A Message from the Engineering Leadership

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As documented in this report, the UConn School of Engineering has emerged as a powerhouse for research and engineering education in the State of Connecticut. Through the dedication of our faculty and staff and careful stewardship of resources, we have fulfilled the commitments made to the State of Connecticut under the Next Generation Connecticut program by:

- Increasing our undergraduate enrollments by 70% in six years to address the state-wide need for engineering talent.
- Increasing our research expenditures (total and per faculty member) by 35%.
- Establishing collaborative partnerships with industry that drive economic competitiveness among Connecticut’s core sectors. Engineering partnerships amounting to $80M place the Technology Park-Innovation Partnership Building in an exceptional position for its 2018 launch.
- Strengthening and diversifying our sponsored research portfolio, bringing resources, engineering talent, and transformative ideas to our state.
- Pursuing innovation and entrepreneurship initiatives that turn our intellectual capital into economic development.

The SoE has also demonstrated an unwavering commitment to the betterment of society in Connecticut and beyond through:

- Research and public service initiatives that address socially-relevant challenges, such as brownfields remediation, cybersecurity, and engineering for human rights.
- A resolute pursuit of diversity and gender parity in engineering through initiatives targeted at all levels of the STEM enterprise, from K-12 initiatives, through undergraduate and graduate education, to faculty hiring and development.
- A strong commitment to developing philanthropy to support our students and faculty during tight budgets.

Connecticut and its engineering community look to UConn Engineering for leadership, intellectual capital, and outstanding graduates who will ensure the economic future of our state. Although we are concerned that challenging fiscal environments may limit our ability to act as a driver for economic development and innovation in Connecticut, we remain excited about our achievements to date and our trajectory for the future. We look forward to working with our many government, industry, and alumni partners to pursue creative strategies to strengthen our programs and build our resources in the years to come.

We gratefully acknowledge our advocates in the State of Connecticut and industry, whose support has led to significant advances in STEM education at UConn. We also deeply appreciate the commitment of our faculty and staff, whose tireless pursuit of excellence has made possible the achievements reported here. We are proud to be part of this team.
Table of Contents

Undergraduate Education ................................. 1
Graduate Education ........................................ 5
Faculty ......................................................... 7
Scholarship ..................................................... 9
Sponsored Research ................................. 10
Industry Engagement ................................. 14
Continuing and Distance Education ................. 15
Entrepreneurship ........................................... 16
Interdisciplinary Initiatives ......................... 18
Development .................................................. 19
Diversity and Outreach ................................. 21
Infrastructure and Staffing ......................... 25
The following sections outline the School of Engineering’s major achievements and initiatives in undergraduate education.

**Enrollment Growth**

In response to ambitious growth targets mandated by the state’s Next Generation Connecticut legislation, UConn School of Engineering (SoE) has nearly doubled the size of its undergraduate student body over the past 10 years and has increased its undergraduate count by 70% since 2012. Our projected enrollment for the fall 2018 semester is 3593. In addition, the quality of our students is rising. The average SAT score of our admitted incoming freshmen is 1372.

**Regional Campus Expansion**

**Four-Year Computer Science Program at the Stamford Campus**

UConn Engineering launched a four-year computer science and engineering program at the Stamford campus in fall of 2017. Our commitment is that students can now complete their entire degree program at Stamford. The Stamford program makes the computer science curriculum widely available to Connecticut’s information-technology-based sectors, such as finance and insurance. However, further investment in teaching staff is required to fulfill this commitment.

**Freshman Engineering Curriculum at Regional Campuses**

The freshman engineering curriculum is now offered at all of the UConn regional campuses. We have also been working closely with regional campus representatives to offer coursework beyond the freshman year at all regional campuses, so as to maximize the number of students that can remain at the regionals to complete 54 credits. By offering sufficient coursework, it could be possible to support 20-30 engineering students per academic year at each of the regional campuses. In spring semester 2018, 90 students were enrolled in the freshman engineering curriculum at regional campuses. The projected enrollment for fall 2018 is 102.

**Regional Campus Support Network Initiative**

Engineering faculty at regional campuses have developed a support network that adopts innovative course approaches to strengthen and expand curriculum offerings. Many regional campus faculty now offer flipped classes and post their lectures online to be available to all students.

**Student Demographics**

- 3280 Students enrolled on the Storrs campus, fall 2017
- 732 Degrees conferred, 2017-18 ytd.
- 817 Female students
- 152 International students
- 1372 Avg. SAT of admitted students

**Student Achievements**

- 4 University Scholars
- 3 Holster Scholars
- 10 IDEA grant
- 8 SURF awardees
- 64 honors graduates

**Scholarships**

In addition to university scholarships, the SoE raised $940,608 in scholarships from industry and individual donors. These scholarship funds were distributed to support 335 students in 2017-2018.
Cornerstone Initiative: Freshman Experience

In 2016, the SoE launched the “Cornerstone Initiative,” which focuses on the radical redesign of the freshman engineering experience. The Cornerstone Initiative reworked the ENGR 1166 – Foundations of Engineering course. In the 2017-2018 academic year (AY), this new course served ~450 freshmen students in biomedical, chemical, civil, environmental, mechanical, and undecided engineering. Students worked in small groups on two multidisciplinary projects and presented their work at the second Freshman Design Expo, held in concert with the Senior Design Day exposition at the end of the Spring 2018 semester.

The 2018-2019 AY will expand the course to the remaining two engineering majors, electrical and materials science, for a total of ~600 students served.

Cornerstone Design Laboratory. Starting in January 2019, the updated ENGR 1166 course and other freshman activities will be housed in a newly-renovated ~2000 sq. ft. Cornerstone Design Laboratory located on the first floor of the United Technologies Engineering Building. With a modular floorplan, a makerspace, and creative student workspaces, this new centerpiece of the freshman experience will serve the entire freshman population in engineering as well as many students interested in exploring engineering for years to come. A proposal has been developed and presented to potential donors to name the Cornerstone Initiative.

International Engineering Program

The School of Engineering consolidated its engineering and foreign language dual degree offerings into the newly-launched International Engineering Program. The International Engineering Program is comprised of Eurotech, Baden-Wurttemberg, Germany (est. 1993), the Engineering Spanish Program, Valencia, Spain (est. 2013); AsiaTech, Shanghai, China (est. 2016), and Technopole France, Toulouse, France (est. 2018). The Technopole France program was established in the 2017-2018 academic year through a new exchange agreement with University of Toulouse.

The Eurotech Program, supporting dual degrees in German and engineering, celebrated its 25th Anniversary and hosted a delegation of four officials from Baden-Wurttemberg, Germany in April 2018. 176 students have graduated from the Eurotech program since its inception in 1993.

<table>
<thead>
<tr>
<th>International Engineering Student Data for AY 2017-2018</th>
<th>Students Enrolled</th>
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<td>Asia Tech</td>
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<td>Technopole France</td>
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Minor in Engineering for Human Rights

A new minor, Engineering for Human Rights, was developed in 2016-17 as a result of collaborations between the School of Engineering and the UConn Human Rights Institute. The minor provides students with interdisciplinary instruction in theoretical, comparative, and historical perspectives on human rights. In addition to classroom instruction, the minor requires a supervised internship in human rights in industrial settings, which gives students valuable practical experience.
ABET

All of the SoE’s programs (except Engineering Physics) are accredited by ABET. The SoE will have its next accreditation visit from ABET (www.abet.org) in the fall of 2019. The 2018-2019 academic year is our self-study year, and the self-study reports for all programs are due to ABET by July 2019.

Advising

In response to one of the outcomes of the ABET review process, the school has hired eight professional advisors to supplement faculty advising. Typically, first- and second-year students are assigned to a professional staff advisor who assists students in their transition to college, in navigating the university, and in course selection and academic planning. Faculty advisors typically meet with engineering students with junior or senior standing in order to assist students in their course selection, counsel them in meeting their educational and career goals, and provide discipline-specific mentorship. In 2017-18, the advising team debuted interactive training for new and returning faculty advisors, including an introduction to the new university-wide advising software, Nexus (formerly Sandbox). The advising team also launched a new internal admissions portal at a new site, request.engr.uconn.edu, and rolled out a new electronic portal with a workflow approval system for graduation substitutions, formerly a paper process.

To accommodate the needs of our increasing student population, the advising team also developed and launched a new peer mentor program to provide engineering undergraduates with additional advising services.

Biomedical Engineering Department

In response to the State of Connecticut’s Biotechnology Initiative, Biomedical Engineering (BME) was proposed and approved as a new department by the Board of Trustees in fall 2012. The dean of the School of Engineering proposed and worked on establishing the department’s novel structure with the deans of medicine and dental medicine. As part of the Schools of Engineering, Medicine, and Dental Medicine, the BME department represents a daring departure from traditional models in order to facilitate significant opportunities for interdisciplinary, cross-campus faculty collaborations and student experiences.

Examples of Active Federal Grants Supporting Undergraduate Education

• Naval STEM Coalition ($1.320,000, Office of Naval Research, 2017) joint program with URI introducing undergraduates to naval science and technology
• Four active NSF Research Experiences for Undergraduates (REU) Sites:
  - REU Site: Engineering Entrepreneurship Education: A Multidisciplinary Entrepreneurial Research Experience for Undergraduates
  - REU Site: Interdisciplinary Nanotechnology Traineeship for Next-Generation Energy, Health, Information, and Manufacturing
  - REU Site: Research Experience in Cyber and Civil Infrastructure Security for Students with ADHD: Fostering Innovation
  - REU Site: Trustable Embedded Systems Security Research

A total of nine NSF REU Sites have been awarded to SoE since 2012.
### School of Engineering Majors and Exploring Engineering ACES students, Fall 2018

Office of the Registrar, as of August 9, 2018

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Overview

School-wide graduate education initiatives augment departments’ academic programs by orchestrating graduate enrichment programs available to all students, providing professional skills training and opportunities, supporting graduate diversity and outreach efforts, and developing interdisciplinary academic programs. Graduate education initiatives aim to produce M.S. and Ph.D. graduates with the highest caliber of academic achievement and the professional capabilities that enable graduates to thrive in both academia and industry. Because we are facing significant challenges in graduate student recruitment and training, we have proactively undertaken multiple initiatives to address these challenges.

Challenges

Cost
In 2017, the fringe benefits rate for graduate students was 27%. The indirect cost burden was 59% and will rise to 61% in 2018. The cost of supporting a full time graduate research assistant is $60,816, including stipend, fringe benefits and indirect cost - excluding tuition (for an entry level MS student for 12 months a year working 20 hours/week). This cost per student is higher than most of our public peer universities in the US, placing significant competitive pressure on faculty researchers who need to support graduate students through their research grants. As the school does not typically provide service courses to non-engineering majors (compared to departments such as mathematics, chemistry, biology, and physics, to name a few), the SoE does not have large numbers of TA lines that are available to support engineering graduate students.

Recruiting
Consistent with nationwide trends, the SoE struggles to recruit and retain high-quality graduate students, particularly domestic students. The debt incurred by undergraduate students makes them unwilling to enter graduate programs. In addition, UConn is competing with peer and higher ranked universities for a shrinking pool of students. As a result, faculty have difficulty securing adequate talented students. This has serious implications for their research programs.

Professional Skills
One of the challenges facing our graduating M.S. and Ph.D. students is that many are deficient in the professional skills needed to find positions in industry or academia commensurate with their technical training and to be successful.

The SoE has undertaken major initiatives in the past year focused on addressing these challenges, as described below.
Major Initiatives

Fellowships Awarded to Supplement and Offset the Cost of Graduate Assistantships

In the past few years, we have 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. Our success in these areas has been significant, totaling over $1.2M in the 2017-2018 AY. and includes the following fellowships (Our students receive many other fellowships directly which are not reported here):

Federal
- 6 Bridge to the Doctorate, NSF
- 21 GAANN, Dept. of Education
- 3 Eisenhower Transportation
- 2 NEUTC
- 3 Naval STEM Coalition

Industry
- 2 Cigna
- 12 UTC
- 22 GE Innovation
- 2 FEI

Foundation
- 1 Ford Foundation

UConn-Internal Competitions
- 2 Giolas Harriott
- 6 Crandall Cordero
- 1 Taylor Booth

Recruitment Initiatives

We have recently developed and implemented a comprehensive graduate student recruiting plan. This includes a focused marketing campaign and providing application fee waivers to top candidates. We have placed significant focus on diversity in recruiting. We have had representatives in various diversity recruiting events across the country. Additionally, we conducted a two-day on-campus domestic student recruitment event. In spring 2018, this event attracted 33 candidates from different US universities (all expenses paid). One of our key initiatives is developing collaborative relationships with the universities in the region that do not have undergraduate engineering programs to provide a bridge for top science students (physical or life sciences) to pursue graduate degrees in engineering.

Professional Development Opportunities for Graduate Students

In fall 2017, we established the John Lof Leadership Academy for Graduate Students and inducted 29 members for the first cohort. Supported by the proceeds of the John Lof Leadership endowment ($1M), the academy supports the academic and future professional success of graduate students in SoE by developing leadership and professional skills through a rich spectrum of workshops, one-on-one mentorships by successful alumni, and opportunities for social interactions in professional circles. We have also formed a “Women in Engineering” subgroup of the John Lof Leadership Academy to further support women in a profession that has traditionally been dominated by male colleagues.
Faculty Head Count

The number of tenured or tenure track (T/TT) in the School of Engineering has stayed relatively constant in the last five years and has modestly increased in the last seven years. A total of sixteen T/TT faculty positions were added in the last seven years. Of the sixteen, eleven account for the faculty lines in the newly developed BME Department, which was established by the Board of Trustees in September 2012 in response to the university’s commitment to the state’s Biotechnology Initiative.

Engineering courses are not taught by graduate students. To accommodate the dramatic increase in the undergraduate enrollment, we have developed a cadre of passionate faculty focused on teaching (APIR- 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 continuously work with, and go through training provided by, the Center for Excellence in Teaching and Learning (CETL) to improve their teaching skills. We have also developed rigorous standards for teaching faculty annual evaluations as well as promotions.

Challenges

To accommodate budget cuts in the SoE, senior faculty who retired or left the school are generally replaced with more junior faculty. While this is an investment in the future, it creates challenges, including accommodating lower teaching loads for pre-tenured faculty. The SoE had a total of 51 pre-tenured faculty in Fall 2017.

We have been extremely successful in enhancing the school’s research portfolio and in supporting industry. However, future expansions in these areas require meaningful investments by the university in additional T/TT faculty lines.

Another challenge we face is that the salaries we are able to offer our existing faculty are now below national norms, placing us at risk of significant talent losses. In the past, direct support was given by the provost to address specific retention risks, which lessened the potential damage of non-competitive salaries.
Faculty Retention

Engineering is a competitive field, and faculty flux is the rule rather than the exception. In the absence of adequate financial flexibility to retain our faculty, we have focused on creating a positive environment and offering faculty support in research development skills and in teaching skills. As a result, our retention rate has drastically improved. The following table shows the trend for faculty attrition (not including retirement) in the SoE in the past six years. About 75% of the senior faculty who left the school have moved to senior leadership positions in academia.

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
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<td>5</td>
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Chair, Named, and Term Professorships

In order to further support our faculty, we have worked extensively with industry and private donors to create chair, named, and term professorships. We currently have seventeen endowed chair, seven named, and twenty term professorships.

Additionally, we have created two Outstanding Achievement Awards per semester, ($10,000 each) to recognize meritorious faculty and staff and to encourage others.

Enhancing Research Development Skills

Since 2015, the SoE has provided grant writing skills training to junior faculty through a series of workshops focused on the NSF CAREER competition. The workshops are offered monthly between November and May. Our multi-year effort culminated in a record five CAREER awards in the past year. Over the past three years, our faculty have received fourteen early career awards from the National Science Foundation, the Office of Naval Research, NASA, and the Air Force Office of Scientific Research.

Enhancing Teaching Skills

To promote high-quality undergraduate instruction, the school has taken measures to support and promote the teaching mission of its T/TT and in-residence faculty. In 2017, Dr. Sarira Motaref was appointed the school’s assistant director of faculty development and its liaison with the Center for Teaching and Learning; her focus is to develop resources and identify opportunities for teaching faculty.

In the 2017-2018 academic year, more than fifteen engineering faculty attended intensive workshops to explore the innovative teaching methods and technologies, including project-based learning, scientific teaching, inclusive teaching (promoting diversity), and empowering high-level skills for STEM students. These teaching techniques will be implemented in undergraduate courses across all departments in the 2018-2019 academic year. In addition, four projects supported by 2017 Academic Plan Mini Grants will explore software-based problem solving, hybrid delivery modes, student-developed comics, and cloud-based management tools to enhance undergraduate student learning.
Scholarship

The generation of knowledge through scholarship is vitally important to the School of Engineering. The SoE promotes scholarship first and foremost by recruiting and retaining the highest caliber faculty. The school 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.

Summary of Scholarly Activity in AY 2017-2018

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.

- 398 Journal publications
- 661 Conference publications
- 16 Patents issued
- 52 Editorships
- 165 Associate editorships
- 16 Early career awardees, including NSF CAREER and Young Investigator Program (ONR, NASA, and equivalent)
- 32 Faculty are fellows of learned national and international societies—many of them are fellows of multiple societies
- 46 Members of the Connecticut Academy of Science & Engineering
- 1 Member, National Academy of Engineering (NAE), National Academy of Medicine, National Academy of Science
- 3 Professors of Practice who are members of the NAE

Faculty Honors and Awards

Connecticut Academy of Science & Engineering (CASE)

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.

Forty-six UConn Engineering faculty are currently members of CASE. Prof. Baki Cetegen currently serves as CASE vice president and president elect. Six UConn Engineering faculty were inducted into CASE in 2018: Richard Christenson, CEE; Horea Ilies, ME; Yu Lei, CBE; Laurent Michel, CSE; Ranjan Srivastava, CBE; Bing Wang, CSE.

Five NSF CAREER Awards in 2018: The CAREER program offers the National Science Foundation’s most prestigious awards in support of early career faculty. In 2018, UConn Engineering had five faculty win the NSF CAREER award: Ali Bazzi, ECE; Maifi Khan, CSE; Julian Norato, ME; Kristina Wagstrom, CBE, and Xu Chen, ME. In addition, Ying Li of ME won the NSF Computer Science Research Initiation (CRII) award, one of only 30 such awards made in 2018.

Air Force Office of Scientific Research Young Investigator: Prof. Xinyu Zhao, ME, was one of 45 faculty nationwide to win the 2017 AFOSR Young Investigator Award.

Other National Recognitions in AY 2017-2018

- 2018 Optical Society Joseph Fraunhofer Award/ Robert M. Burley Prize
- 2017 IEEE RAS George Saridis Leadership Award in Robotics and Automation
- Prof. Cato Laurencin, recipient of the National Medal of Technology from President Obama in May 2016, is one of eight University Professors in UConn’s history and is a Member of both the National Academy of Engineering and the National Academy of Medicine. Prof. Laurencin is a faculty member in the Departments of Biomedical Engineering, Chemical and Biomolecular Engineering, and Materials Science and Engineering.
- Prof. Laurencin also holds leadership positions at UConn in biomedical engineering and medicine, including: Albert and Wilda Van Dusen Distinguished Endowed Professor of Orthopaedic Surgery; Director, Institute for Regenerative Engineering; Director, Raymond and Beverly Sackler Center for Biomedical, Biological, Physical and Engineering Sciences; and Chief Executive Officer, Connecticut Institute for Clinical and Translational Science.
Sponsored Research

The UConn Engineering research enterprise encompasses an expanding federal research portfolio, state-funded research and service initiatives, and major industrial partnerships—many of which undergird the Technology 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.

Sponsored Research Overview

The School of Engineering is one of the most research-active schools at UConn. The school’s research expenditures have been consistent and increasing over the past five years. The SoE achieved a 40% increase in research expenditures between 2011 and 2017, reaching $34.7M in 2017, as reported by the OVPR. These expenditures were augmented by research funds administered through the UConn Foundation and the UConn Health Center that are not included by the OVPR, bringing our total 2017 research expenditures to $47.7M. Our T/TT faculty expended an average of $330K in external research funds in 2017.

Research Development Strategy

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

1. **Faculty Support:** Strengthen faculty members’ ability to pursue funding through open competitions, such as federal agency funding opportunity announcements, by offering mentorship and grantsmanship skills training and by providing proposal development support.

2. **Mission-Driven Agencies:** Identify opportunities in mission-driven agencies that align with SoE’s unique capabilities and State of Connecticut priorities, initiate and pursue contacts and advocacy with program managers and agency personnel, and work with the Office of Governmental Relations to gain access to diverse funding streams.

3. **Industry Partnerships:** Work with industry partners to build applied research portfolio and capabilities. Increase likelihood of success on federal funding competitions by identifying and pursuing strategic industry partnerships. Pursue partnerships on national initiatives that can lead to increased support for industry-relevant research. Continue to build IPB presence as a gateway for industry engagement throughout UConn.

Details on the school’s initiatives and successes in these three areas follow.

Sponsored Research Data

- $47.7M Total FY 17 research expenditures
- $330K Average research expenditure per faculty
- 485 Proposals submitted
- 584 Active grants

Research Funding Sources

- 80% Federal
- 6% Corporate
- 14% Other

The National Institute for Undersea Vehicle Technology was launched to support national naval technology capabilities, 2017
Faculty Support

Junior Faculty Skills Development
Since 2015, the SoE has provided grant writing skills training to junior faculty through a series of workshops, offered monthly between November and May, that focused on the NSF CAREER competition. Our multi-year effort culminated in a record five CAREER awards in the past year, and a 37% success rate for the faculty who participated in the workshops. Over the past three years, our faculty have received fourteen early career awards from the National Science Foundation, the Office of Naval Research, NASA, and the Air Force Office of Scientific Research.

Targeted Research Proposal Development Support
In 2014, the SoE engaged a full time writer/editor with expertise in proposal development, academic writing, reporting, and strategic communications. The writer has supported junior faculty skills development, large-scale multi-investigator research proposals, and programmatic proposal support. To address an unmet need for proposal support, the SoE secured the services of three additional freelance writer/editors who support proposal submissions on-demand. In 2018, the SoE launched an automated online system to facilitate scheduling of writing/editing resources for faculty.

We have also provided support for faculty members to receive grantsmanship training and to connect with program managers through national conferences and workshops and through visits to federal agencies.

Mission-Driven Agency Engagement

Over the past five years, the SoE has worked to build its funding base by identifying funding opportunities in mission-driven agencies that align with SoE’s unique capabilities, by pursuing contacts and advocacy with program managers and agency personnel, and by working with the Office of Governmental Relations to gain access to funding streams. Examples of these efforts follow.

National Institute for Undersea Vehicle Technology
The SoE worked with UConn’s Office of Governmental Relations, the University of Rhode Island (URI), regional industry (Electric Boat), and Navy partners (NUWC) to establish the National Institute for Undersea Vehicle Technology, a university-industry partnership that collaborates with the Navy to advance the capabilities of the next generation US undersea fleet by training innovative workforce and by accelerating the research, development, and transition of key enabling technologies. NIUVT is slated to receive funding from the Navy in excess of $5M for FY 2018. UConn Co-Director: Prof. Richard Christenson.

AFRL Manufacturing Technologies Award
In July 2018, the SoE received a $5.4M grant from the US Air Force Research Laboratory, “Simulation-Based Uncertainty Quantification of Manufacturing Technologies.” This award was a result of work with UConn’s Government Relations Office and industry partners (Pratt & Whitney, Aerogear, and GKN). PI: Prof. Pamir Alpay.

DoE Fuel Cell Technologies Award
In August 2018, Prof. Radenka Maric, Vice President for Research and Professor of Materials Science and Engineering, was awarded a $2M grant from the Department of Energy, “Catalyst Layer Design, Manufacturing and In-line Quality Control.”

DoE Advanced Manufacturing Graduate-Level Traineeships
In February 2018, SoE secured a $1.25M award to launch an MS and MENG program in Advanced Manufacturing for Energy at UConn. UConn and Georgia Tech were the only two universities in the country to receive these grants. PI: Prof. Ugur Pasaogullari.

In the Pipeline

NSF Engineering Research Center
Prof. Cato Laurencin submitted a proposal for an ERC in Regenerative Engineering (under review).

USAID
UConn Engineering and the Office of the VP for Global Affairs have partnered with Virginia Tech and Alexandria University in Egypt to submit a proposal in August 2018 to USAID for $30M to create a multi-center of excellence consortium on sustainable energies.

Graduate Assistance in Areas of National Need (GAANN)
Four SoE teams are submitting proposals for the GAANN competition. Since 2009, the SoE has been awarded 13 GAANN grants.

NSF Research Traineeship Program (NRT)
The SoE currently has two NSF NRT proposals under review.
Transportation Initiatives
We made significant strides in building resources for transportation research and transportation safety initiatives through our Connecticut Transportation Institute (CTI) and our Connecticut Transportation Safety Research Center (CTSRC) that serve the State of Connecticut.

- CTI/CTSRC secured over $20M in new awards in FY16 and put forward new research initiatives in FY17.
- In collaboration with the Connecticut Department of Transportation (CTDOT), we have initiated a state-wide effort in autonomous vehicle technologies. We established a new major transportation facility by securing and installing a driving simulator in spring 2018.
- In fall 2017, UConn Engineering became a partner on a new University Transportation Center, funded at $14.2M over five years, led by the University of Maine.
- We are currently partnering with the CTDOT to undertake several multi-million dollar initiatives on autonomous vehicles at UConn.

Industry Research Partnerships

Manufacturing USA Initiatives
The resurgence of manufacturing in Connecticut is recognized to be one of the state’s key sectors for economic growth. To support Connecticut manufacturing, the school secured six national grants with industry partners focusing on development and implementation of advanced manufacturing technologies. Five of these grants are through national institutes established by the Manufacturing USA initiative:

- Under a DOE Clean Energy Smart Manufacturing Innovation Institute (CESMII) grant awarded May 2018, UConn will collaborate with UTRC, GKN, CCAT, and EDAC to establish a smart manufacturing testbed facility in Connecticut. ($2M with cost share) PI: Prof. George Bollas.
- Under a DoD Advanced Robotics for Manufacturing (ARM) institute grant awarded June 2018, UConn is collaborating with UTRC and ABB to develop and demonstrate collaborative robotic technologies for the manufacture of wire harness assemblies, which are used extensively in the aerospace and automotive industries. ($1.4M total with cost share) PI: Prof. Ashwin Dani.
- Under a second DoD ARM institute grant awarded June 2018, UConn is working with Connecticut’s community colleges to launch a robotic manufacturing apprenticeship program. ($330K total) PI: Prof. David Giblin.
- Under a NIST Rapid Advancement in Process Intensification Deployment (RAPID) institute grant awarded August 2018, UConn’s Fraunhofer Institute along with a UConn TIP company will develop advanced methods for ethanol distillation using carbon nanotubes. ($1M total with cost share) PI: Prof. Jeffrey McCutcheon.
- Under a DoD Flexible Hybrid Electronics Manufacturing Institute (NextFlex) grant awarded July 2018, UConn is teaming with Boeing to develop and demonstrate advanced manufacturing processes for printing of flexible electronics. ($1.2M total with cost share) PI: Prof. Anson Ma.
Centers and Institutes

The SoE has taken the lead to support the university in working with industry to establish impactful partnerships at the UConn Technology Park Innovation Partnership Building (IPB). The goal is to make the IPB the gateway for industry collaborations across the university. Engineering-led industrial partnerships, listed below, have brought $80M to UConn’s IPB/ TechPark in the past five years, thereby enabling a successful IPB launch in September 2018.

**Connecticut Cybersecurity Center (C3)**
- Comcast Center of Excellence for Security Innovation  
  est. 2014, industry investment $7M
- Center for Hardware Assurance and Security Engineering (CHASE)  
  est. 2012, industry investment $1.075M, $2.5M federal
- Synchrony Financial Center of Excellence in Cybersecurity  
  est. 2017, initial industry investment $2.2M
- VoTeR: Center for Voting Technology Research  
  est. 2006, state investment approx. $500K annually

**Connecticut Transportation Safety Research Center (CTSRC)**
est. 2012, $21.8M total investment, ~$21M from state and federal government

**Enterprise Solution Center**
- Connecticut Manufacturing Simulation Center
- Quiet Corner Innovation Cluster
- Proof of Concept Center
  These centers were established in 2016 with $2M support from the Economic Development Administration and Connecticut Innovations.

**Eversource Energy Center**
Est. 2015, industry investment $10M. An additional $7M investment is expected in 2018.

**Fraunhofer USA Center for Energy Innovation (CEI)**
Est. 2013, industry/ state investment $6M

**National Institute for Undersea Vehicle Technology (NIUVT)**
Est. 2018 in collaboration with URI, Electric Boat, and NUWC, $5M initial federal support expected in 2018.

**Pratt & Whitney Additive Manufacturing Innovation Center**
Est. 2013, industry investment $7M

**Reverse Engineering Fabrication Inspection & Non-Destructive Evaluation (REFINE)**
Est. 2017, industry investment $5.5M

**UConn Thermo Fisher Scientific Center for Advanced Microscopy and Materials Analysis (CAMMA)**
Est. 2014, industry investment $12.7M

**UTC Aerospace Systems Center for Advanced Materials**
Est. 2016, industry investment $1.4M

**UTC Institute for Advanced Systems Engineering**
Est. 2013, industry investment $10M

Research done in SoE-led centers, such as the Eversource Energy Center, support industry/university collaboration at the IPB

**Standing Centers and Institutes**

These centers operate directly under the auspices of the School of Engineering:

**Center for Clean Energy Engineering (C2E2)**
est. 2001

**Connecticut Transportation Institute (CTI)**
est. 1974

**Taylor L. Booth Engineering Center for Advanced Technology (BECAT)**
est. 1981

Engineering faculty have a strong presence in the following standing university centers and institutes:

**Institute for Materials Science (IMS)**
est. 1965

**Center for Environmental Sciences and Engineering (CESE)**
est. 2006
Industry Engagement

A central mission of the School of Engineering is to collaborate with industry partners through education, research and technology infusion, which contributes directly to economic development within the state and nation. The following section summarizes the school’s significant industry engagement activities during the past year. Our research and development initiatives with industry are described in the sponsored research section of this report.

Senior Design Program

Each year, all graduating engineering students are required to complete a year-long design project, which is typically performed in teams of three to four students and in collaboration with an industry or government sponsor. In AY 2017-2018, about 100 industry/government sponsors were involved in the approximately 250 senior design projects performed; some companies sponsored up to five separate projects. The Engineering Senior Design Program provides a multitude of benefits to UConn students and the sponsoring companies.

Student Career Development

The demand for engineering talent within Connecticut is particularly high with the unprecedented growth in the state’s aerospace and naval sectors. In AY 2017-2018 and in addition to university career fairs, the school held two career fairs, which were attended by 136 companies and government agencies. In addition to participating in career fairs, many of our students accept internships with companies. Internships provide students with exposure to the engineering workplace and help develop professional skills.

Engagement with Small- and Medium-Sized Manufacturers (SMEs)

Through its trio of centers at the Tech Park—the Quiet Corner Innovation Cluster (QCIC), Proof of Concept Center (POCC), and the Connecticut Manufacturing Simulation Center (CMSC)—the school has launched an effective new model for connecting small companies with advanced research capabilities and business expertise. The Tech Park SME engagement effort has reached 21 companies.

Centers and Institutes

Considerable industry engagement is performed by the school through its centers and institutes, which are identified in the Research section. During the past year, many of these centers/institutes were moved from temporary space to the Innovation Partnership Building.

Over 300 companies have worked with UConn Engineering in the past four years, including the following:

- 3M
- ACADEMIC KEYS
- ADAPTIVE-AVIATION ADVANCED ENVIRONMENTAL INTERFACE, INC.
- AERO GEAR
- AGROVOLUTION
- AIRBORNWAY CORPORATION
- ALDRICH CONSTRUCTION COMPANY
- ALSTOM POWER
- AMASTAN TECHNOLOGIES LLC
- AMTI
- ASML
- ASSOCIATED SPRING
- BARNES AEROSPACE
- BELCO
- BGR RADIATOR
- BIOFILERS LLC
- BIOMASS CONTROLS LLC
- BIORAS
- BOSTON SCIENTIFIC
- BUCHER EMMART CLASS
- CAPESWELL AERIAL SYSTEMS
- CARLING TECHNOLOGIES
- CARLISLE JOHNSON CENTRAL CENTERLESS GRINDING
- CHAPMAN MANUFACTURING CIQNA
- CLARCOR EMS
- CLARCOR ENGINE MOBILE SOLUTIONS
- CME ASSOCIATES, INC.
- COMMERCIALLY LICENSED COOPERATIVE KITCHEN, INC.
- CONNECTICUT CORSAIR
- COVIDEN
- COWI MARINE NORTH AMERICA
- CS COMMUNICATION & SYSTEMS
- DELONI
- DELUXE SYNTHES
- MITEK
- DURACELL
- EAST COAST FLOOD AND STORM PRODUCTS LLC
- EDAC TECHNOLOGIES
- EDGEEWELL EEMAX
- ECGRID HEAD ICE CREAM
- EMERSON PROCESS MANAGEMENT
- EMMART CLASS RESEARCH CENTER
- EMMRE
- EVERSOURCE ENERGY
- FLEXION
- FOSTER DELIVERY SCIENCE
- FROST & LAY
- GE ENERGY MANAGEMENT
- GE POWER
- GENERAL DYNAMICS - ELECTRIC BOAT
- GENERAL ELECTRIC
- GENERAL ELECTRIC INDUSTRIAL
- GE POWER
- DELIVERY SCIENCE
- FRITO-LAY
- GE ENERGY MANAGEMENT
- EMHART GLASS
- EMHART GLASS RESEARCH CENTER
- EMME
- EVERSOURCE ENERGY
- FLEXION
- FOSTER DELIVERY SCIENCE
- FROST & LAY
- GE ENERGY MANAGEMENT
- EMHART GLASS
- EMHART GLASS RESEARCH CENTER
- EMME
- EVERSOURCE ENERGY
- FLEXION
- FOSTER DELIVERY SCIENCE
- FROST & LAY
- GE ENERGY MANAGEMENT
- EMHART GLASS
- EMHART GLASS RESEARCH CENTER
- EMME
- EVERSOURCE ENERGY
- FLEXION
- FOSTER DELIVERY SCIENCE
- FROST & LAY
- GE ENERGY MANAGEMENT
- EMHART GLASS
- EMHART GLASS RESEARCH CENTER
- EMME
- EVERSOURCE ENERGY
- FLEXION
- FOSTER DELIVERY SCIENCE
- FROST & LAY
- GE ENERGY MANAGEMENT
- EMHART GLASS
- EMHART GLASS RESEARCH CENTER
- EMME
- EVERSOURCE ENERGY
- FLEXION
- FOSTER DELIVERY SCIENCE
- FROST & LAY
- GE ENERGY MANAGEMENT
The Continuing and Distance Engineering Education (CDEE) program delivers coursework required by graduate students toward completion of an engineering degree or certificate; courses of interest to students and corporate partners who wish to expand their knowledge and that of their mid-career employees, and courses for practitioners and students who are interested in advancing their knowledge of specific engineering subjects in a non-degree path. CDEE is a major component of the school’s industrial engagement effort.

During the 2017-2018 Academic Year, the CDEE program launched the following strategic activities, which support the program’s growth and revenue generation trajectory:

1. Established a CDEE Advisory Board consisting of members from the following organizations: EDAC Technologies, General Dynamics Electric Boat, Eversource, Fuss & O’Neill, GE Power, Langan Engineering, Medtronic, Pfizer, Pratt & Whitney, Stanley Black & Decker, Unilever, United Technologies Corporation and UTC Aerospace Systems.
2. Extended digital presence of the CDEE through a new website, extended on-line course offerings, and implemented regular webinars and Lunch & Learn sessions to attract industry interest.
3. Promoted excellence in curriculum by: collaborating extensively with the Center of Excellence for Teaching and Learning for programmatic support, engaging with the School of Business to extend program offerings, and adding new offerings in clinical engineering, contaminated site remediation, and composites.
4. Collaborated extensively with the SoE development team, alumni relations, and the senior design director to build industry partnerships.

As a result of these efforts and according to preliminary registration data, revenue from CDEE is projected to increase significantly in 2018, as follows:

1. Established a CDEE Advisory Board consisting of members from the following organizations: EDAC Technologies, General Dynamics Electric Boat, Eversource, Fuss & O’Neill, GE Power, Langan Engineering, Medtronic, Pfizer, Pratt & Whitney, Stanley Black & Decker, Unilever, United Technologies Corporation and UTC Aerospace Systems.
2. Extended digital presence of the CDEE through a new website, extended on-line course offerings, and implemented regular webinars and Lunch & Learn sessions to attract industry interest.
3. Promoted excellence in curriculum by: collaborating extensively with the Center of Excellence for Teaching and Learning for programmatic support, engaging with the School of Business to extend program offerings, and adding new offerings in clinical engineering, contaminated site remediation, and composites.
4. Collaborated extensively with the SoE development team, alumni relations, and the senior design director to build industry partnerships.

As a result of these efforts and according to preliminary registration data, revenue from CDEE is projected to increase significantly in 2018, as follows:

- Master of Engineering (MENG) Degree
- Advanced Engineering Certificates (AEC) Programs
- Graduate Courses (Non-degree)
- Corporate Education (Customized Training & Development)

CDEE Student Data

- 27 MENG degrees awarded, 2017
- 110 MENG students enrolled
- 9 Certificate students enrolled
Entrepreneurship

Over the past five years, the SoE has strategically pursued initiatives that promote a culture of entrepreneurship at the university and provide entrepreneurship training and resources to students. The school’s efforts have led to joint academic programs with the School of Business and have supported students and faculty pursuing startup ventures. The school’s entrepreneurship initiatives are a direct response to Connecticut’s need to support innovation and entrepreneurship as drivers of economic growth.

Entrepreneurship and Innovation Consortium &
Peter J. Werth Institute for Entrepreneurship & Innovation

In 2016, the deans of the Schools of Engineering and Business worked together to establish the UConn Entrepreneurship and Innovation Consortium. For the first time in the university, this initiative brought together more than 30 university units with activities in the entrepreneurship space. The consortium’s success, activities, and achievements became the foundation for securing the gift/endowment and commitment (amounting to $22.5M) from Peter J. Werth to establish the Peter J. Werth Institute for Entrepreneurship and Innovation in December 2017. The institute, now under the leadership of Provost Kennedy, will bring together student and faculty programs fostering entrepreneurship and innovation that have potential commercial applications and can be used to create new companies. In addition to nurturing innovation, the institute will facilitate entrepreneurship speaker forums and host an entrepreneur-in-residence to instruct students.

Master of Engineering in Global Entrepreneurship

In spring 2018, the SoE secured a CTNext grant to establish a Global Entrepreneurship Network in Connecticut. A collaborative program among UConn, the University of New Haven, and Trinity College, the network aims to energize Connecticut’s innovation economy by attracting and retaining science and technology entrepreneurs from around the world and will strengthen Connecticut’s higher education infrastructure in entrepreneurship by establishing best practices in entrepreneurship education, technology transfer, technology incubation, recruitment of student entrepreneurs, and creation of entrepreneur-friendly communities.

A Master of Engineering in Global Entrepreneurship (MGE) program designed to cultivate student entrepreneurs capable of responding to emergent global trends in business and technology and to embed student-led start-up companies in Connecticut is the cornerstone of the program.

Courses in Entrepreneurship

Over the past few years, the SoE established a two-semester engineering course, Experiential Technology Entrepreneurship I and II, for graduate students and created two undergraduate courses on Technology Entrepreneurship, cross-listed with the School of Business (ENGR/MGMT 3500 and 3501). In addition, an undergraduate minor in technology entrepreneurship was established in collaboration with the School of Business.
Funding for Startups

In the past few years, the SoE has been critical in securing the sources of funding for our entrepreneurship ventures listed below. Dr. Hadi Bozorgmanesh, who leads the mission of entrepreneurship and innovation in the school, has been instrumental in promoting startups:

- Secured The Third Bridge and UConn Innovation Fund to support student and faculty entrepreneurs ($750K)
- Secured Bioscience Pipeline in collaboration with Yale and Quinnipiac (PI) ($600K)
- UConn Innovation Fund ($750K/year)

UConn Engineering Startups

Since 2017, the SoE supported the launch of over 27 startups through individual mentoring and entrepreneurship courses
Engineering and Human Rights Initiative

The Engineering for Human Rights Initiative is a collaborative venture between the School of Engineering and the UConn Human Rights Institute. The aim of the initiative is to make human rights an integral component of effective engineering practice. The initiative draws on a human rights minor open to all undergraduates, new curriculum in engineering and human rights, field experiences, and industry outreach. The initiative engages colleagues in the social sciences, humanities, business, agriculture and natural resources at UConn and internationally and is the first of its kind in the world.

A proposal on Engineering and Human Rights was submitted to NSF in summer 2018 and is currently under review. In addition, a proposal for a named initiative in Engineering for Human Rights is under consideration by a donor.

Connecticut Brownfields Initiative (CBI)

The CBI, launched in December 2017, is an interdisciplinary training program that teaches students how to transform polluted and abandoned property into usable land. UConn students work directly with Connecticut cities and towns to revitalize and restore properties, gaining experience while supporting local communities. Prof. Maria Chrysochoou is the UConn lead for this initiative.

Engineering and Fine Arts Initiative

The Schools of Fine Arts and Engineering are collaborating to develop joint research and educational programs that explore engagement of engineering and the arts across technological fields, industrial design, and advanced manufacturing. A proposal for a named Institute for Arts & Engineering has been submitted to potential donors. The institute will establish a major, a minor, graduate seminars and workshops, and an online graduate certificate. Opportunities to visit and intern at industrial design studios and advanced manufacturers and to participate in research initiatives will be part of every student’s experience.
Five years ago, the SoE formulated a new development strategy that leverages the school’s role as a critical engine for growth and economic impact in the State of Connecticut. The strategy resulted in purposeful industry engagement initiatives, described below, that increased our endowment by 34% in five years and led to over $20M in additional non-endowed gifts.

School of Engineering: An Economic Driver in Connecticut

An estimated 37% of the Connecticut economy is driven by various forms of engineering. By educating skilled graduates, through continuing and distance education for working professionals, by conducting research and technology deployment projects in collaboration with industry, and through technology entrepreneurship, the SoE plays a critical role in Connecticut’s economy. Collaborations between industry and SoE help to establish a climate in Connecticut that encourages innovation leading to economic growth.

Need for Engineering Graduates

UConn produces almost 52% of the engineering graduates in the state. These graduates are in high demand by industry and make a huge impact on Connecticut’s economy. The SoE works closely with industry and state partners, including Pratt & Whitney, General Dynamics Electric Boat, Sikorsky-Lockheed Martin, Eversource, General Electric, the Department of Economic and Community Development, and others, who have a vested interest in the intellectual capital produced by the school; all of these partners have repeatedly emphasized to us the need for more, not fewer, highly skilled engineering graduates. This intrinsic interest by industry is the pillar of our development strategy.

Endowment

The SoE now has an endowment of $36 million, 34% above its value of $26.8 million five years ago. This growth has allowed the School to award $940,608 in scholarship support to 335 students in AY 2017-2018 in addition to the scholarships awarded by the university that are available to engineering students. The endowment also secured 24 chaired and named professorships and 20 term professorships.

The following are examples of relationships built in the past five years:

2013:
- United Technologies for Advanced Systems Engineering ($10M)
- Pratt & Whitney Center for Additive Manufacturing and Innovation ($8M)
2014:
- Comcast Center of Excellence for Security Innovation ($7.5M),
- UConn-FEI Center of Excellence in Microscopy & Materials Characterization ($12.7M)
2015:
- Eversource Energy Center of Excellence ($9M)
2016:
- Synchrony Financial Center of Excellence in Cybersecurity ($3.2M)
2017-2018:
- Gift of Vetra FIB for circuit edit system (anonymous $1.35M)
- Connecticut Brownfields Initiative (multiple donors $300K)
- MSC Software Inc (not yet announced gift of simulation and modeling software to SoE and Tech Park for the CT Manufacturing Simulation Center)
- Ansys Inc. (not yet announced gift of simulation and modeling software to the School and Tech Park for the CT Manufacturing Simulation Center to enhance skills of mid-career engineers, grad, and undergrad students)
- Two individual donors have committed a $500K gift to fund scholarships
- Planned gift of $2.4M

Our engineering students are in high demand by Connecticut industry
**Strategy for Future Giving**

Engineering has built a donor pipeline from which we expect to solicit up to $87 million in support. Current active prospects are:

- Name the School ($50M)
- Create the “Named Institute for the Arts & Engineering” ($10M)
- Name the Engineering for Human Rights Center ($5M)
- Renew the Eversource Center ($7M)
- Create the “Named Cornerstone Engineering Design Laboratory” ($3M)
- Renew the United Technologies Institute for Advanced Systems Engineering ($2.5M)
- Create the “Named Cybersecurity Laboratory” ($1.5M)
- Additional initiatives with Avangrid, the Electric Power Research Institute, Pratt & Whitney, and also several individual donors that have expressed interest to support the School

**Programs Cultivating Donor Relationships**

The SoE supports a number of initiatives that steward external relationships throughout the year. For example, SoE’s Senior Design program supports full-year collaborations between teams of students and company sponsors. These projects address real-world engineering challenges, leading directly to technology transition and connecting companies with future employees. The Senior Design program generates approximately $600,000 per year from company partners.

In addition, sponsored research projects, distance learning and continuing education programs, and networking events engage industry partners throughout the year. Events like the Industry Open House, which attracts more than 200 businesses and industry executives; GE Night; General Dynamics Electric Boat Alumni Reception, and an upcoming Lockheed Martin-UConn Day, September 27, 2018, are just a few examples of engagement between the school and our partners. SoE administrators have also held frequent donor events and alumni receptions around the country.

In Fall 2016, we held the Centennial Engineering Gala to mark the 100th anniversary of UConn Engineering as a four year degree program. Every major Connecticut manufacturing company and many state and university leaders were among the 370 attending – reflecting the close rapport and reliance that business and industry has developed with the School of Engineering. Additionally, the Centennial Gala generated net income of $279,000 for engineering scholarships.
Diversity and Outreach

Faculty Diversity Initiatives

Recognizing the need for greater diversity in our faculty, the SoE has focused on outreach and active recruiting of outstanding faculty that enhance the diversity of the school. In recent years we have had significant success in recruiting outstanding female faculty. Just last year alone (since Fall 2017) seven out of 15 new hires have been women. Currently 27 out of 140 T/TT faculty and 10 out of 26 APIR faculty are female. Additionally, in the last few years we have been able to hire two exceptional faculty of Hispanic background as well as the school’s first African American female faculty member.

In summer 2018, the school chose its first ever female department head (in the Civil and Environmental Engineering Department).

Graduate Diversity Initiatives

Universities nationwide are struggling to attract and retain a diverse graduate student body. We recognize that successful recruitment of minority students requires a sustained national presence at conferences and other recruitment venues. Accordingly, we recruited students at the COMPACT and NSBE conferences and at the Graduate Education for Minorities (GEM) GradLab poster session hosted by the Northeast LSAMP. As a result of these efforts, 25 GEM students applied to UConn Engineering last year and six of them were accepted.

In addition, we supported six minority students through our NE LSAMP Bridge to the Doctorate Fellowship grant, awarded by the NSF in March, 2017. The Bridge to the Doctorate provides mentorship and professional development tailored to the needs of minority students. We worked to recruit female students from local colleges, including Trinity College and University of Saint Joseph, both of which have a high female student ratio.
This section reports on diversity and outreach initiatives targeting K-12 and undergraduate students. These initiatives are run by the School of Engineering Undergraduate Programs Office through its Engineering Diversity and Outreach Center (EDOC).

**Undergraduate Diversity Initiatives**

**Women in Engineering (WIE)**
The SoE continues to be a leader in increasing the number of young women pursuing and completing engineering degrees. Recognized in 2016 by The Washington Post as the public university with the largest percentage increase in the number of B.S. engineering degrees awarded to women, the school credits this success to the numerous outreach activities aimed at promoting young women in engineering across the K-12 educational space. With fewer than 14% women in the school in 2006, that percentage is now almost 25%, and nearing 30% in the incoming freshman class in 2018. Since 2013, the school has seen a **53% increase** in its female undergraduate population. In each of the past three years, the school has hosted Women in Engineering Day (see photo below) which has brought nearly 500 STEM-interested young women, their families, and their teachers to campus to interact with our current students, faculty and successful female alumni.

**BRIDGE**
We celebrated the 30th anniversary of BRIDGE in July 2017. BRIDGE is made possible by the school’s donors and endowments. To date, more than 1,000 women and underrepresented minorities have graduated from the five-week intensive summer program for incoming engineering freshman. The summer 2018 cohort topped 100 students, the largest ever. Focused not only on academic enrichment and preparing students for the challenging freshman curriculum, BRIDGE participants also form a close-knit community that provides a safety net and peer mentoring for students as they progress through their academic programs. BRIDGE participants graduate from the School of Engineering at higher rates than their peers. They become leaders on campus, in the workforce, and in the community.

**BRIDGE Mentor/Mentee**
Now in its second year, BRIDGE Mentor/Mentee matches freshmen who completed the BRIDGE program with upperclassmen to provide one-on-one social and academic support throughout the academic year. One hundred fifty students participated in one-on-one meetings and monthly group events, including a trip to Florida for engineering tours behind the scenes at Disney World.

**K-12 Students Served**
- 2612 Total number of students on campus
- 1353+ Female students
- 337+ Underrepresented Minority (URM) students

**K-12 School Visits by Engineering Ambassadors**
- 4000 Students served

**Undergraduates Served**
- 170 Total
- 106 Female
- 94 Underrepresented Minority: 94

**UConn Student Volunteers**
- 334 Total

*SoE Women in Engineering Day, Fall 2017*
Diversity and Outreach, cont’d

Undergraduate Student Organizations
Promoting Diversity and Outreach

Engineering Ambassadors (EA)
Engineering Ambassadors has been an extremely effective student outreach program since its inception in the fall of 2010. In September 2017, UConn EA hosted the annual Engineering Ambassador Network Fall Conference. Over 100 EA members from across the country participated in this three-day workshop to train members of the Presentation Team. During the year, UConn’s EA Presentation Team delivered 61 off-campus visits to K-12 schools, and hosted 13 on-campus visits, reaching 4,000 students from 32 schools across the state. EA tour guides provided 210 tours of the SoE, a 124% increase in prospective students served. They also provided 20 tours of UConn’s Cogeneration Plant to 540 visitors. EA members led 230 student volunteers for the three SoE open houses, which reached 4,000 visitors. Finally, EA’s annual STEM Night at the Connecticut Science Center drew 300 middle school students and 100 accompanying adults.

Society of Women Engineers (SWE)
SWE plays a leading role in planning and carrying out the Women in Engineering outreach activities, including helping to organize the on-campus tours for young women, spending one-on-one time with the visitors during the student lunch, and calling many of our prospective female students to give them a personal insight into how UConn Engineering is working to support female engineers. The SWE team also volunteered as workshop leaders and role models for Multiply Your Options (MYO), our program for 8th grade girls, and leading on-site workshops at local schools.

National Society of Black Engineers (NSBE)
The UConn chapter and several individual members were recognized at the Regional and National NSBE conferences, earning the Region I Chapter of the Year award and national awards for Community Service (TORCH) Programming of the Year and Academic Excellence Programming of the Year. Outreach events included We Lift to the Future career exposition for high school students hosted at the Wilson-Gray YMCA in Hartford, and UConn’s Engineer Your Future one-day conference to expose underrepresented eighth grade boys to the field of engineering. NSBE also hosted the annual Black Women in STEM Brunch at UConn, which brings together high school, college, and professional women, to network and celebrate minority women in STEM disciplines. This year’s brunch featured keynote speaker Dr. Njema Frazier, a physicist in the U.S. Dept. of Energy’s National Nuclear Security Administration.

Society of Hispanic Professional Engineers (SHPE)
SHPE students serve as workshop leaders and role models for UConn’s Engineer Your Future conference for eighth grade boys. This year SHPE launched its first bilingual outreach program. Members gave bilingual presentations on engineering to students at Christopher Columbus Family Academy middle school in New Haven.

Engineering Student Leadership Council (ESLC)
In addition to being a resource for all Engineering student organizations, ESLC launched an outreach initiative of its own this year. ESLC recruited engineering undergraduate students to lead an after-school program for Windham Middle School students. The year-long STEM Scouts program provided hands-on exposure to STEM fields for sixteen students in an underserved school district.
K-12 Teacher Outreach, Summer 2018

DaVinci Program
Thirty-seven teachers, including 12 NSF-funded Joule Fellows, engaged in this weeklong summer program that introduces core engineering concepts to math and science educators. Teachers spend the week working in an engineering lab and visiting engineering facilities across the Storrs campus.

Joule Fellows
The NSF Research Experience for Teachers, "Joule Fellows: Sustainable Energy for an Inclusive Society" program offers an intensive six-week summer research and professional development experience for teachers serving grades K-14. The Joule Fellows program specifically targets teachers from underserved districts to promote educational opportunity among minority communities. Now supported by its third NSF grant, the Joule Fellows program supported 12 teachers in the summer of 2018 and 90 since its inception in 2009.

K-12 Student Outreach, AY 2017-2018

SPARK
The Engineering Diversity and Outreach Center premiered SPARK summer residential program for girls entering seventh through tenth grades. Fifty-seven girls participated in one or more of the three week-long sessions in Coding, Underwater Robotics, and 3D Printing.

Pre-Engineering Program (PEP)
Nearly 100 middle school students from underrepresented schools participated in this 11-week Saturday enrichment program. Students learn engineering concepts from female and minority undergraduate role models.

Multiply Your Options (MYO)
This one-day conference drew nearly 500 eighth grade girls to UConn to participate in fun, hands-on activities under guidance of female undergraduate students and young female alumnae.

Engineer Your Future (EYF)
Over 100 eighth grade boys from minority-serving schools came to UConn for this one-day workshop led by minority male undergraduate students and recent alumni.

Explore Engineering (E²)
This popular summer residential program attracted 268 high school juniors and seniors to UConn to explore engineering disciplines.

Connecticut Invention Convention (CIC)
The School of Engineering hosted over 800 K-12 students for the 35th Connecticut Invention Convention at Gampel Pavilion.

Science Bowl
UConn Engineering hosts the largest regional Science Bowl in the country. Over five hundred high school students from CT, MA, RI and NH competed this year. Two hundred fifty UConn Engineering students volunteered to make this event possible.
Infrastructure and Staffing

Engineering Advisory Board

The School of Engineering has an active, engaged, and diverse advisory board representing industry, government, alumni, and higher education. Members are appointed for renewable three-year terms. The board meets as a group twice a year, but sub-groups may meet more often. Members are also contacted by the dean when guidance or support is needed. Current board members include three commissioners of State of Connecticut departments (Economic and Community Development, Energy and Environmental Protection, Transportation), the CEO of CT Innovations, two engineering deans (RPI, URI), one provost (Dartmouth College), and many senior state and national industry leaders. A list of the Engineering Advisory Board members can be found at: https://www.engr.uconn.edu/about-us/people/advisory-board/

Space Planning and Management

With the strong growth in enrollment and research over the past five years, the SoE has faced ongoing challenges in addressing its space needs. The new Engineering & Science Building (ESB) opened last year, providing some relief. The SoE worked closely with University Planning, Design and Construction (UPDC) on space planning and moving for ESB as well as re-occupation of the space vacated by these moves. Engineering also assisted in the moving and setup of its centers and institutes that moved from temporary locations to the Innovation Partnership Building (IPB) during the past year.

We are currently in the process of remodeling the space vacated as a result of the ESB and IPB moves. The vacated space will be repurposed primarily for undergraduate laboratories.

The SoE worked with UPDC and an external architectural firm over the past year to complete a comprehensive space study for the School. The study found that the SoE continues to have significant unmet space needs, despite the occupation of ESB and IPB, and that a significant portion of the School’s existing space is in buildings that are in need of renovations.

IT Support for Education and Research

The school worked closely with ITS and the OVPR Export Control Office during the past year to develop and implement an IT system that meets NIST 800-171 data compliance standards. NIST 800-171 mandates new requirements for storing and transmitting controlled unclassified information to and from government agencies. The ability to meet these IT security standards significantly benefits UConn faculty with sponsored research from federal agencies that require use of controlled data and with proprietary data used in industry based research. Engineering also worked closely with ITS on the ongoing process of centralizing IT services, resulting in increased service and resources for SoE users. Some of the migration tasks include: moving all 5,000 users’ data and web pages to the new system, migrating all SoE virtual servers to ITS, transferring all SoE email users to ITS email system, among others.

Machine Shop and Electrical Shop

Engineering’s Machine Shop and Electrical Shop provided precision manufacturing services and technical assistance to hundreds of faculty members and students in support of the school’s educational and research missions. Support included assisting over 800 UConn Engineering seniors on their senior design projects, and supporting numerous research teams on prototype design and construction.
Infrastructure and Staffing

Staffing Levels

One of the challenges stemming from the budget cuts is the shortage of support staff in the School of Engineering. Despite dramatic growth in the number of students and in the scale of our research enterprise, the staff size in the school has stayed relatively flat or has been reduced in certain areas. One notable exception is the number of professional undergraduate advisors that increased from zero to eight in 2013 in response to a deficiency identified in an external review in 2012. The new advising hires account for eight of the ten staff gains (from 48 to 58) between 2012 and 2014 (see chart below). Overall, we believe the SoE is operating on a very lean staff size.

Deanery and Academic Support Staffing Levels

Research Support Staff

The university’s support for research support staff is minimal (see chart below). The support staff in the research centers are mainly supported by grants and in most cases are project specific. In general, we consider the staff size in the SoE to be inadequate and an impediment to further growth in our research, industry engagement, or educational mission.

Research Center Support Staffing Levels
Left: The new five-story Engineering and Science Building comprises 118,000 square feet of laboratories, research space, meeting and gathering spaces, offices, and other amenities meant to foster cross-campus and interdisciplinary collaborations among the Storrs, UConn Health, and regional campuses.

The building features three floors supporting engineering research initiatives in robotics, advanced manufacturing, cyber physical systems, virtual and augmented reality, mechatronics, and other areas. The other two floors house the Institute for Systems Genomics, which conducts world-class research and training in genomics and personalized medicine.

Below: The Innovation Partnership Building (IPB) at the UConn Tech Park is UConn’s hub for industry/university engagement. The IPB offers the state-of-the-art facilities and equipment needed to conduct transformative research and support cross disciplinary partnerships. This vibrant new facility houses academic/industry partnerships in advanced materials, manufacturing, biomedical devices, cybersecurity, and many other areas. The IPB’s initiatives foster the development of new and innovative ideas and technologies that promote the creation of new jobs and economic growth for the State of Connecticut.