

2020-2021 ANNUAL REPORT – DATA COLLECTION TEMPLATE -- DEPARTMENTS

Please provide the following information for your department. This information will be used to develop the SoE Annual Report, which will be submitted to the provost. In addition, the information you provide will be used throughout the year for the school's marketing and government relations initiatives, so please be as accurate as possible. Please also submit any photos or information graphics that might help illustrate your department's achievements.

Please provide your data by June 10. If you have questions, please contact Donna Thibault (donna.thibault@uconn.edu) and/or Bethany Javidi (bethany.javidi@uconn.edu).

Name of Department: Electrical and Computer Engineering

Mission Statement. Please provide your department's mission statement

The mission of the Electrical & Computer Engineering (ECE) Department is fourfold:

- *To provide educational programs in Electrical and Computer Engineering and related fields at the bachelor's, master's and doctoral levels of high quality and sufficient breadth and depth to serve industry, government and academic institutions of our State and Nation.*
- *To conduct research and pursue scholarship to advance knowledge and apply that knowledge in areas relevant to our State and Nation in order to meet the demands of the coming information age and global competition.*
- *To serve the State and Nation by making available the accumulated expertise, knowledge and experience of the faculty to industry and government.*
- *To recruit and provide educational opportunities to underrepresented minorities, women and physically disabled students.*

OVERVIEW

In a few paragraphs, please describe your department's strategic activities for the 2020-2021 academic year.

Strategically, the department continues to pursue long-term goals of sustained excellence in research and teaching. Plans to increase undergraduate enrollment through proactive outreach with summer enrichment programs, demonstration projects and targeted calls were waylaid because of the pandemic but will hopefully be in place in the 21-22 academic year. Undergraduate students created projects that would be interesting and attractive to high school and middle school students as an introduction to electrical engineering. A robotics engineering undergraduate degree to be housed in the ECE department in partnership with the ME and CSE departments was approved by the School of Engineering in the spring. It is awaiting Board of Trustees approval in June and a marketing plan is being developed in coordinations with Admissions for a start date of Fall 2022. The new robotics degree has a potential to double the number of undergraduate students in the ECE department over the next 5 years. The department hired a new faculty member, **Shan Zuo**, who will be an instrumental part of this new robotics program along with existing faculty Ashwin Dani, Abhishek Dutta, and Shalabh Gupta. This new robotics cluster has the potential to lead to new large-scale funding efforts from federal agencies.

In addition to Shan Zuo, the department also hired two new faculty, **Zongjie Wang** and **Junbo Zhao** (starting Jan. 2022) who will be part of the power group and will be affiliated with the Eversource Center.

These new faculty along with existing faculty Ali Bazzi, Yang Cao, Sung Yeul Park and research faculty Thi Ha Nguyen, form the backbone of a formidable power group. The breadth and depth of this group has already led to new efforts to engage with the power industry and federal labs as well as create a national level research center in power systems.

Prof. Rajeev Bansal and **Peter Luh** retired in Fall 2020.

EDUCATION

AY 2020-2021 Student Data: **NOTE: Student data will be obtained by the Undergrad Office and shared with you when it is received.**

Includes EE/CompE/Eng Phys	Enrollment*					Degrees Awarded AY 20-21	
	Total Enrolled	Male	Female	US minority	Int.		
Undergraduate							
Freshmen	55	47	8	25	3	B.S	93
Sophomores	57	53	3	20	7		
Juniors	95	86	9	36	8		
Seniors	141	125	15	47	9		
Total	348	311	35	128	27		
Graduate							
M.S.	32	27	5	3	6	M.S.	10
M.Eng.	25					M.Eng.	4
Ph.D.	86	74	12	1	62	Ph.D.	9

*Counting all EngPhys-EE and half of CompE

AY 2020-2021 Senior Design Information

# Projects/ Teams	27
# Students Participating	86
# Company Sponsors	24
\$ Revenue from Sponsors	\$23,306

Please list (and briefly describe, if needed) your department's most important initiatives or accomplishments in undergraduate education.

- (1) Created new undergraduate robotics engineering major to start in Fall 2022.
- (2) Using initiative funds from School of Engineering, seven electrical and computer engineering demonstration projects were created to use at open house and high school events. Because of the pandemic, we were not able to deploy them this year, but plan to do so in the upcoming academic year.
- (3) **Faqir Jain** and **Krishna Pattipati** were recognized for their "excellent in teaching" rating for Fall 2020.
- (4) **Lauren Boulay** ('21) received the 2021 Outstanding Senior Women Academic Achievement Award.
- (5) ECE undergraduate students created a chat group on the Discord platform to enable communications between students

Please list (and briefly describe, if needed) your department’s most important initiatives or accomplishments in graduate education.

- (1) The department helped create a new graduate student organization, **IEEE Grad**, to help support the needs of ECE graduate students. The department sponsored weekly seminars organized by IEEE Grad as well as prizes in the poster competition. The new organization will serve as a valuable social and professional development outlet for our grad students.
- (2) **Roman Mays**, Ph.D student advised by Prof. Faquir Jain, received the GEM fellowship for academic year 2020/2021
- (3) **Daniel Trombetta** (M.S '20) and graduate students **Ghananeel Rotithor** and **Iman Salehi** with their advisor Prof. **Ashwin Dani** were selected as a finalist for the International Federation of Automatic Control (IFAC) World Congress 2020 Application Paper Prize for their paper “*Human Intention Estimation using Fusion of Pupil and Hand Motion.*” The IFAC meets every three years and is the largest and most important meeting of its kind.
- (4) **Raja Hari Gudlavaletti** received the Bronze Prize of the “DTS Student Research Award” at the 20th Annual Diabetes Technology Meeting for his poster “*Highly Miniaturized, Low Power CMOS ASIC for Long-Term, Needle-Implantable CGMs*” co-authored with **Allen Legassey**, **Pik-Yiu Chan**, **Joon-Sung Kim** and **Profs. Diane J. Burgess**, **Fotios Papadimitrakopoulos**, and **Faquir Jain**.
- (5) **Brandon D’Agostino** (’20 EE,CMPE) a first-year graduate student earned the National Science Foundation Graduate Research Fellowship (NSF-GRFP)
- (6) **Peter Douglass** was awarded a GAANN (Graduate Assistantships in Areas of National Need) fellowship with funding from the U.S. Department of Education.
- (7) **Hiep Nguyen**, **Yishu Bai** and **Zijiao Tian** were winners of the first ECE Department Poster Competition held virtually March 28, 2021. It was sponsored by IEEE Grad, in collaboration with The Young Professionals group of IEEE-CT.

RESEARCH

AY 2020-2021 Research Development Data

Through May 2021 From Kerrie	Expenditures	Proposals Submitted thru May 2021		New Awards From OVPR quarterly Reports Q1, Q2, Q3	
		Number	Value \$	Number	Value\$
Industry	\$445,478	10	\$782,582	5	\$892,999
Federal	\$4,274,076	39	\$20,309,795	13	\$1,787,516
State					
Other	\$277,258	1	\$40,000		
Total	\$4,996,813	50	\$21,132,377	18	\$2,680,515

AY 2020-2021 Research Products Data

	Number
# Patents Awarded	14
# Journal Papers and Book Chapters	125
# Conference Papers	87

Major Faculty Awards and Honors. *Please include the name of the faculty member and the name of award or honor. Use as many lines as needed.*

- (1) **Shalabh Gupta, Peter Luh, Krishna Pattipati and Shengli Zhou** are involved in an \$8 million contract from the Air Force Research Laboratory to continue research into advance aerospace manufacturing processes.
- (2) **Peter Willett** was part of a team at NATO's Centre for Maritime Research and Experimentation that was awarded the Science Achievement Award for their "Advances in Artificial Intelligence and Information Fusion for Maritime Situational Awareness" project. He also received the 2019-2020 ECE Faculty Award for outstanding research achievements.
- (3) **Ali Gokirmak** received the 2019-2020 ECE Faculty Award for outstanding teaching achievements. He was also appointed as the Charles H. Knapp Associate Professor in Electrical Engineering.
- (4) **Bahram Javidi** was awarded the prestigious C.E.K. Mees Medal from the Optical Society (OSA). He was also named a SPIE Luminary 2021 by The International Society of Optics and Photonics (SPIE).
- (5) **Bahram Javidi** has been named a finalist for the Berthold Leibinger Innovation Award for his rapid disease identification technology using compact, low-cost optical holographic instruments, including COVID-19 detection.

Most Significant Faculty Professional Leadership Positions, *including society officer, journal editorships. Please include the name of the faculty member and the name of leadership position. Use as many lines as needed.*

- (1) **Yaakov Bar-Shalom** gave the first virtual IEEE AESS Distinguished Lecture seminar at Technion, his alma mater, on March, 2020. He gave another virtual AESS Distinguished Lecture for Universidad Don Bosco in El Salvador July, 2020.
- (2) **Eric Donkor** was elected Secretary of the Connecticut Academy of Science and Engineering. The Secretary also served as a member of the CASE Executive Committee.
- (3) ECE Faculty are ranked in the top 2% of engineering scholars in a study published in PLOS Biology Journal. They are: **Yaakov Bar-Shalom, Ali Bazzi, Bahram Javidi, Krishna Pattipati, Marten van Dijk, Peter Willett** and **Shengli Zhou**. Emeriti **David Kleinman, Peter Luh** and **Geoff Taylor** were also ranked. New faculty **Junbo Zhao** is also on this list.

OUTREACH

Please list (and briefly describe, if needed) your department's top achievements and initiatives in outreach.

- (1) Prepared and distributed a **newsletter** highlighting ECE achievements during the previous year.
- (2) Created new summer program in robotics (canceled because of COVID19)
- (3) Organized effort to have a few current students to call all admitted female and minority students to help in recruitment

DEVELOPMENT

Please list (and briefly describe, if needed) your department’s top achievements and initiatives in development.

- (1) ECE Alumni LinkedIn group has nearly 400 members. About half of class of 2021 have already joined.
- (2) **Vijaya Raghavan (PhD '96)** donated \$125,000 for the creation of the Peter Willett Fellowship in support of a graduate student pursuing a degree in Electrical and Computer Engineering.

PERSONNEL

Please provide the numbers of faculty and staff in each category.

	FT	PT	Total
Faculty			
Tenured/ Tenure Track	26		
Research Faculty	3		
Post-Docs	1		
Teaching (In-Residence, Visiting, etc.)			
Adjunct		2	
Total			
Staff			
Administrative	3		
Lab/ Technical	1		
Other			

Alumni Accomplishments:

- (1) **Michael R. Douglass** (B.S. '79), **Eric B. Reed** (B.S. '91, M.S. '95), and **Kenneth D. Taylor** (B.S. '71) were inducted into the UConn Academy of Distinguished Engineers in 2020.
- (2) **Steven Greineder** ('82, '87) won the Meritorious Senior Professional Presidential Rank Award which is awarded by the President of the United States.
- (3) **Evan Faulkner** ('20) is the first author of an IEEE journal paper with a high impact factor (5-year impact factor: 11.7). E. Faulkner, Z. Yun, S. Zhou, Z. Shi, S. Han and G.B. Giannakis “An Advanced GNU Radio Receiver of IEEE 802.15.4 OQPSK Physical Layer” in *IEEE Internet of Things Journal*, June 2021.
- (4) **David Tonn** (Ph.D. '07), an engineer at Naval Undersea Warfare Center (NUWC) Division Newport, won the Harold G. Bowen Award for Patented Inventions for his invention reducing the complexity of antenna controller unit saving the US Navy submarine fleet more than \$15 million.