies like the CT DECD, as well as US DOT, NSF, EDA, DOE, and EPA. She co-led the EDA Build Back Better Regional Challenge and EDA MBE Tech Hub initiatives for SoE and the University. She oversees activities under CAEE, NIUVT, CT Brownfields, CT Transportation Institute, manufacturing, facilities, Engineering Technical Services, infrastructure, and communications. Kylene supports research proposals that require equipment, instrumentation, space, and proposal management.

Christina "Tina" Ryan, Research Development (RD) Officer is focused on creating and managing systems that connect research leadership and faculty with information and resources to bolster the SoE Research Enterprise. RD provides funding, collaboration, and training and development opportunities, as well as metrics and strategic reports. Tina also manages the RD Proposal Team which provides support services such as team science, project management, consultation, and editing. These RD activities ensure that the research teams have the support they need to maximize their chances of bringing in major new awards.

Leslie Shor, Associate Dean focuses on research strategy for biotech; healthcare; environment and sustainability; innovation and entrepreneurship; DEI. She supports faculty in their research with agencies like NSF, NIH, DOE, USDA, EPA, CTDEEP, and the Department of Education, while overseeing SoE Graduate Education programs, including, NRT, GAANN, Innovation & Entrepreneurship (CI/CTNext/eHub), and the NursEng Innovation Center.

Sponsored Research Trends

Research expenditures have consistently increased over the past five years. Expenditures are based on the Office of the Vice President for Research (OVPR) preliminary fiscal year reports in addition to estimated research funds administered through the UConn Foundation and the UConn Health Center. The average research expenditure per faculty aligns with many top-50 schools of engineering.



SPONSORED RESEARCH

NSF CAREER Support

In 2023, SoE Research Development helped support faculty in the CAREER submissions process by:

- Providing proposal and project management feedback
- Coordinating the Proposal Team to review faculty proposals
- Collaborating with the OVPR Research Development Services (RDS) team for proposal development workshops and streamlining proposal support requests and proofreading schedules

As described in the Faculty section of this report, the efforts from the 2022 support resulted in four faculty being awarded CAREER awards.

Research Funding

The three pie charts show preliminary FY2023 data on expenditures, awards, and proposals submitted (OVPR only) by funding agency. The charts show a healthy diversity of different agencies, including organizations that primarily support basic research e.g., the National Science Foundation (NSF) and the National Institutes of Health (NIH) as well as mission-driven agencies; the Department of Defense (DOD), corporate sponsors, the Department of Transportation (DOT), and the Department of Energy (DOE).

SPONSORED RESEARCH DATA

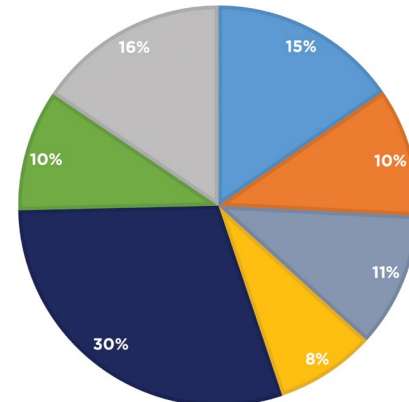
\$75M Total FY2023
Research Expenditures

\$503K Average Research
Expenditure per Faculty

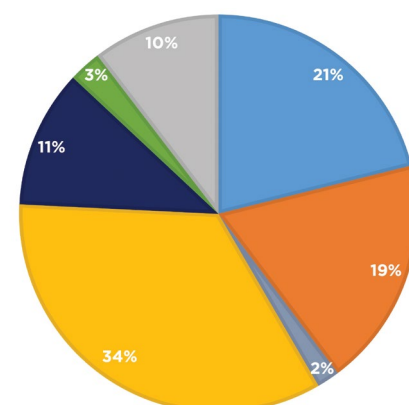
489 Proposals Submitted

480 Active Grants

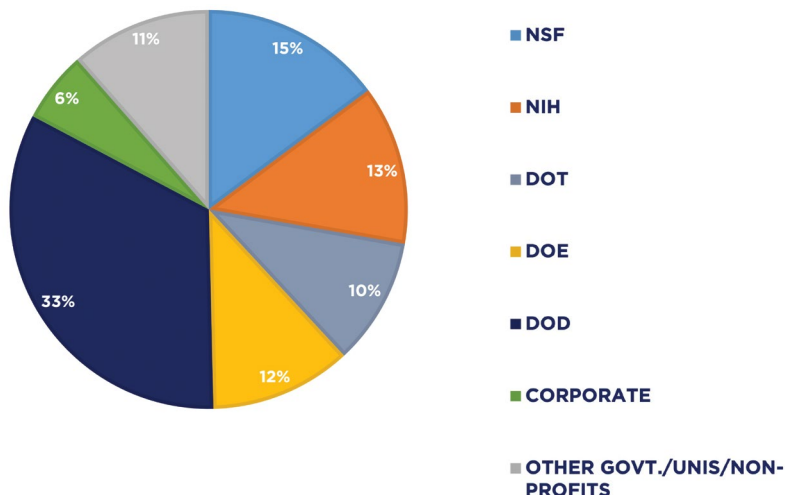
EXPENDITURES BY SPONSOR (OVPR)



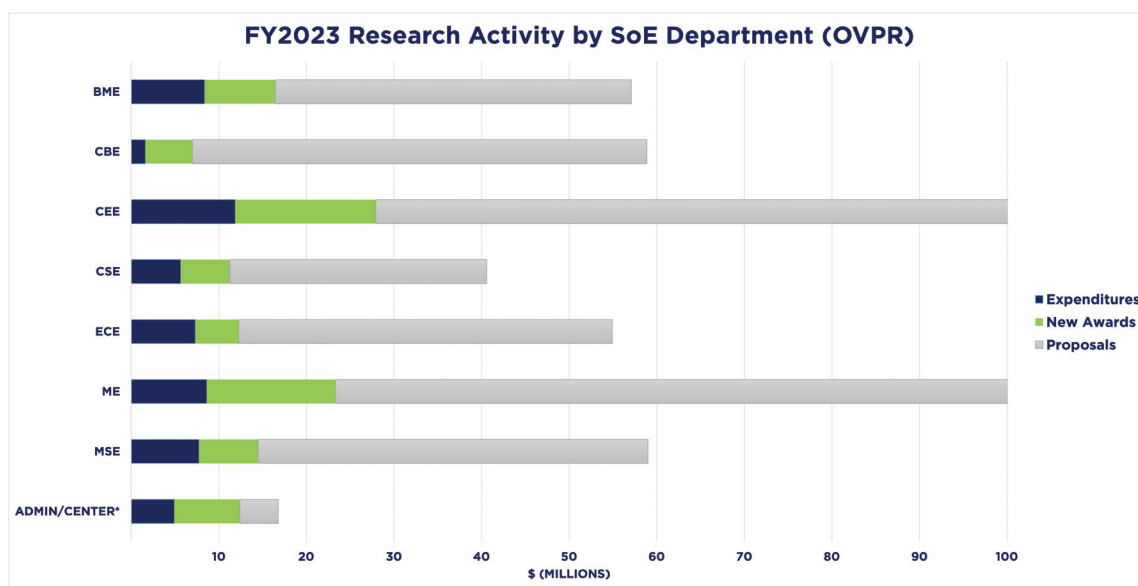
PROPOSALS BY SPONSOR (OVPR)



AWARDS BY SPONSOR (OVPR)



SPONSORED RESEARCH



Major Awards (FY2023)

PRINCIPAL INVESTIGATOR	AWARD	SPONSOR	PROJECT
Richard Christenson	\$7.39M	DOD	NIUVT - Applied Research to Advance Current and Future Technologies in the Undersea Vehicle Domain (FY2022)
Wilson K. Chiu	\$3.00M	DOE	UNLP Scholarship and Fellowship Support for the University of Connecticut
Donna Shea	\$2.45M	DOT	Connecticut Safety Circuit Rider Program
Richard Christenson	\$2.32M	DOD	GUID-4: GUIDANCE in Smart Materials and Structures for Vibration and Shock
Thanh D. Nguyen	\$2.16M	NIH	Novel Piezoelectric Amino-acid Ultrasound Transducer to Deliver Drugs Through the Blood Brain Barrier
Kelly A. Burke	\$1.97M	NIH	Highly Tunable Brush-Like Polymer Architectures to Control Therapeutic Delivery and Cell-Material Interactions
Yupeng Chen	\$1.86M	NASA	Biomimetic Fabrication of Multi-Functional Nanomaterials via Controlled Self-assembly in Space
Rainer J. Hebert	\$1.67M	DOD	GUID-5: Evaluation of Deep-Sea Structural Failures and Underwater Shock through Solids and Fluids
Mohammad Razaur Rahman Shaon	\$1.47M	DOT	Development of an Application For Real-Time Dissemination of Commercial Vehicle Parking Availability (Federal)
Guoan Zheng	\$1.45M	NIH	Label-Free Digital Cytopathology Using Deep-Ultraviolet Coded Ptychography with Intrinsic Molecular Contrast

SPONSORED RESEARCH

Industry Research Partnerships and Economic Development

The SoE has been highly successful in forming strategic partnerships with industry, federal, and state agencies, pursuing major research funding opportunities to establish new centers and institutes that target economic development areas for the State of Connecticut and the region. Over the last several years, these efforts have focused on the aerospace and naval sectors in technical areas including materials characterization, advanced manufacturing, cybersecurity, energy, and systems engineering.

National Institute for Undersea Vehicle Technology (NIUVT)

The U.S. Navy is currently rebuilding its fleet of submarines, which provides a once-in-a-generation opportunity for Connecticut and Rhode Island to expand economic development associated with this ramp-up. The SoE worked with UConn's Office of Governmental Relations and University of Rhode Island (URI) in partnership with regional industry (Electric Boat) and Navy collaborators (Naval Undersea Warfare Center (NUWC) Newport, and Undersea Warfighting Development Center (UWDC) to establish the Institute, launched in 2019. UConn's Co-Director for NIUVT is Professor Richard Christenson.

NIUVT is a university-industry-government partnership that leverages cross-disciplinary expertise to address technology and workforce needs for the large naval ecosystem. Their partnership with the URI leverages mutual strengths in naval science and technology.

NIUVT active research grants total \$48.3 million. In FY2023, there were 111 (58 UConn-led) short-term high-impact applied research projects engaging 47 UConn faculty members, 55 graduate students, and 46 undergraduate researchers.

Investment: NIUVT received \$22.4M in new awards in FY2023 with \$7.6M in expenditures.

Project Daedalus – Air Force Advanced Manufacturing Initiative

Project Daedalus is a collaboration with the Air Force Research Laboratory (AFRL) currently totaling \$18.1M, led by Professor Pamir Alpay. Working with industry partners Pratt & Whitney, Aero Gear, GKN Aerospace, Collins Aerospace, and Sikorsky, Project Daedalus will help the U.S. Air Force and their original equipment manufacturers (OEM) to improve manufacturing technologies. It will apply highly specialized expertise in manufacturing simulation, extensive materials analysis, and process modeling to achieve its objective of improving the performance of key technologies used by aerospace manufacturing companies.

With the initial contract ending in August 2023, two contracts are active that focus on metal-related manufacturing topics as well as on electronic, photonic, magneto-optic, magnetic, and multiferroic materials for functional applications. For the functional material research, Project Daedalus has partnered with Raytheon Technologies, Carillon Technologies, and Aperture Optical Sciences to investigate and lay the framework for next generation technologies. In FY2022-2023 a proposal was submitted for a fourth contract of \$10M to support manufacturing of hypersonic systems with Raytheon as a key industry partner.

Investment: Project Daedalus currently has a \$10M contract pending with AFRL.

SPONSORED RESEARCH

Center for Hardware and Embedded System Security and Trust (CHEST)

In 2019, NSF designated CHEST as an Industry-University Cooperative Research Center Program (IUCRC), now the largest center in the IUCRC program. As a member, UConn partnered with Northeastern University, University of California-Davis, University of Cincinnati, University of Texas-Dallas, and University of Virginia. CHEST is led by Professor John Chandy.

The focus of the Center is to coordinate university-based research with the needs of industry and government partners to advance knowledge of security for electronic hardware and embedded systems including identification, detection, monitoring, mitigation, and elimination of vulnerabilities. This Center has strengthened UConn's ongoing engagement with industry in cybersecurity while also bringing additional national recognition to our activities.

Investment: \$2.6M industry and \$5.9M federal. CHEST received approximately \$500,000 through congressional funding in FY2023.

Eversource Energy Center (EEC)

The EEC, established in 2015 and led by Professor Emmanouil Anagnostou, is a dynamic partnership between UConn and the major utility provider Eversource that strives to solve complex challenges in weather, climate, and energy, particularly where they coincide with real-life events such as hurricanes and snowstorms. Current research areas include projects on storm outage forecasting, tree and forest management, electric grid reinforcement, resiliency, climate change and flooding, geomagnetic disturbances, integration of renewable generation, and cybersecurity. These research topics and ability to quantify damages, outages and impact are becoming particularly salient for growing discussions centered around energy justice across the state.

The Outage Prediction Model (OPM) is one of EEC's key developments. This sophisticated computational algorithm tool has been adopted by Eversource to develop its storm preparedness and restoration support system across their service territories in Connecticut, Massachusetts, and New Hampshire. The OPM makes forecasts publicly available through major TV channels in Connecticut. The system is currently being tested by other utilities across the country including Avangrid and Dominion, and is commercialized by a major analytics and machine learning solutions company (DTN LLC).

In December 2021, Eversource announced an additional investment of \$14M, extending its joint commitment to the program. In addition to Eversource, Avangrid recently announced an investment of \$5M to support research on grid resilience and clean energy integration, bringing the total funding in the Center to \$42M.

Investment: FY2023 - \$18.3M in new awards and \$3.4M in expenditures

Pratt & Whitney Institute for Advanced Systems Engineering (PW-IASE)

Formerly the UTC-IASE, the Pratt & Whitney Institute for Advanced Systems Engineering (PW-IASE) produces, disseminates, and commercializes new science and technology in the field of cyber-physical systems engineering through transformative research, education, and workforce development. The Institute serves as a hub for world-class research, project-based learning by globally-distributed teams of students, and industrial outreach activities focused on model-based systems engineering (MBSE) and digital engineering of complex systems that are built from and are dependent on the synergy of computational and physical components. Research applications are broad, and include, e.g., smart buildings and cities, aerospace systems, manufacturing, robotics, energy, and cybersecurity. The Institute is led by Professor George Bollas and his Associate Directors, Ravi Gorthala and Amy Thompson.

Investment: Initial funding of \$10M was provided by RTX. The Institute received more than \$41M in extramural funding beyond its initial seed funding. The PW-IASE has sought more than \$39M grant funding in FY2023. Its expenditure for FY2023 was \$4.1M.

SPONSORED RESEARCH

Centers and Institutes

The SoE provides effective leadership support to the University in establishing impactful partnerships at the Innovation Partnership Building (IPB) at UConn Tech Park with the objective of continuing to cultivate the IPB as a gateway for industry collaborations across the University. The IPB features state-of-the-art laboratories, high-tech equipment, networking space, and staff that supports a diverse team of leading-edge university, industry, and government research programs and partnerships.

Several academic-industrial partnerships, listed below, have brought greater than \$150M to UConn's Tech Park in the last four years, enabling a successful continued growth of the IPB since its 2018 launch. Note that further details on Tech Park initiatives can be found on the UConn Tech Park website.

Center for Materials Processing Data (CMPD) (Est. 2019)

Mission: A member-driven research center dedicated to producing and collecting pre-competitive transient material property data used in materials process simulations; to be the premiere platform for the materials community to access transient materials data; and a data hub for accelerating the transfer of knowledge discovery in materials science to implementation in manufacturing. This center is led by Professor Lesley Frame.

Center for Science of Heterogeneous Additive Printing of 3D Materials (SHAP3D) (Est. 2018)

Mission: To develop critical insight into the fundamental structure-processing-property relationships for 3D printing, with a focus on multi-material printing and heterogeneous structures. This center is led by Professor Anson Ma.

Collins Aerospace Center for Advanced Materials (Est. 2016)

Mission: The Collins Aerospace Center for Advanced Materials offers research support to graduate and undergraduate students in materials development and characterization. It supports several co-op and internship positions and multiple senior design projects. This center is led by Professor Pamir Alpay.

Connecticut Advanced Computing Center (CACC) (Est. 2014)

Mission: CACC serves both the public and private sector in addressing research and educational needs in cybersecurity, machine learning, computer systems, and computational science. CACC is comprised of multiple centers focused on cyber and hardware security and is led by Professors John Chandy and Laurent Michel.

Connecticut Center for Applied Separations Technology (CCAST) (Est. 2013)

Mission: To provide contract R&D services that identify energy and cost-efficient solutions for separation needs through thoughtful consideration of innovative materials, differentiating techniques and robust process design and to identify opportunities to implement membranes into various industrial processes to lower energy use, reduce carbon footprint, limit waste, and prevent adverse environmental and health impacts. This center is led by Professor Jeffrey McCutcheon.

Connecticut Manufacturing Simulation Center (CMSC) (Est. 2016)

Mission: Promote innovation and economic development through modeling and simulation and develop the next-generation workforce with computing and simulation skills. This center is led by Professor Jeongho Kim.

Pratt & Whitney Additive Manufacturing Center (PW AMC) (Est. 2013)

Mission: To advance the fundamental understanding of additive manufacturing machine-material-microstructure linkages and to develop students into future leaders of additive manufacturing. This center is led by Professor Rainer Hebert.

Proof of Concept Center (POCC) (Est. 2016)

Mission: To help Connecticut manufacturers achieve their production goals through access to rapid prototyping technologies. This center is led by Director Joseph Luciani.

SPONSORED RESEARCH

Reverse Engineering Fabrication Inspection & Non-Destructive Evaluation (REFINE) (Est. 2017)

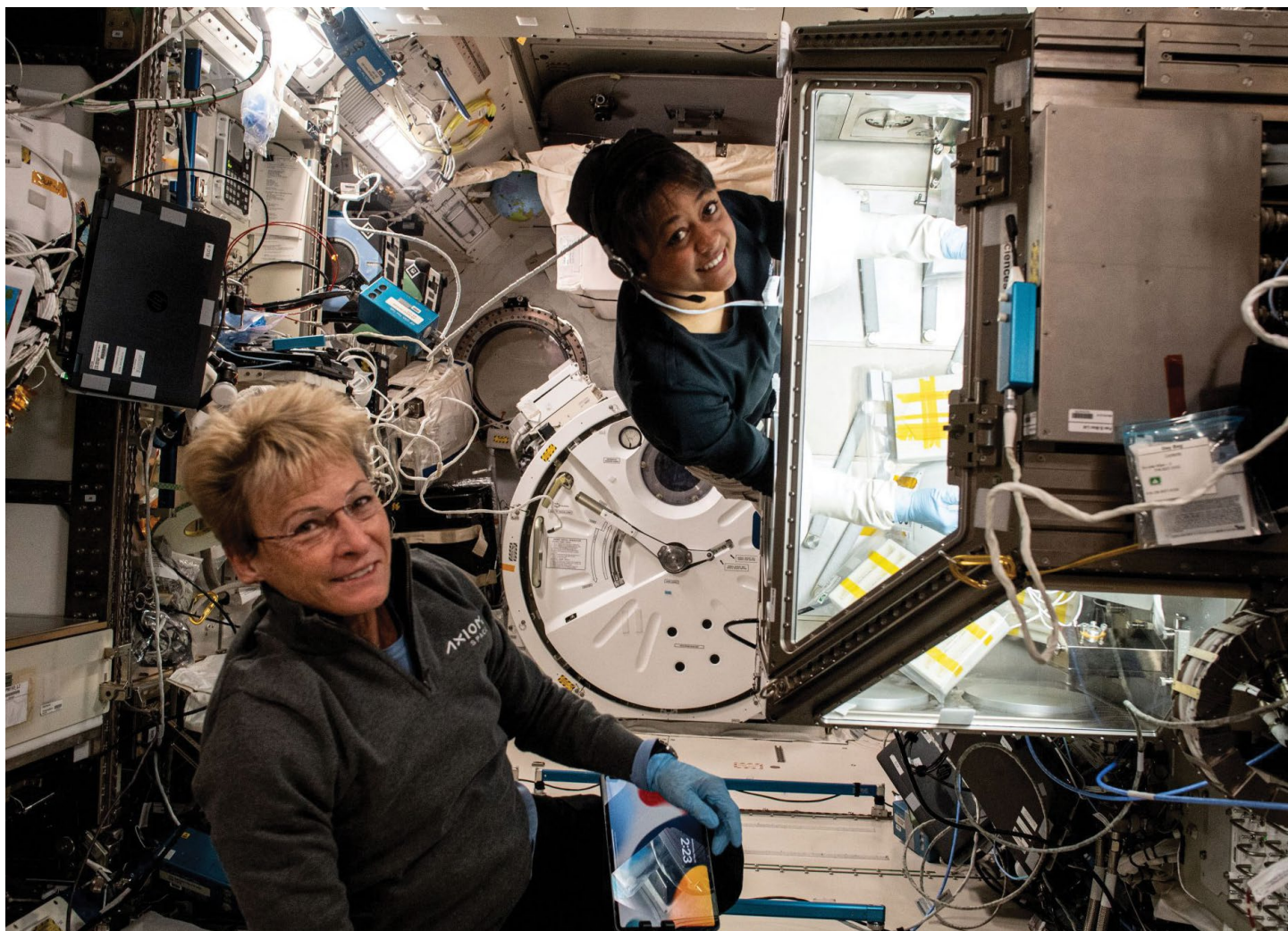
Mission: REFINE focuses on “correlative microscopy.” The center makes instruments talk to each other to bridge length scales and answer real world problems. This center is led by Professor Sina Shahbazzmohamadi.

Thermo Fisher Scientific Center for Advanced Microscopy and Materials Analysis (CAMMA) (Est. 2014)

Mission: CAMMA is one of the world’s foremost facilities for electron microscopy. Its nine microscopy instruments include the Titan Themis for sub-angstrom analysis of materials and the Talos TEM for simultaneous quantitative energy dispersive spectroscopy and analysis of the chemical composition of materials. CAMMA equipment will be available for collaborative research with industry partners, including applications for clean energy materials and the testing of additively-manufactured components such as those found in medical devices and polymeric materials for biomedical applications. This center is led by Professor Steve Suib, of the Chemistry department.

UConn DENSsolutions Center for IN-situ/Operando Electron Microscopy (InToEM) (Est. 2019)

Mission: The InToEM center transforms transmission electron microscopes from an imaging instrument into a comprehensive research laboratory on a chip. This center is led by Professor Yuanyuan Zhu.



Axiom Space Ax-2 mission commander Peggy Whitson and mission specialist Rayyanah Barnawi conducting DNA nano therapeutics research onboard the International Space Station. Biomedical Engineering Associate Professor Yupeng Chen, who is the principal investigator of these experiments, and his graduate students partnered with UConn-affiliated Easra Biotech and Axiom Space. (Photo Credit: NASA). [See the full story online at UConn Today.](#)

INDUSTRY ENGAGEMENT

A central mission of the SoE is to collaborate with industry partners through education, research, and technology infusion, as these aspects directly contribute to economic development within the state and nation. In alignment with this goal, the Innovation Partnership Building (IPB) at UConn Tech Park continues to diligently pursue outreach and engagement efforts to increase visibility into its technologically advanced scientific resources and to cultivate sustainable growth. The program aims to establish new business collaborations that can benefit the citizens of the State of Connecticut and contribute to the IPB's collective resources, with an emphasis on key industry and manufacturing sectors in Connecticut such as energy and aerospace. Visitors gain a keen insight into the IPB's incredible resources, including its sophistication, its high-tech equipment, and its academic distinction, and engage with the IPB centers in diverse ways, including building tours, faculty consultations, seminars, scientific brainstorming workshops, and more.

The Tech Park team has accelerated business outreach in 2022, increasing industry exposure by 50% when compared to the first four years of operation. Aided by reduced COVID-19 risks, increases in industry exposure have been possible through in-field visits to manufacturing companies, collaborations with industry trade organizations, and new relationships with state and municipal governments. IPB visitors from industry, government and academia totaled 305 in the 29 months between IPB's opening in 2018 and April 2022. In the eight months following between May and December 2022, IPB visitors totaled 106.



UConn Tech Park

Interim Executive Director of the Innovation Partnership Building at UConn Tech Park Emmanouil "Manos" Anagnostou gives the closing remarks of the Navigating Climate Change & Energy Security in the Northeast: The Next Five Years summit. The summit was held in the Fall of 2022 and will be followed up by another energy summit to be held in the Fall of 2023.

Noteworthy Outreach

Summits, workshops, and conferences

ORGANIZATION/ACTIVITY	ATTENDANCE	DATE
Connecticut Manufacturing Meetup	9 small business executives	July 13, 2022
Functionally Graded Materials Conference Tours	20 guests	Aug 7, 2022
Hydrogen Power Task Force	15 guests	Aug 9, 2022
Waterbury Regional Industry Visit	6 businesses represented	Sept 14, 2022
Connecticut Manufacturing Meetup	10 small business executives	Sept 20, 2022
Waterbury Regional Industry Visit	10 businesses	Sept 22, 2022
NEUCORSE Workshop	85 guests	Sept 29, 2022
Connecticut SolidWorks User Group	15 small business members	Oct 13, 2022
NEL Hydrogen Workshop	30 guests	Oct 19, 2022
Connecticut Manufacturing Meetup	9 small business executives	Nov 30, 2022

INDUSTRY ENGAGEMENT

Small and Medium-Sized Business Support

As part of its mission statement to support industry partnerships, the IPB strives to support Connecticut small and medium-sized enterprises in their pursuit of innovation, production efficiency, and new product development.

In 2022, IPB centers supported 30 small business projects.

INDUSTRY CLIENT

Zaneez Health
Schwertle
Willington Nameplate
Precipart
Parker Hannifin
Prysmian
South Central CT Regional Water
Manchester Sewage Treatment Plant
Fairfield Wastewater Treatment Plant
Yankee Casting
MOTT Corp
Henkel
ACMT, Inc
AECOM/CTDOT
Carey Manufacturing
PCX Aerospace
Precision Combustion
AdiaTech
Taniobis
Mercury Scientific
NEL Hydrogen
Rogers Corporation
Kano Labs
Otis Elevator
Foster
SCC
Giner
Gerber Technology
Soclean
Pulse Technologies
Prometheus Fuels
Aperture Optical Sciences
Nala Membranes
ZwitterCo
Vortex Engineering
Modelon, Inc

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INDUSTRY ENGAGEMENT

UConn Gateway

The UConn Gateway led by the UConn Tech Park, initiative proposes a means to connect faculty with small and medium-sized enterprises to support economic development. UConn Gateway will provide local businesses with access to a catalog of expertise. Upon identifying their need, the industry client will be connected directly to the faculty where they can receive advisement on their challenges at a reduced rate.

More than the immediate value of the advisement, this program will act as a gateway to further collaboration between local companies and UConn. Affordable expert advice, provided via a simple vehicle, is a perfect springboard to Sponsored Program Services projects, senior design, fee-for-service work, workforce development, and philanthropy.

There exists untapped value at UConn. UConn Gateway will provide companies easy access to intellectual expertise. This transaction is the starting point for support from research labs, proof of concepts, increased technical readiness, and levels of commercialization that collectively will yield tremendous returns to the state and the University.

COBOT Manufacturing Advancement

In connection with the Proof of Concept Center

IPB's Proof of Concept Center (POCC) with CCAT is preparing a proposal to the State of Connecticut to help bring automation to Connecticut manufacturers. Bringing Industry 4.0 standards to Connecticut manufacturers is a critical goal for the state. The adoption of automation into its manufacturing base will help keep Connecticut globally competitive and in a position of long-term economic strength.

This proposed concept will put state funded robotics into manufacturing locations state-wide, providing businesses the opportunity to prove out a robotics application without committing to a full capital investment. Over a five-year period, this project has a lofty goal of outfitting 200 new manufacturing automation applications.

Manufacturing Innovation Undergraduate Intern Project

In connection with the Proof of Concept Center

IPB's Proof of Concept Center has hired two undergraduate mechanical engineering interns to help broaden the capabilities of the center. These undergraduates will support small businesses in Connecticut by helping them reach a proof-of-concept stage for the new products and production innovations. Oftentimes businesses are eager to use the POCC facilities, but their ideas have not been fully conceptualized. Having undergraduate designers available for computer-aided design and simple engineering efforts to bring definition to undefined projects helps more businesses take advantage of POCC facilities.

Climate Venture Studio

In connection with OVPR

The IPB is the host of UConn/RGA's Climate Venture Studio, a studio that identifies, supports, and collaborates with promising startups addressing the most critical dimensions of the climate challenge, including decarbonization, alternate energy, planetary resilience, social impact and more. Six companies have been accepted into the first cohort, with the second cohort expected to start in Fall 2023.

INDUSTRY ENGAGEMENT



Innovation Partnership Building

Emerging Centers

To expand the IPB into a proper tech park, the IPB must foster an expansion of internal research capabilities and affiliated programs and faculty. In 2022, IPB received applications for six new research lab/center-type activities:

Industrial Assessment Center (IAC)

The Southern New England Industrial Assessment Center at the University was selected by the Department of Energy, among 32 universities across 28 states to conduct industrial assessments to help local manufacturers reduce their carbon footprint, lower costs, and train the energy workforce of tomorrow.

IAC Center of Excellence

UConn is joining Syracuse University IAC in proposing to develop a joint regional IAC Center of Excellence (IAC CoE). This center will develop new tools for energy assessments, offer training to other regional IACs, and accelerate decarbonization of SMEs through electrification of industrial process heat.

NursEng

The NursEng Innovation Center aims to advance healthcare and workforce and economic development through interdisciplinary collaborations between nursing and engineering that promotes innovations in health technology.

Center for Excellence in Sensor Technology and Diagnostics

This center's goal is to be the premier innovation platform and hub to foster UConn-Sensor/Diagnosis Industry-Government partnerships, advance cutting-edge sensor/diagnosis research, and strengthen technology transfer for public health, food safety, homeland security, and environment/agriculture/energy sustainability.

Daigle Labs

The goal of this lab is to improve short and long-term outcomes for small/medium enterprises, as well as to provide a commercialization pipeline for both global and locally conducted research with a particular emphasis on areas of agriculture and sustainability.

UConn EPIC

UConn proposed to the U.S. Department of Energy to serve as the next national center for Energy Partnership Intermediary for Commercialization (EPIC) to support and help expedite U.S. Department of Energy (DOE) Office of Technology Transitions with its mission of technology transfer and commercialization in energy and energy adjacent areas.

INNOVATION & ENTREPRENEURSHIP

The SoE launched the Entrepreneurship Hub (eHub) this year to support technology innovators and entrepreneurs: ehub.engr.uconn.edu. The eHub is created as a space to actively promote the exchange of ideas and facilitate collaborations and partnerships among UConn's Tech community.

We're very excited to be able to have this space dedicated to innovation, entrepreneurship, partnerships, and collaborations, and to be able to support our School's students, postdocs, and faculty through a myriad of programs in the commercialization of their work.

Directed by Assistant Professor in Residence of Innovation and Entrepreneurship and Biomedical Engineering Leila Daneshmandi, the eHub offers courses, programs, and activities that provide training and support in entrepreneurship, creative thinking, innovation, and communication. Programs are open to any student, faculty, or postdoc with a technology-based idea that is looking for translation, commercialization, and impact.

The eHub is also developing a mentor network of alumni, local entrepreneurs, and business and industry executives to engage with the eHub's aspiring entrepreneurs and help support them in developing and scaling their ventures.

Courses

Courses currently being offered in technology innovation and entrepreneurship at the SoE include:

Technology Innovation and Entrepreneurship

I and II (taught by Leila Daneshmandi): These three-credit experiential project-based entrepreneurship courses bring together multidisciplinary student teams from engineering, business, and fine arts to develop viable technology-based startups. The courses are focused on ideation, design thinking, product-market fit, startup strategy, operations and organization, future of work, business and revenue models, iterative prototyping and testing, and financial analysis.

Innovation Entrepreneurship (taught by Shiri Dori-Hacohen): This three-credit entrepreneurship course was created to catalyze new venture formation based on cutting edge science and technology. The course provides an experiential, team-based learning opportunity where hybrid engineering and business teams will form and test their ventures through iteratively performing customer discovery and rapid prototyping.

TESTIMONIAL

“ Having the opportunity to learn about and work with amazing technologies at UConn inspired my ideas for implementing some of them into applications that could improve people's health and well-being. Collaborations from professionals



in both scientific and entrepreneurial fields can be difficult to navigate, and the opportunity to learn entrepreneurship skills is not common for most scientists and engineers. Still, Professor Leila Daneshmandi's course on Technology Innovation and Entrepreneurship at UConn provided me with

guidance on both things. Through this course, I was able to further develop my idea for continuous health monitoring through smart-clothing and transform it into a startup which is now called Toribio Labs. Through my experience, I felt tremendous personal growth as an entrepreneur; specifically, I learned how to identify and define the problems I aimed to solve, how to communicate my product's value, and how to pitch my startup.”

John M. Toribio

Ph.D. Candidate, Department of Chemistry
UConn Institute of Materials Science
Toribio Labs Founder

INNOVATION & ENTREPRENEURSHIP

Startup Consulting (taught by Leila Daneshmandi):

This project-based experiential learning opportunity enables students to directly work with UConn startups and gain practical hands-on experience. Throughout the semester, students will work on startup projects and will be given the opportunity to strengthen their technical skills while expanding their entrepreneurial knowledge and learning.

Entrepreneurial Skills (taught by Leila Daneshmandi):

This one-credit professional development course trains SoE graduate students in entrepreneurial skills including creative, critical, and strategic thinking, problem solving and decision making, big picture thinking, communication and presentation, financial literacy, branding, and future of work.

The SoE also offers the Entrepreneurship and Technology Innovation Minor jointly with the School of Business for students interested in learning about the fundamentals of entrepreneurship and technology innovation, with a focus on the product design process, business principles required for viable startups, and physical prototyping.

TESTIMONIAL



During my time in the program, I gained a solid foundation that empowered me to transform my passion for accessible education into an early-stage startup. The program's curriculum not only laid the groundwork for intentional customer discovery but also facilitated the establishment of a vibrant entrepreneurial community, both of which proved to be pivotal in the evolution of my startup. Guided by this knowledge and support, I founded Webquity, a digital accessibility company aimed at introducing "Digital Glasses," a web plug-in specifically tailored to enhance the educational experience of students with visual dyslexia and minor visual impairments. Following the completion of my Master's of Engineering in Global Entrepreneurship journey, I attended the Harvard Graduate School of Education, during which time Webquity continued to flourish and garnered notable acclaim. Presently, I am advancing the growth of Webquity and eagerly anticipate nurturing ongoing connections within the entrepreneurial ecosystem at UConn."



Kianjai Huggan

Candidate, Harvard Graduate School of Education
Webquity Founder
LINGO Product Manager

DEVELOPMENT

The AY2022-2023 was used to grow the Engineering Development team as the SoE prepares for future growth and the University undertakes a national search for a new Dean. Simultaneously, Development staff deepened Engineering's alignment with University focus areas in sustainability, Diversity, Equity & Inclusion and manufacturing.

AY2022-2023 Leading Gifts to the School Included:

- A \$5M bequest to establish the NursEng Innovation Center given by James Belmont '86
- The Cigna Computer Science & Engineering Scholars Program (a \$882,000 DEI/financial need scholarship program that supports 20 CSE students).
- The Belimo Scholars Program (a \$316,000 DEI/financial need scholarship program that supports six Mechanical, Electrical & CSE students)

Major Initiatives:

- Reorganized the team – Senior Director of Development Don Swinton hired new Director of Development Sarah Martin and new Associate Director of Development Shawn Bernier
- Collaboration on UConn's first conference on sustainable energy: "Navigating Climate Change & Energy Security in the Northeast – The Next Five Years," which was chaired by UConn President Radenka Maric. We are preparing for a Fall 2023 follow-up conference titled "The Sustainable Clean Energy Summit: Decarbonizing Society and the Grid"
- Collaboration with Interim Director of the Innovation Partnership Building (IPB) and Director of the Eversource Energy Center Professor Emmanouil Anagnostou on a "Sustainable Energy Initiative" at the IPB, in which three major New England-based companies are planning a public demonstration project
- Collaboration with Connecticut Chief Manufacturing Officer Paul Lavoie and IPB Business Development Manager Michael DiDonato for monthly roundtable lunches – introducing a dozen companies at a time to UConn and all its resources. These lunches have been extremely successful and led to many productive introductions
- Finally, the Development team is planning a year of visits in which Dean Kazerounian will meet with friends of the School interested in cementing their ties and lifting the School to new heights in his final year as dean and in the years to come when he will return to the Engineering faculty



BELIMO PARTNERSHIP

In a competitive job market, recent graduates need to draw on studious scholarship, relevant internship experience, and hands-on practicum to earn an attractive offer.

Thanks to Belimo, an international HVAC manufacturer, several SoE graduates will be able to check off those boxes before they earn a diploma.

University leadership celebrated a partnership between the UConn Foundation, the UConn SoE and Belimo that was announced in Fall 2022. Six SoE students are being supported every year thanks to the generous Belimo Scholarship Program totaling \$316,000.

Photo Caption: Rohan Anderson '25 (ENG) and Lauren Guo '25 (ENG) touring Belimo with UConn President Radenka Maric and SoE Dean Kazem Kazerounian.

DEVELOPMENT

Development Team

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2023 COMMENCEMENT

UConn School of Engineering Commencement speaker, Aryanna Fontanez, Civil Engineering '23.

INFRASTRUCTURE

Space Planning and Management

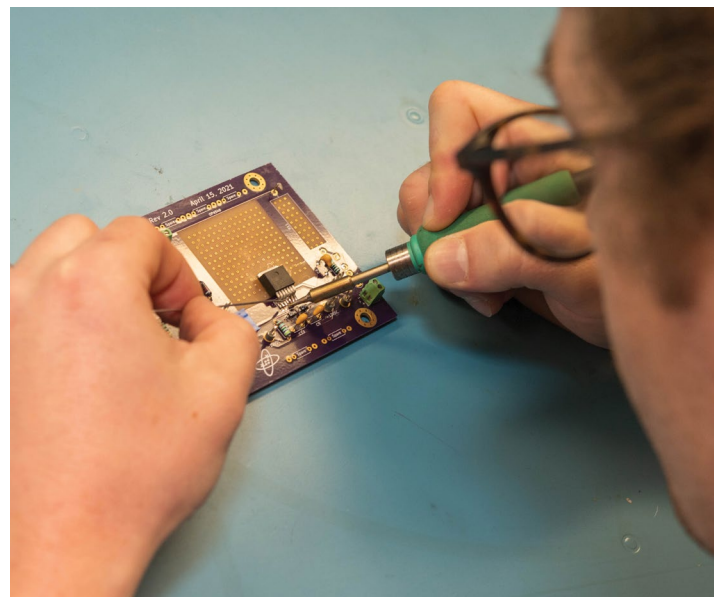
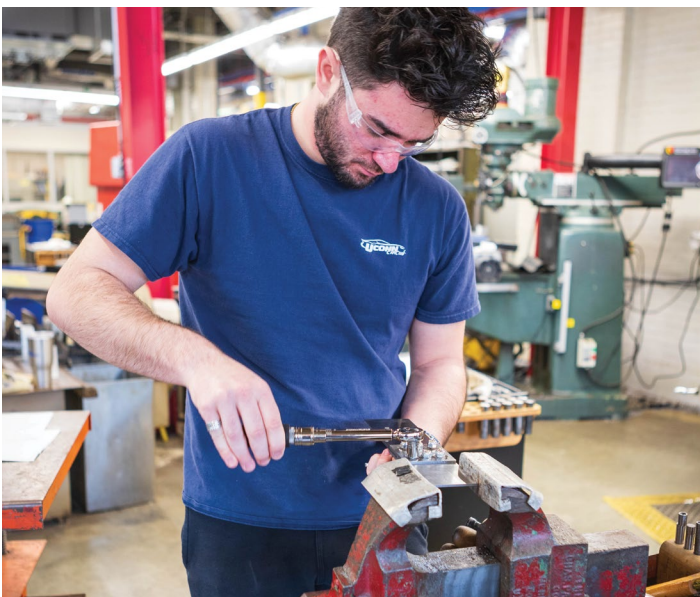
In the last year, we will have spent \$2.1M toward consolidation and renovation of all research, teaching, and administrative spaces. SoE continues to work with University Planning Design and Construction, and UConn Facilities to repair, upgrade and renovate SoE spaces and optimally utilize existing space. SoE continues to address the space shortages as outlined in the Payette report from 2019. The Payette report outlined space needs with growth, and the school continues to fall short in space required for research, academics, and teaching labs. Business operational discussions are addressing space shortages as well as efficiency of our administrative, IT, research, teaching, and shop spaces. The continued growth of the School's enrollment and research expenditures, as well as availability of space to support the School's core missions, has required the university to identify additional spaces and new buildings.

IT Support for Education and Research

As COVID-19 has moved from the Pandemic to an Endemic phase; UConn students, faculty, and staff have continued to work in a hybrid manner. Engineering Technical Services (ETS) is committed to supporting the SoE community regardless of location. Our security teams continue to make improvements in identifying, prioritizing, and managing all computer and network systems. Export controlled research, which requires NIST 800-171 compliance, continues to grow and ETS has provided support to improve the IT and administrative support structure to manage over 130 projects. Senior Design (SD) continues to be a large program for SoE, ETS working with SD administrators to centralize data and processes on UConn supported resources.

Machine Shop and Electrical Shop

In response to state and national needs for engineering students with manufacturing skills, the SoE team is looking at major curriculum changes and at the possibility of reimagining 15,000 square-feet of machine shop spaces into a safe, hands-on teaching and student use space. Engineering's machine shop and electrical shop provide precision manufacturing services and technical assistance to hundreds of faculty members and students in support of the School's educational and research missions. Support has included assisting over 800 SoE seniors on their senior design projects and supporting numerous research teams on prototype design and construction. The shops are equipped with state-of-the-art metal, plastic, and woodworking machinery. Additionally, SoE has begun implementing a student worker program which will allow the shops to remain open for longer hours to support the needs of our students.





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