PROGRAM PERFORMANCE REVIEW

MASTER OF SCIENCE
IN
ELECTRICAL ENGINEERING

Self-Study Report

Submitted by:

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Electrical Engineering Department

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Master of Science in Electrical Engineering (MSEE)
Self-Study Report

California State University, Fullerton

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Background Information

1. Contact Information

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2. Organizational Structure

The College of Engineering and Computer Science is one of the eight academic colleges of the university. Engineering programs are offered only within this college at CSUF. The college (which is headed by a Dean) consists of the departments of Civil & Environmental Engineering, Electrical Engineering, Mechanical Engineering, and Computer Science; each Department has its own Department Chair. Computer Engineering, Master's in Software Engineering and Master's in Environmental Engineering programs are also part of the college and are headed by their own Program Coordinators.

The following is a brief chart showing the organizational structure of the College of Engineering and Computer Science in the University (Figure 1):

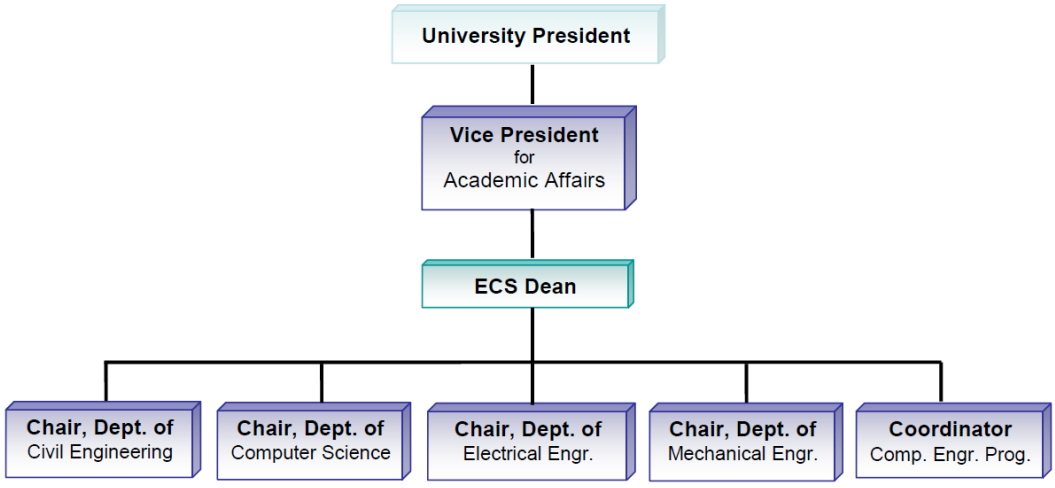


Figure 1: Organizational Chart of the College of Engineering and Computer Sciences

Self-study Elements for the MSEE Program

I. Department Mission, Goals and Environment.

A. Department Mission and Goals

The mission of the EE Department is consistent with the college mission. We want to educate engineers and computer scientists who will graduate with state-of-the art knowledge in their chosen field and are ready to embark on careers in industry and government, or proceed to acquire advanced degrees in their own or related fields.

The department's **undergraduate student learning goals** are consistent with the university's undergraduate student learning goals which are:

1. Demonstrate intellectual literacy through the acquisition of knowledge and development of competence in disciplinary perspectives and interdisciplinary points of view.
2. Think critically, using analytical, qualitative and quantitative reasoning, to apply previously-learned concepts to new situations, complex challenges and everyday problems.
3. Communicate clearly, effectively, and persuasively, both orally and in writing.
4. Work effectively as a team member or leader to achieve a broad variety of goals.
5. Evaluate the significance of how differing perspectives and trends affect their communities.
6. Recognize their roles in an interdependent global community.

The department's **graduate student learning goals** are consistent with the university's graduate student learning goals which are:

1. Knowledge, skills, and professional dispositions including higher order competence in disciplinary perspectives and interdisciplinary points of view;
2. The ability to access, analyze, synthesize, and evaluate complex information from multiple sources and in new situations and settings;
3. Advanced communication skills;
4. The ability to work independently and in collaboration with others as artists, practitioners, researchers, and/or scholars;
5. The ability to apply appropriate methods and technologies to address problems that affect their communities;
6. Social responsibility within diverse communities and in interdependent global community.

To achieve these goals, the faculty and students of the Electrical Engineering Department, with input from other constituents, have established the following **Program Educational Objectives (PEOs)**:

1. **Technical Growth:** Electrical Engineering graduates will be successful in modern engineering practice, integrate into the diverse, local and global workforce, and contribute to the economy of California and the nation.
2. **Professional Skills:** Electrical Engineering graduates will continue to demonstrate the professional skills necessary to be competent workforce contributors, assume research, development, and leadership roles, and have career success and satisfaction.
3. **Professional Attitude and Citizenship:** Electrical Engineering graduates will become productive citizens with high ethical and professional standards, who make sound engineering or managerial decisions, and have enthusiasm for the profession and professional growth.

B. Changes and Trends in the Discipline and the Department's Response

Electrical Engineering is one of the fastest expanding and growing fields. Some of the most rapid advances and developments in industry during the past several years have been in the areas of Digital Communications, Digital signal Processing, Digital Control and Robotics, Radio Frequency (RF), VLSI design, and Power generation/conservation. Our program has been strong in covering most of these areas.

Due to the recent changing needs of the industry and downward trend in the enrollment in electrical engineering at both undergraduate and graduate levels, the department has **retired** seven 400 level and seven 500 level courses while introducing one **new** 400 level course in the area of VLSI design and one **new** 500 level course in the area of power systems. We are considering adding some new courses to the curriculum; however, due to the recent budget cuts, the implementation of this task, which may need employment of new faculty, is becoming more and more challenging.

C. Department's Priorities for the Future

Our main priority for the program is to maintain our high standards and quality of education. Our graduates are well-accepted and desired by the local as well as national industry. Many of them are employed by the local large companies and many of the local

smaller companies. Our program also attracted a very large number of international students in the past.

Among other priorities, we will continue to assess the program and apply improvements, as needed. We will monitor market trends and the new industry needs to act in a timely manner and make necessary curriculum changes. We will continue to try to attract new students and increase our enrollment. We will continue to encourage our faculty to seek funded projects and research and involve students in the research activities and will facilitate it by providing support and state-of-the-art equipment.

Our current faculty members have excellent theoretical and practical knowledge of the subjects they teach. However, we will try to augment our faculty by new members in the new advancing areas.

We use the feedback from our constituencies for review, assessment, and improvement of the program. They include our faculty, industrial advisory board, our alumni and their employers, and colleagues in other universities.

D. Special Sessions and Self-Support Programs

The department does not have any Special Sessions or Self-Support programs.

II. Department Description and Analysis

A. Substantial Curricular Changes Since the Last Program Review

Since the last review in 2012, the program has gone through significant curricular changes.

Option in Systems Engineering –College of Engineering and Computer Science made the decision to close admission to Option in Systems Engineering from fall 2015 and the college has not been admitting students to the Option in Systems Engineering since fall 2015.

Fourteen 400 level and 500 level courses have been retired because of lack of demand. The retired courses are given in Table 1.

Two new courses have become part of the curriculum which are given in Table 2.

The Graduate Comprehensive Examination format was revised by the department in 2012. Instead of the oral examination, students would take written examination from the five core courses on their study plan. The problems from each of the five courses (20 points each) are proposed and graded by the respective faculty who taught that course. Passing score on the examination is 55 percent. (Due to the ongoing COVID pandemic, however, it was not

logistically feasible to administer written Graduate Comprehensive Examination since Spring 2022. Temporarily, the department has reverted to the oral Graduate Comprehensive Examination.)

Table 1: Courses Retired Since the Last PPR

Course Number	Units	Course Title
EGEE 404L	1	Microprocessor Laboratory
EGEE 407	3	Digital Computer Architecture and Design
EGEE 407L	3	Digital Computer Design Laboratory
EGEE 412	3	Digital Computer Architecture and Design
EGEE 424	3	Computer Simulation of Continuous Systems
EGEE 425	3	Introduction to System Engineering
EGEE 430	3	Fuzzy Logic and Control
EGEE 519A	3	Parallel and Multiprocessing
EGEE 519B	3	Computer Networks and the Internet
EGEE 527	3	Fault Diagnostic and Fault Tolerant Design
EGEE 531	3	Phase-Locked and Frequency Feedback Systems
EGEE 558A	3	Microprocessors and System Application, I
EGEE 585	3	Optimization Techniques in System Engineering
EGEE 587	3	Operational Analysis Techniques in Systems Engineering

Table 2: New Courses Since the Last PPR

Course Number	Units	Course Title
EGEE 461	3	Low Power Digital IC Design
EGEE 536	3	Modern Power Systems

B. Structure of the Degree (Program Description)

Overview of Undergraduate and Graduate Programs

The **Bachelor of Science (BS) degree in Electrical Engineering (EE)** is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite1050, Baltimore, MD 21202-4012 -telephone: (410) 347-7700. Our most recent ABET visit was in Academic Year 2020 and the Department received the best possible rating of NGR (Next General Review).

The BS degree program provides the undergraduate students with knowledge of basic and advanced topics in the areas of design and analysis of VLSI and electronic circuits, design and analysis of computer architecture, microprocessors, communication systems, signal processing, and control systems. Through this program students develop an ability to apply design and analysis knowledge to the practice of electrical engineering in an effective and professional manner. This knowledge can be applied to various engineering practices in aerospace, computer, electrical, electronics and other applied fields.

The BS program consists of 120 units. The breakdown of these units is given in the following Table 3. In addition, a student has to satisfy upper-division writing requirement by passing EE 303L (Electronics Laboratory), EE 310L (Electronic Circuits Laboratory), EE 313L (Power Laboratory) and EE 485 (Electrical Engineering Design Project Laboratory) with a grade of 'C' or better.

Additionally, students may focus on one of the following areas of specialization for choosing their technical elective courses:

- Communication Systems and Signal Processing
- Computer Engineering and Embedded Systems
- Control Systems and Robotics
- VLSI and Electronic Circuits

Table 3: Undergraduate Degree Requirement by Category

Category	Units
General Education Requirements	24 Units
Mathematics and Science Courses	31 Units
Required Electrical Engineering Courses	50 Units
Technical Electives in Electrical Engineering	15 Units
Total	**120 Units**

The **Master of Science (MS) Degree in Electrical Engineering** is not required to be accredited. However, the graduate program goes through a review process called Program Performance Review (PPR) every seven years. The program was last reviewed in 2012 and the next scheduled review in 2020 was delayed due to the ABET visit that year and was then scheduled for the Academic Year 2021.

Master students take a combination of 400-level and 500- level courses. The 400-level courses can be taken by graduate students as well as junior/senior undergraduate students who take some of the 400-level courses as Technical Electives. Assessment of 400-level courses is a part of the department's review for ABET accreditation. The assessment results of all

undergraduate courses, including 400 level courses from the 2020 ABET Self Study Report is included in Table 4.

Enrollment in 500-level courses is limited to graduate students only. Exceptions may be made for the qualified undergraduate students on the basis of demonstrated preparation and need on a case by case basis. A graduate student is required to take at least 15 units of 500-level courses for MSEE.

During the last semester of studies, each student has to pass a Graduate Comprehensive Examination. The written examination is given from the five core courses from the study plan. Defense of thesis is used as a comprehensive examination for those students who choose thesis option.

In addition, a student has to satisfy English writing requirement, for example, by meeting the upper-division writing requirement at an undergraduate institution, or by completing a designated 3-unit English writing course or scoring a minimum of 4.0 on the GRE writing assessment test.

MSEE Coursework

The MSEE degree consists of a 30-unit coursework (10 courses) to be completed in one of the five available areas of concentration. At least15 units should consist of 500-level courses.

Additionally, an MSEE student is required to select a minimum of 15 units within an area of specialty. These15 units may be 400- or 500-level courses in one of the following areas of specialization.

Communications Systems/Signal Processing

EGEE416 Feedback Control Systems (3)
EGEE420 Introduction to Digital Filtering (3)
EGEE435 Microwave Engineering (3)
EGEE442 Electronic Circuits (3)
EGEE443 Electronic Communication Systems (3)
EGEE460 Introduction to Cellular Mobile Communication Systems (3)
EGEE469 Antennas for Wireless Communications (3)
EGEE480 Optical Engineering and Communications (3)
EGEE483 Introduction to Global Positioning System (GPS) (3)
EGEE483L Global Positioning System Lab (2)
EGEE503 Information Theory and Coding (3)
EGEE507 Detection Theory (3)
EGEE510 Optics & Electromagnetics in Communication (3)
EGEE518 Digital Signal Processing (3)
EGEE522 Spread Spectrum Communications (3)

EGEE529 Principles of Neural Systems (3)
EGEE537 Satellite Communications (3)
EGEE580 Analysis of Random Signals (3)
EGEE581 Theory of Linear Systems (3)
EGEE582 Linear Estimation Theory (3)

Computer Engineering

EGEE404 Introduction to Microprocessors (3)
EGEE406 Design Applications with Microcontroller and FPGA (3)
EGEE445 Digital Electronics (3)
EGEE448 Digital Systems Design (3)
EGEE465 Introduction to VLSI Design (3)
EGEE529 Principles of Neural Systems (3)
EGEE557 Microprogramming and Embedded Microprocessors (3)
EGEE558B Microprocessors and System Applications II (3)
EGEE559 Robotics (3)

Control Systems

EGEE409 Introduction to Linear Systems (3)
EGEE416 Feedback Control Systems (3)
EGEE420 Introduction to Digital Filtering (3)
EGEE483 Introduction to Global Positioning System (GPS) (3)
EGEE483L Global Positioning System Lab (2)
EGEE504A Linear Network Synthesis (3)
EGEE526 Digital Control Systems (3)
EGEE529 Principles of Neural Systems (3)
EGEE559 Robotics (3)
EGEE580 Analysis of Random Signals (3)
EGEE581 Theory of Linear Systems (3)
EGEE582 Linear Estimation Theory (3)

Electronics and Circuit Theory

EGEE420 Introduction to Digital Filtering (3)
EGEE435 Microwave Engineering (3)
EGEE442 Electronic Circuits (3)
EGEE445 Digital Electronics (3)
EGEE455 Microelectronics and Nano Devices (3)
EGEE465 Introduction to VLSI Design (3)
EGEE469 Antennas for Wireless Communications (3)
EGEE504A Linear Network Synthesis (3)
EGEE510 Optics & Electromagnetics in Communication (3)
EGEE523A VLSI and Nano Technology and Devices (3)
EGEE523B CMOS VLSI Design (3)

EGEE557 Microprogramming and Emulation (3)
EGEE558B Microprocessors & Systems Applications II (3)

Mathematics Requirement

Additionally, independent of the area of specialty, all students are required to take two math-based courses: EGGN-403, Numerical Analysis, and EGEE-580, Analysis of Random Signals. For the students who have taken EGGN-403 as a technical elective at undergraduate level, EGEE-518, Digital Signal Processing may be used to replace EGGN-403.

Graduate Comprehensive Examination

During the last semester of studies, each student has to pass a Graduate Comprehensive Examination. The written examination is given based on the five core courses from the student's study plan.

As stated earlier, the Graduate Comprehensive Examination format was revised by the department. Instead of an oral examination, students take written examination from the five core courses on their study plan. The problems from each of the five courses (20 points each) are proposed and graded by the respective faculty who taught that course. Passing score on the examination is 55 percent. (However, due to the ongoing COVID pandemic, it was not logistically feasible to administer written Graduate Comprehensive Examination. Temporarily, the department has reverted to the oral Graduate Comprehensive Examination.)

Thesis, Independent Study and Project

Students have option of taking EGEE 597 Project (1-3 units), EGEE 598 Thesis (1-6 units) or EGEE 599 Independent Study (1-3 units) with the approval of the advisor and the department. Thesis has to be approved by a committee of 3 faculty chosen by the department. A student taking the thesis option is not required to take the Graduate Comprehensive Examination. An oral defense of the thesis is required instead.

Writing Requirement

Graduate students have to satisfy upper-division writing requirement by either 1) completing a designated 3-unit English writing course with a grade of "C" or better, or 2) by having passed the upper-division baccalaureate writing requirement at any CSU campus, or 3) by having passed the upper-division baccalaureate writing requirement at another university equivalent to meet the CSU baccalaureate requirement, or 4) by scoring a minimum of 4.0 on the

GRE writing assessment test, or 5) by completing a written thesis, dissertation that severs as the approved culminating experience.

C. Student Demand for the Electrical Engineering Program

The demand for undergraduate and graduate electrical engineering degree program, although strong in the past, however, has been declining over the past six years. The number of applications to the graduate program has been on a downward trajectory and number of admissions and numbers joining the program have likewise been on a downward trend.

The enrollment trends of undergraduate and graduate students in the department of Electrical Engineering have followed the national trend where many Electrical Engineering programs see a decline of the student demand due to the increasing demand of other related disciplines such as computer science.

Table 4 below shows graduate program applications, admissions and enrollments since 2016.

Table 4. Graduate Program Applications, Admissions, and Enrollments

Fall	# Applied	# Admitted	# Enrolled
2016	378	187	58
2017	280	221	51
2018	217	148	29
2019	132	85	19
2020	129	88	25

Table 5 provides FTES (full-time equivalent students), FTEF (full-time equivalent faculty) and SFR (student/faculty ratio) data for the past six years. The first column of the table shows a decline in FTES which corresponds to the decline in applications and admissions shown in the Table 4. Although the faculty allocation has also been declining as shown in the FTEF column of the Table 5, the rate of FTEF decline is not as steep as the decline in FTES, causing the SFR to decrease over the years, however, getting close to the university average of about 22.0 students per faculty (Fall 2021).

Table 5: FTES, FTEF and SFR data for the department.

Term	**FTES**	**FTEF**	**SFR**
Fall 2016	470.8	16.3	28.9
Fall 2017	426.6	18.0	23.7
Fall 2018	425.4	16.1	26.5
Fall 2019	358.3	14.9	24.0
Fall 2020	310.2	12.5	24.7
Fall 2021	266.4	12.2	21.8

Because of the declining enrollment, many of the 400 level courses and almost all of the 500 level courses are under enrolled. The number of 400 and 500 level classes being offered has also been declining because several classes had to be cancelled each semester in the past several years due to their enrollment falling below the cutoff point of approximate 8 to 12 students. As an example, in the current semester (Spring 2022), only three 500 level courses are being offered in Electrical Engineering.

The reduced availability of 400- and 500-level EE courses has affected graduation rates. Table 6 shows percentage of graduate students graduating in two, three and four years. As can be seen, the percentage of students graduating within 2 years has declined from about 73% in 2015 to only about 37% in 2019.

Table 6: Graduation Rates for Master's Programs

All Master's Entered in Fall:	Cohort	% Graduated		
		In 2 Years	**In 3 Years**	**In 4 Years**
2015	64	73.4%	90.6%	90.6%
2016	58	75.9%	89.7%	89.7%
2017	51	58.8%	76.5%	78.4%
2018	29	62.1%	79.3%	N/A
2019	19	36.8%	N/A	N/A

D. Enrollment Trends in the Master's Program

Since 2016, the number of new students joining the graduate program has shown a significant decline as the plot of Figure 2 shows. The decrease in graduate enrollment has been largely due to the decline in international students as seen in the plot of Figure 3.

The decline in international students can be attributed to several factors such as strict visa/immigration policies of the last administration and, most recently, Corona-virus pandemic.

The graduate degrees awarded and annualized headcount of graduate students follow the similar trend as shown in the plots of Figures 4 and 5 respectively.

The undergraduate enrollment has followed a similar downward trend although the rate of decline from one year to another has not been as rapid as seen in graduate enrollment, as shown in the plot of Figure 6.

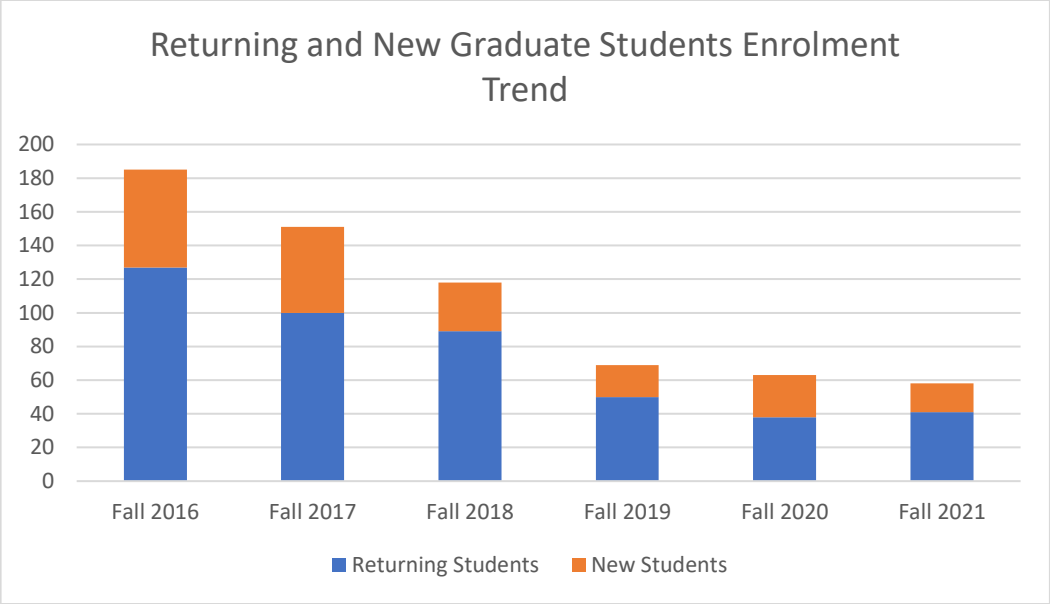


Figure 2: Returning and New Graduate Students Enrolment Trend

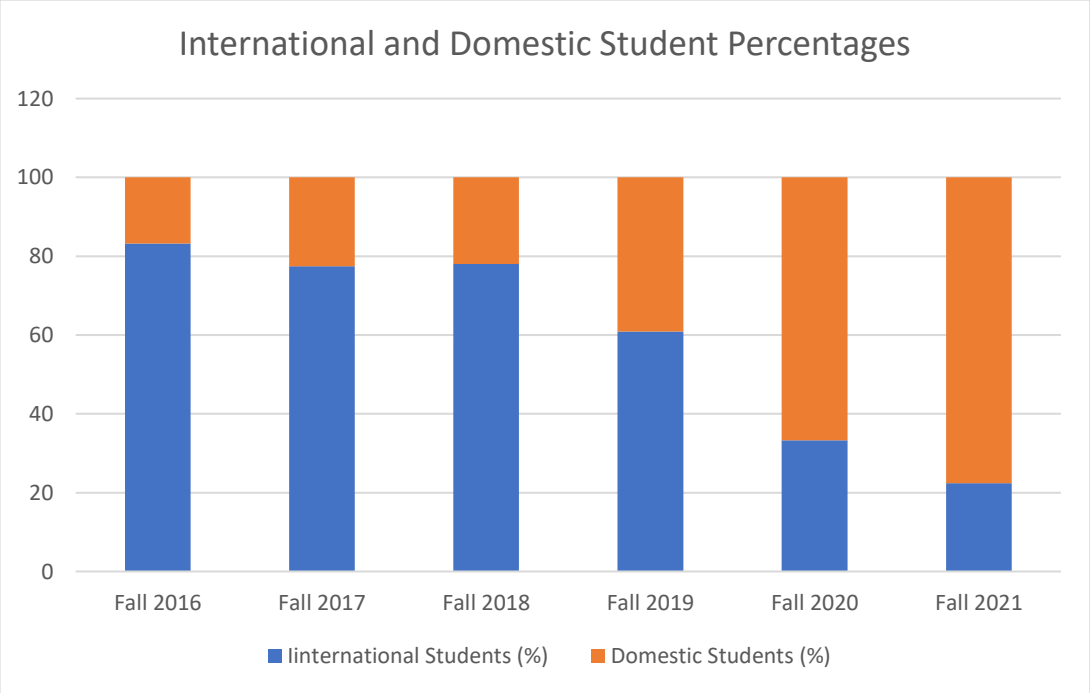


Figure 3: International and Domestic Student Percentages

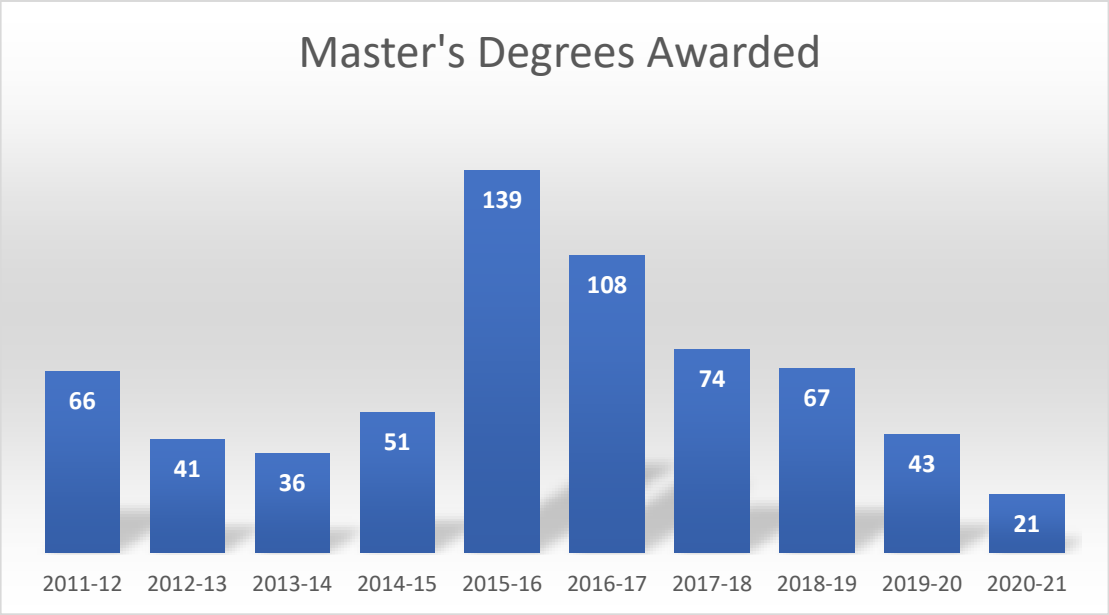


Figure 4: Master's degree awarded each year.

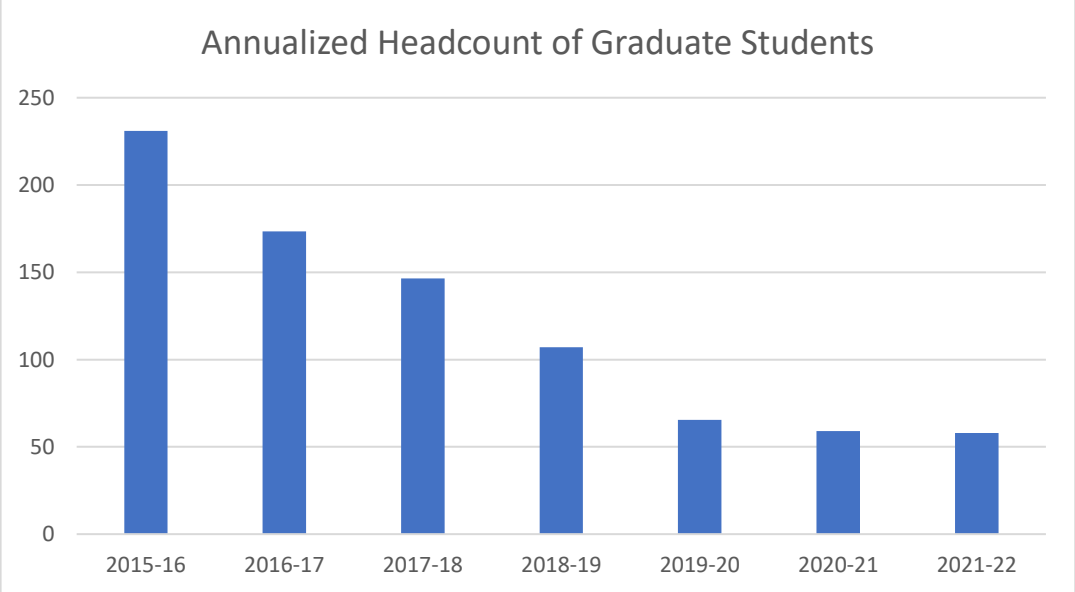


Figure 5: Annualized headcount of graduate students.

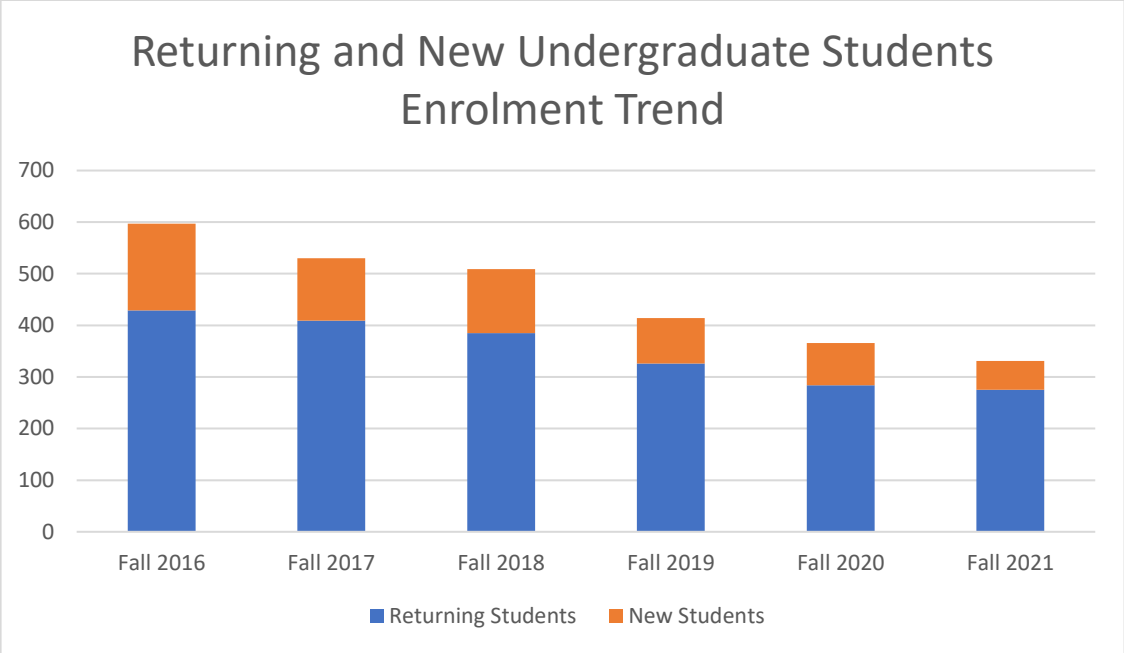


Figure 6: Returning and New Undergraduate Students Enrolment Trend

E. Short- and Long-Term Plans for Curricular Changes

During Fall 2021, in an effort to address the declining enrollment, the department approved reducing the MSEE areas of specialization from five to two: Communications, Signal Processing and Control Systems; and Electronics, Circuits, VLSI and Computer Systems. The Communications, Signal Processing and Control Systems specialty was created by combining the specialties of Control Systems, System Engineering and Communication Systems/Signal Processing. The Electronics, Circuits, VLSI and Computer Systems specialty was created by combining the specialties of Computer Engineering and Electronics and Circuits Theory. This change will be implemented from the 2022-23 academic year.

The department is also planning to reduce the Mathematics requirement in MSEE from two courses to one that is closely related to each area of specialization. The proposed change is under consideration by the department but has not been approved yet.

Additionally, our curriculum is continuously monitored by our own reviews and inputs received from our constituencies. We consider the demands of the industry to modify our existing courses, and offer new courses as needed. Currently, we do not have any major plan for substantial changes in the curriculum; however, to remain competitive, we need to employ new faculty so as to expand our program and establish new courses in the recently popular and in-demand areas of electrical engineering, such as Communications, RF, Artificial Intelligence/Robotics, and Power.

F. Special Sessions and Self-Support Programs

The EE department currently does not offer any special sessions and self-support programs.

III. Documentation of Student Academic Achievement and Assessment of Learning Outcomes

A. Undergraduate and Graduate Student Outcomes and their Assessment

Starting from the semester of Spring 2019, the **undergraduate** Electrical Engineering program has adopted the following 1-7 **Student Outcomes (SO)** consistent with the ABET requirement.

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

In 2021, the department adopted the following **graduate program Student Learning Outcomes (SLO)**:

1. Academic preparation and proficiency in mathematics, science, and engineering.
2. Ability to identify, formulate, design, implement, and solve engineering problems using modern engineering practice.

3. Ability to integrate into the local and global workforce, and communicate effectively.

Undergraduate student outcome achievement in the Electrical Engineering program is assessed through a variety of both indirect and direct measures, with the major ones being: 1) course evaluation surveys, 2) senior exit interviews/surveys, 3) direct assessment of students' work (projects, homework, and exams), 4) comprehensive discussions via faculty meetings, industrial advisory board/employer meetings and EE Chair open houses, and 5) periodical review of EE courses.

The undergraduate outcome assessment also includes 400 level courses which are taken by graduate students as well.

Tools and methods used for assessing undergraduate SO's vary from course to course. Generally, they include homework assignments, examinations, project reports and presentations. Student surveys are also used for assessment.

Each learning goal is met by one or more courses and is assessed by one or more assessment strategies and methods.

Detailed assessment of undergraduate courses is a part of the department's review for ABET accreditation. As such they will not be included in this PPR; however, they are part of the undergraduate Self-Study Report prepared for ABET and is available upon request.

In the fall of 2021, the department instituted **graduate student learning outcome achievement** assessment through graduate comprehensive examination. Based on a student's performance on the graduate comprehensive examination (written or oral), each examiner assesses the degree of achievement of each SLO for that student. The department uses that data to determine if the graduate Student Learning Outcomes are being satisfied. Remedial actions are planned if a minimum threshold is not met.

As described earlier, the written graduate comprehensive examination will be given during the last semester of studies based on the five core courses from a student's study plan. Temporarily, due to COVID, the department has reverted to the oral graduate comprehensive examination, however, still relying on questions to be asked on the five core courses from a student's study plan.

Figure 7 shows the form each graduate comprehensive examination committee member completes for each student as part of the SLO assessment process.

Figure 8 shows the form used to give student grade in the oral graduate comprehensive examination based upon the assessment. (Please note this form is not used in the written graduate comprehensive examination; in that case a numerical score on the written examination determines the student score.)

Graduate Student Learning Outcome Assessment Form

Semester: Fall 2021 **Student Name:** **CWID:** **Faculty Name:**

SLO 1a: Academic preparation and proficiency in mathematics.

5 Superior	4 Above Average	3 Satisfactory	2 Marginal	1 Fail	Courses/Topics covered	Additional Comments
○	○	○	○	○		

SLO 1b: Academic preparation and proficiency in science and engineering.

5 Superior	4 Above Average	3 Satisfactory	2 Marginal	1 Fail	Courses/Topics covered	Additional Comments
○	○	○	○	○		

SLO 2a: Ability to identify, formulate, design, implement, and solve engineering problems.

5 Superior	4 Above Average	3 Satisfactory	2 Marginal	1 Fail	Courses/Topics covered	Additional Comments
○	○	○	○	○		

SLO 2b: Ability to use modern engineering practice for solving engineering problems.

5 Superior	4 Above Average	3 Satisfactory	2 Marginal	1 Fail	Courses/Topics covered	Additional Comments
○	○	○	○	○		

SLO 3a: Ability to integrate into the local and global workforce

5 Superior	4 Above Average	3 Satisfactory	2 Marginal	1 Fail	Courses/Topics covered	Additional Comments
○	○	○	○	○		

SLO 3b: Ability to communicate effectively

5 Superior	4 Above Average	3 Satisfactory	2 Marginal	1 Fail	Courses/Topics covered	Additional Comments
○	○	○	○	○		

Figure 7: Graduate Student Learning Outcomes Assessment Form

CALIFORNIA STATE UNIVERSITY, FULLERTON
DEPARTMENT OF ELECTRICAL ENGINEERING

Date_____

Name of Candidate_____ File No._____

In accordance with the evaluation policy of the Department of Electrical Engineering for the Master of Science in Engineering Oral Examination, the following grading and conditions exist:

1. **Superior:** The candidate automatically passes ☐
2. **Above Average:** The candidate automatically passes ☐
3. **Satisfactory:** The candidate automatically passes ☐
4. **Marginal:** The candidate may be:
   a. passed in part and required to repeat part of the examination, or ☐
   b. passed with the condition of satisfactory completion of remedial work, such as one or two courses, a thesis, or a project. ☐
5. **Failed:** The candidate may be required to:
   a. retake the examination within a certain time period, or ☐
   b. retake the examination after completion of remedial work as in 4.b. above. ☐

As a result of the Oral Examination given on_____(date), your grade result is:_____. The condition(s), (if in category 4 or 5) established by your committee is (are): *

*Note to Committee: Re-examination or partial re-examination should carry limiting dates. Not before_____ and not later than_____.

Chairman_____

Member_____

Member_____

Figure 8: Oral Comprehensive Examination Grading Form.

B. Graduate Student Learning Outcomes (SLO's) Assessment Results

400 Level Course Assessment

Assessment of 400-level courses is carried out along with all the 200-level to 400-level undergraduate courses. The assessment has two components; indirect assessment and direct assessment.

As an example, Table 7 shows the results of SO student survey results (indirect assessment) of all the 200-400 level courses offered in fall 2019.

As another example, Table 8 shows the results of direct assessment of a 400-level course (EGEE-465) from fall 2021.

Table7: Course-Based SO Survey Results (Percent of 4 plus 5 ratings) -- Spring2019

Course	SO1	SO2	SO3	SO4	SO5	SO6	SO7
203	89.2%						
203L	95.7%		95.7%		100.0%	95.7%	91.3%
215	100.0%	88.9%				100.0%	
245	76.2%	71.4%					78.6%
245L	84.2%	75.0%	64.3%			78.6%	89.3%
280	96.8%	90.5%				93.7%	
281	100.0%	89.5%				100.0%	95.2%
303	97.0%						94.4%
303L	93.5%	90.9%	91.5%		95.7%	93.5%	95.7%
308	93.5%						
309	84.2%						
310	86.5%	73.0%					
310L	97.1%	91.2%	97.2%		100.0%	97.1%	94.1%
311	92.9%	89.3%					96.4%
313	100.0%						
313L	100.0%						
323	87.5%	76.5%					
401	96.3%	100.0%		100.0%			96.3%
406	76.0%	84.0%					88.0%
409	83.9%						71.0%
416	85.7%	100.0%					85.7%
420	94.1%						100.0%
445	100.0%	100.0%					100.0%
455	97.9%	95.7%					93.6%
460	100.0%	93.3%					
469	91.8%	89.8%					85.7%
480	94.1%	92.2%					94.1%
483L	100.0%	100.0%					100.0%
485	100.0%	97.4%	97.3%	97.4%	97.3%	97.4%	100.0%

Table 8: Direct assessment results for EGEE-465 (Fall 2021)

Measurement Tool Used	Project 1	Project 2	Project 3	Project 4
Student Outcome	**SO 1**	**SO 2**	**SO 6**	**SO 7**
Student Name / Points Possible	**100**	**100**	**100**	**100**
[redacted]	100	95	80	100
[redacted]	100	100	100	60
[redacted]	100	100	100	80
[redacted]	90	0	80	100
[redacted]	100	100	100	100
[redacted]	100	100	100	60
[redacted]	100	100	80	35
[redacted]	65	100	100	60
[redacted]	0	100	80	70
[redacted]	65	100	0	0
[redacted]	65	100	85	60
[redacted]	65	100	60	70
[redacted]	100	100	100	100
[redacted]	60	100	85	60
[redacted]	50	100	100	60
[redacted]	100	100	100	100
[redacted]	90	80	100	70
[redacted]	60	100	95	80
[redacted]	100	100	100	70
[redacted]	60	100	100	60
[redacted]	10	80	80	50
[redacted]	100	100	100	80
[redacted]	100	100	70	35
[redacted]	100	100	100	80
[redacted]	60	100	60	70
[redacted]	10	100	100	60
Average	75	94	87	68
% of Students above 70%	**58**	**93**	**92**	**54**

Reasons for fewer than 70% students scoring above 70% for SO 1 and SO 7 in Table 8.

SO 1: Students were required to use Microwind for all the projects. They learn the software in Project 1. However, because of the remote course format due to COVID, students could not seek adequate help.

SO7: Project 4 has a major self-study component. However, because of the remote course format due to COVID, students could not seek adequate help.

In addition, the graduate student learning outcome assessment through graduate comprehensive examination (oral ones) was carried out in fall 2021 for the first time. The assessment results on a scale from 1 to 5 (1: fail, 2: marginal, 3: satisfactory, 4: above average, and 5: superior) are given in Table 9.

Table 9: Graduate Student Learning Outcome (SLO) Assessment Results from Fall 2021

Student Name	**Evaluator/Instructor**	**SLO 1**	**SLO 2**	**SLO 3**
[redacted]	Hamidian/Chaudhry	3.0	2.8	3.5
[redacted]	Huang/Ku	5.0	4.5	5.0
[redacted]	Cheng/Chaudhry	4.0	3.5	4.5
[redacted]	Hamidian/Shiva	4.3	3.8	3.5
[redacted]	Hamidian/Shiva	5.0	4.8	4.5
[redacted]	Shiva/Grewal	3.0	3.3	3.0
[redacted]	Huang/Ku/Bai	3.7	3.0	3.0
[redacted]	Huang/Ku/Bai	3.8	3.0	3.2
[redacted]	Grewal/Shahi	4.0	3.5	3.5
[redacted]	Cheng/Zhao/Ku	3.3	3.2	3.5
[redacted]	Huang/Hashemi/Ku	4.2	4.2	4.7
[redacted]	Grewal/Huang/Unnikrishnan	3.0	2.8	2.8
[redacted]	Grewal/Hashemi/Tehrani	3.0	3.0	3.0
[redacted]	Cheng/Grewal	4.0	4.0	3.5
	Average	**3.8**	**3.5**	**3.6**
	Percentage of students scoring 3.0 or higher	**100**	**86**	**93**

C. Continuous Improvement Process and Results.

As shown in Figure 7, the process of continuous improvement starts from data collection. Based on collected data, preliminary evaluation is done by the department's Assessment and Continuous Improvement committee and the Graduate Committee. The evaluation results are then shared with the faculty in department meetings where inputs are sought from the faculty for possible improvement suggestions. Based on the faculty input and recommendations, the department chair takes possible improvement actions as needed. Such improvement actions may include improvement of learning environment; improvement of pedagogical practices in individual course; update of course materials; and/or providing supplemental academic support to students.

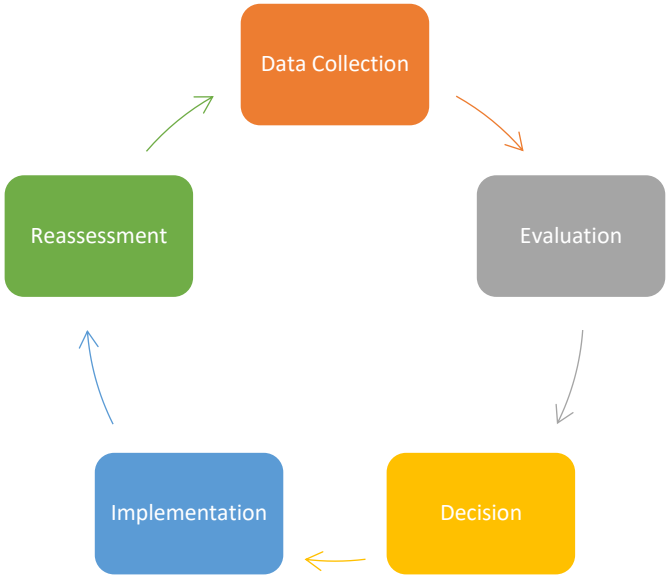


Figure 7: Continuous Improvement Process

As a specific example, Table 10 below shows course survey results from fall 2017 for the courses with results below 70%. There was a total of 4 classes identified as the courses that may need to be improved, EE-280, EE-281, EE-323 and EE-404. In this report, we will only follow the course EGEE 404 because it is also taken by graduate students.

The instructor of EGEE 404 was contacted by the department chair in Spring regarding possible improvement plan. Correspondingly, shown below in Table 11 are the courses with SO ratings below 70% in fall 2018, next time when EGEE 404 was offered. As can be seen, EGEE 404 was no longer on the list needing improvement.

Table 10: Course(s) Recommended for Improvement from Fall 2017

Semester	Course	SO A	SO B	SO C	SO D	SO E	SO F	SO G	SO H	SO I	SO J	SO K
Fa17	280	45.8%				62.1%						54.2%
	281	77.4%	74.2%	58.1%		67.7%		71.0%		71.0%		75.0%
	323	68.3%				67.5%				72.0%		71.4%
	404	64.8%		61.1%		60.0%				64.2%		66.7%

Table 11: Course(s) Recommended for Improvement from Fall 2018

Semester	Course	SO A	SO B	SO C	SO D	SO E	SO F	SO G	SO H	SO I	SO J	SO K
Fa18	280	52.2%				54.3%						52.2%
	323	75.0%				70.7%						69.6%

Revision of SLOs and Assessment Strategies

Every few years, the Assessment and Continuous Improvement Committee of the Department initiates revision of the SLOs and assessment strategies. The committee usually consists of three elected faculty members. The committee collects the feedback from our constituencies for review, assessment, and improvement of the program. The constituencies include our faculty, industrial advisory board, our alumni and their employers, and colleagues in other universities.

Suggested revisions are presented to the EE faculty, industrial advisory board, and students such as those student clubs' officers. The EE faculty, taking into account the recommendations of the various constituent groups considers the proposed revisions and may adopt them. Figure 9 shows significant constituencies of the program, which contribute to revision of the SLOs and the assessment strategies.

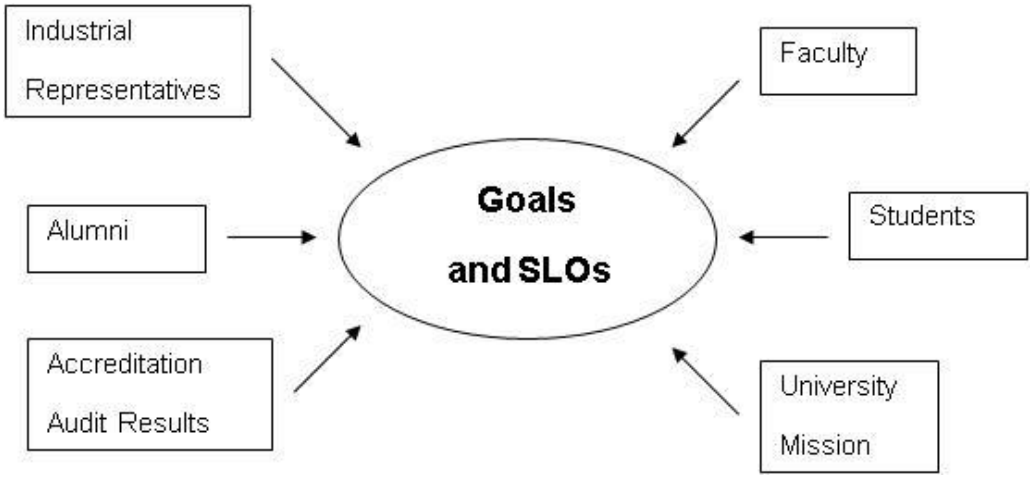


Figure 8: Significant Constituencies of the Program

D. Other Quality Indicators used by the Department for Assessment

Other than the assessment indicators described above, the department does not use any additional assessment indicators for the MSEE graduate program.

E. Alternate Format Course Offerings

The EE Department is not currently offering any alternate format course offerings such as on-line asynchronous classes, etc. Due to COVID-19, EE courses had been temporarily offered virtually from Spring 2020 to Fall 2021.

IV. Faculty

A. Changes in Faculty Since the Last Review

There are (10) tenured and tenure-track faculty members in the department of Electrical Engineering, of which four are in Faculty Early Retirement Program (FERP). All have advanced academic degrees (Ph.D. or equivalent). Most have extensive industrial experience obtained through previous employments, part-time employments and consulting.

Currently, all ten faculty members in EE are tenured full professors. The size of the faculty has gone down in the past several years because the retiring faculty have not been replaced equivalently. MS in Electrical Engineering is a major based degree covering all important aspects of the field. Without hiring new faculty, providing sufficient coverage to major MSEE areas of specialty has become very challenging.

The teaching load of an EE full-time faculty is 12 credit hours. The faculty members are also required to hold a minimum of three office hours every week to meet with students. They also attend the Department's faculty meetings and participate in Department, College, and University committees. The total average work load is around 15 credit hours per week, depending on the lecture/lab mixture of the teaching assignments and the committee services. Additionally, time is also spent on lecture preparation and professional development.

The department also employs part-time lecturers as needed. Part-time lecturers are chosen from a pool of available teachers with different backgrounds and teaching experiences. New lecturers are screened and added to the pool once in a while. The part-time lecturers go through the evaluation process annually. All of the part-time lecturers are either working or retired engineers and/or professionals.

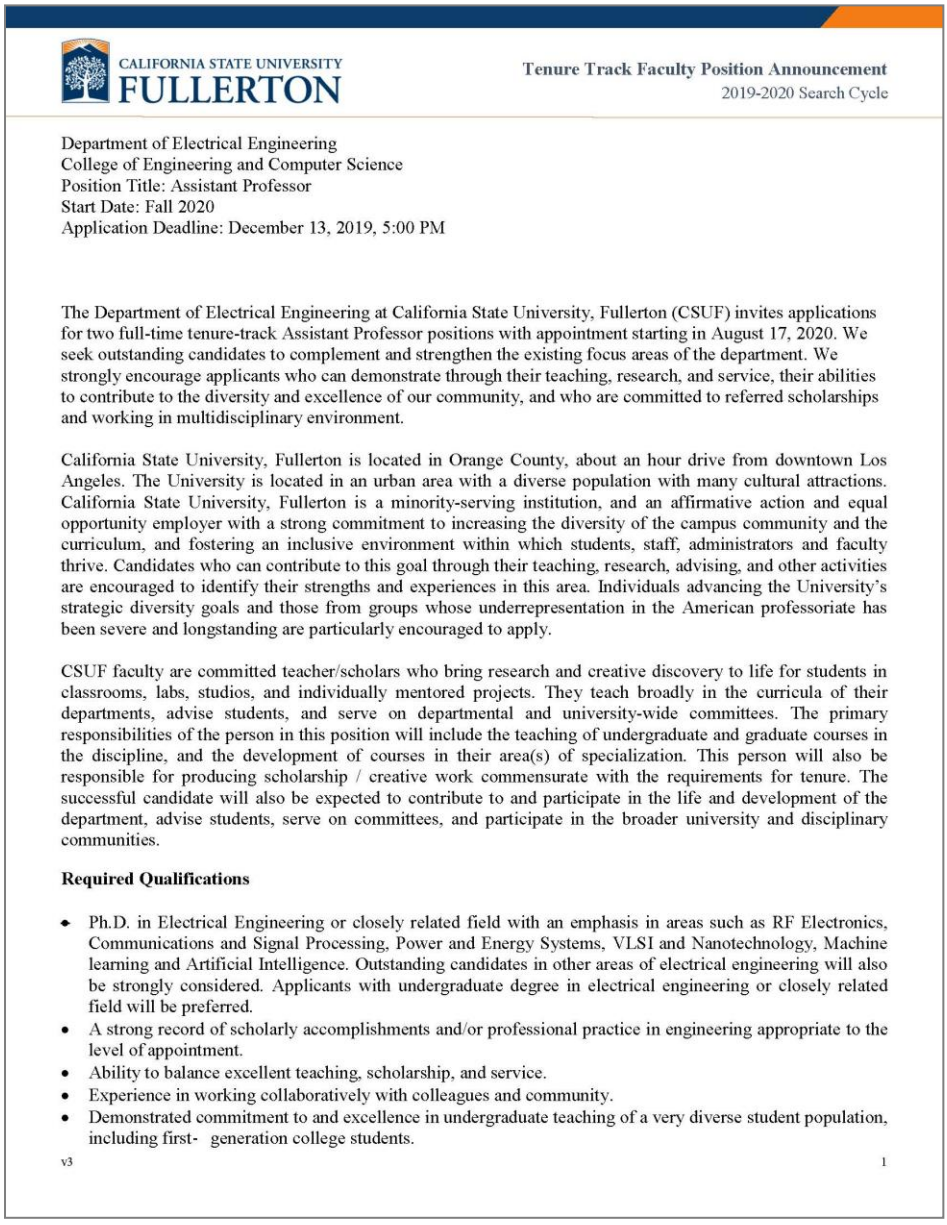
In the past, the department chair appointment used to be an academic year based (10 months). Because of which, the department would be left without sufficient leadership during the summer breaks. Nevertheless, the current chair appointment is for the entire year, which provides continuity in leadership throughout the year.

B. Priorities for Additional Faculty Hires

Electrical Engineering is a fast developing field with many new technologies constantly developed. The retiring EE faculty members in recent years have created lack of expertise in their areas of expertise. In addition, since Electrical Engineering is rapidly expanding in several areas, there is an urgent need for new hires. If and when new hiring is approved, priority will be mainly given to the expertise in the needed areas.

There was an effort in Fall 2019 and Spring 2020 to hire two new tenure-track EE faculty members to start from Fall 2020. This hiring plan was developed in Spring 2019 through faculty meetings, recognizing the current and future development needs of the department.

Shown below in figure 9 is the position description that was advertised in Fall 2019. This position description was advertised on very well known higher education job sites such as academickeys.com, Chronicle of Higher Education, HigherEdJobs.com, IEEE jobs, IEEE spectrum, as well as the HR website for CSUF and CSU system. Additionally, in an effort to recruit diverse faculty candidates for the department, this job advertisement was also posted on diverse job websites, such as DiverseJobs.net, Women in Higher Education, Hispanic Outlook, American Indian Higher Education Consortium, Asians in Higher Education, Blacks in Higher Education, LGBT in Higher Education, and Veteran Jobs.



CALIFORNIA STATE UNIVERSITY
FULLERTON

Tenure Track Faculty Position Announcement
2019-2020 Search Cycle

Department of Electrical Engineering
College of Engineering and Computer Science
Position Title: Assistant Professor
Start Date: Fall 2020
Application Deadline: December 13, 2019, 5:00 PM

The Department of Electrical Engineering at California State University, Fullerton (CSUF) invites applications for two full-time tenure-track Assistant Professor positions with appointment starting in August 17, 2020. We seek outstanding candidates to complement and strengthen the existing focus areas of the department. We strongly encourage applicants who can demonstrate through their teaching, research, and service, their abilities to contribute to the diversity and excellence of our community, and who are committed to referred scholarships and working in multidisciplinary environment.

California State University, Fullerton is located in Orange County, about an hour drive from downtown Los Angeles. The University is located in an urban area with a diverse population with many cultural attractions. California State University, Fullerton is a minority-serving institution, and an affirmative action and equal opportunity employer with a strong commitment to increasing the diversity of the campus community and the curriculum, and fostering an inclusive environment within which students, staff, administrators and faculty thrive. Candidates who can contribute to this goal through their teaching, research, advising, and other activities are encouraged to identify their strengths and experiences in this area. Individuals advancing the University's strategic diversity goals and those from groups whose underrepresentation in the American professoriate has been severe and longstanding are particularly encouraged to apply.

CSUF faculty are committed teacher/scholars who bring research and creative discovery to life for students in classrooms, labs, studios, and individually mentored projects. They teach broadly in the curricula of their departments, advise students, and serve on departmental and university-wide committees. The primary responsibilities of the person in this position will include the teaching of undergraduate and graduate courses in the discipline, and the development of courses in their area(s) of specialization. This person will also be responsible for producing scholarship / creative work commensurate with the requirements for tenure. The successful candidate will also be expected to contribute to and participate in the life and development of the department, advise students, serve on committees, and participate in the broader university and disciplinary communities.

Required Qualifications

- Ph.D. in Electrical Engineering or closely related field with an emphasis in areas such as RF Electronics, Communications and Signal Processing, Power and Energy Systems, VLSI and Nanotechnology, Machine learning and Artificial Intelligence. Outstanding candidates in other areas of electrical engineering will also be strongly considered. Applicants with undergraduate degree in electrical engineering or closely related field will be preferred.
- A strong record of scholarly accomplishments and/or professional practice in engineering appropriate to the level of appointment.
- Ability to balance excellent teaching, scholarship, and service.
- Experience in working collaboratively with colleagues and community.
- Demonstrated commitment to and excellence in undergraduate teaching of a very diverse student population, including first- generation college students.

v3 1

Figure 9. Position Announcement for EE Faculty Hiring, Fall 2019

After this job advertisement was posted, the department received about 170 applications, with many from highly qualified candidates. The Department Search Committee then reviewed those applications received before the deadline. A shortlist was created by the search committee and several video conference interviews were made in February and March of 2020.

Unfortunately, due to the outbreak of COVID-19 pandemic that interrupted the many normal operations of the university, the search had to be cancelled at the end of March 2020.

C. Role of Faculty in the Department's Curriculum Offerings

Faculty is fully involved in development of the department's curriculum. After reviewing the inputs received from our constituencies, the final curriculum modifications and enhancements are decided by the faculty. The curriculum is taught by both the full-time and the part-time faculty. The department has used increasingly more part-time instructors in the past several years.

Table 12 shows the percentages of part-time faculty teaching the electrical engineering classes for the past two years. The share of the part-time faculty has been consistently around 40% which is a bit higher than the department target of 30% and is due to the combination of the retirement of the faculty who were not replaced by the new faculty.

Table 12: Percentages of Classes Taught by Part-Time Instructors

Semester	Total Courses Taught	# Taught by Part-Time	% Taught by Part-Time
Sp 2020	64	25	40
Fa 2020	63	24	38
Sp 2021	63	25	40
Fa 2021	58	22	38

D. Instructor Participation in Special Sessions or Self-Support Programs

Currently, the department does not have any Special Sessions or Self-Support programs.

V. Student Support and Advising

A. Student Advising

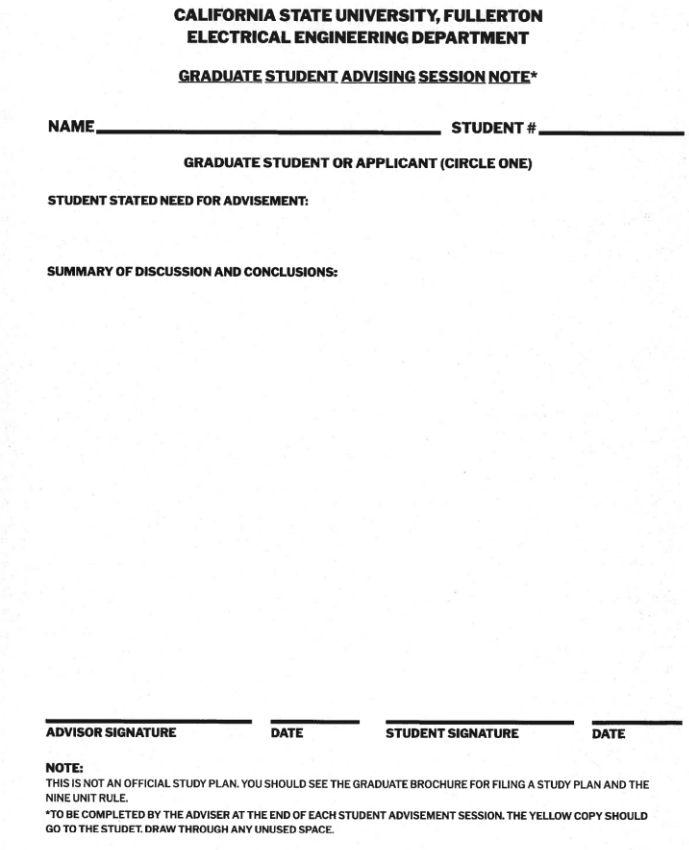
The initial MSEE student advisement is done during the student orientation usually held one or two weeks before a semester starts. In the orientation, the ECS College provides general

information to the students, and that is followed by major advisement by the department chair and/or graduate advisor.

Next, before the first semester registration, each student is advised either by the department graduate adviser, or the chair. During this formal advisement, students choose an area of specialty for their MSEE program, and are assigned a permanent faculty adviser who is specialized in their areas of interest. Next, sometime during their first semester, students meet with their permanent adviser to set up their Study Plan, i.e., the set of ten courses that they will take to complete the degree requirements. Students further meet with their advisers during the course of their studies (usually once a semester) for monitoring their progress and possible modifications of their Study Plans.

In each advising session, the adviser writes a summary of the discussion, and lays out the coursework for the next semester. A copy of the advisement sheet is given to the student and another one is placed in his/her file to be stored in the department's office.

Figure 10 shows the graduate advising form faculty advisors used during the advising session.



CALIFORNIA STATE UNIVERSITY, FULLERTON
ELECTRICAL ENGINEERING DEPARTMENT

GRADUATE STUDENT ADVISING SESSION NOTE*

NAME_____ **STUDENT #**_____

GRADUATE STUDENT OR APPLICANT (CIRCLE ONE)

STUDENT STATED NEED FOR ADVISEMENT:

SUMMARY OF DISCUSSION AND CONCLUSIONS:

ADVISOR SIGNATURE **DATE** **STUDENT SIGNATURE** **DATE**

NOTE:
THIS IS NOT AN OFFICIAL STUDY PLAN. YOU SHOULD SEE THE GRADUATE BROCHURE FOR FILING A STUDY PLAN AND THE NINE UNIT RULE.
*TO BE COMPLETED BY THE ADVISER AT THE END OF EACH STUDENT ADVISEMENT SESSION. THE YELLOW COPY SHOULD GO TO THE STUDET. DRAW THROUGH ANY UNUSED SPACE.

Figure 10: Graduate Advising Form

B. Students' Participation in Honors Programs and Research with Faculty

The Department encourages students to participate in nation-wide honors programs such as Tau Beta Pi, Eta Kappa Nu and student clubs such as the Institute of Electronics and Electrical Engineering (IEEE) and the Institute of Navigation (ION). Both undergraduate and graduate students are also encouraged to work with faculty by participating in research projects and directed studies.

Some of the graduate students and faculty research projects result in significant outcomes that are submitted for exhibitions and publications. Graduate students also participate in research through thesis option.

The university career office and the college career specialist provide support to students in job placement and career guidance. In addition, regular engineering job fairs and STEM job fairs are held on campus where students can interact with potential employers.

VI. Resources and Facilities

A. State and Non-state Support and Resources Received

The Electrical Engineering program is mostly supported by the state with very few non-state supports such as external grants received.

The following tables summarize the financial support received by the EE department from various sources during the past five years.

OE&E Allocation (baseline funds)	
	EE
2017-18	12,000
2018-19	12,000
2019-20	25,200
2020-21	12,000
2021-22	29,500
Total	**90,700**

UEE Allocation (approximate) - SELF Support	
	EE
2017-18	9,372
2018-19	11,490
2019-20	12,000
2020-21	-
2021-22	-
Total	**32,862**

Equipment/Lab Allocation (approximate)	
	EE
2017-18	-
2018-19	103,461
2019-20	-
2020-21	-
2021-22	-
Total	**103,461**

Misc Course Fees Allocation	
	EE
2017-18	37,935
2018-19	26,130
2019-20	21,465
2020-21 **	1,686
2021-22	30,075
Total	**117,291**

	EE
Grand total	**344,314**

**** $20,349.99 additional was purchased with Philanthropic funding (out of the Begovich account) instead of CCF funding**

B. Special Equipment used by the Program

The Electrical Engineering program maintains an ongoing plan for laboratory modernization. The plan sets up goals and objectives for the laboratory equipment purchase needs. The condition of all equipment is classified and priority lists are prepared. The Department has one full-time technician and shares another one with the Computer Engineering program. This provides 1.5 highly qualified technicians who maintain the laboratory equipment.

The EE faculty members who teach lab courses are responsible for the lab operations in their classes. The two EE technicians, one for hardware and one for IT, are responsible for the daily maintenance of the EE labs, with minor equipment repair work handled in house by them. They also manage the lab inventory and maintain good communications with faculty on the need of maintaining, upgrading and replacement of tools, equipment and computing resources in the EE labs. In addition, the IT Technician receives support from the University IT Office to maintain, upgrade and operate computing facilities.

If the need arises for major upgrade or replacement of tools, equipment, or computing resources by the faculty of staffs of the department, it is brought to immediate attention to the department chair. The department chair then discusses the direction of upgrades or replacement in a faculty meeting. After the department decision is made, the proposal for upgrade and/or replacement is sent to the College of ECS Dean for the final approval.

Since the last PPR, the EE Department and the College of ECS budgets have provided over $666K in funding to maintain and upgrade EE laboratory equipment and classroom/ computing facilities. Among this,

- Approx. $474K was used to provide major upgrades to EE office, lab and classroom facility. Such major upgrades include office/classroom/lab renovations, furniture upgrades, installation of new AV systems, addition of new computer stations, and conversion of classroom without computer to a dual-use classroom/computing lab.
- Approx. $192K was used to provide addition, upgrades and replacements of various tools, hardware and equipment as well as renewing and/or purchasing the license for engineering software in the EE labs.

As a result,

- The capacity of the circuits and electronics labs, E-303 and E-403, was expanded from 16 to 20 student work stations in each of the above two labs, allowing more students to be able to add to the lab classes they need.
- CS-402 is converted from a lecture classroom without computer to a dual-use lecture classroom and digital computing lab, allowing more EE courses to be able to use computers in their class instruction.
- AV systems were installed or upgraded in multiple EE classrooms and labs, including CS-402 (upgrade), CS-406 (upgrade), E-302 (new) and E-303 (new), allowing faculty and students to have enhanced presentation tools.
- The hardware and lab equipment were well maintained and upgraded as needed; and the license for engineering software on EE computers is up to date for the newest versions.
- The microcontroller boards used by EE-280 and the FPGA boards used by EE-281 got upgraded to the newest editions, allowing students to learn the use of most current computing devices in a fast-changing technology field.

In addition to this, with funds allocated in academic year 2013, a new robotics lab was added to EE and the GPS and Navigation lab got upgraded in 2014. In the new robotics lab,

multiple computer workstations, robotic kits, advanced GPS receivers with roof-mounted antennas, laser scanner, robotic sensors, and various equipment and tools were added to the lab for students to implement robotics design projects. In the GPS and Navigation lab, multiple new computer work stations, advanced GPS receivers with roof-mounted antennas, and other advanced navigation sensors were added.

Most of the standard EE laboratories are used in the BSEE program; however, all equipment can be used for the MSEE students when needed. The following is a brief description of our laboratories:

1. EE Senior Design Laboratory

Room E302.

The EE Senior Design Lab supports the instruction of EE Senior Design Projects class: EE-485. This cumulating experience is required for all BSEE students so that they will develop the ability to synthesize the knowledge and apply the skills they gain through the BSEE coursework to solve complex, real-world engineering problems, and become sophisticated on all required student outcomes 1 through 7. In addition, E-302 is not only used as an instructional lab for EE senior design projects but also a research lab for faculty-guided student independent research projects.

2. Electrical Circuits Laboratory

Room E303, 20 Stations.

This laboratory is adequately equipped with basic measurement and signal generating equipment for students to perform the experiments individually. The Laboratory has 20 stations each with HP module of Timer/counter, Function generator, Power supply and Multi-meter. A digital scope and banks of decade resistors, inductors, and capacitors are on each station. One station is assigned to each student to experiment with basic AC and DC circuits.

3. Power Laboratory

RoomE402, 8 Stations

The Electrical Machines Laboratory has 8 laboratory stations each with a Hampton AC and DC motor/generator set, a load bank, and patch panel for station configuration. These are large real-world motors delivering about 5hp to the device under test. There are a set of transformers, high current and high voltage meters, and wattsmeters available at each station.

4. Global Positioning System Research Laboratory

Room E402C, 11 Stations

The Global Positioning System Laboratory is used for senior students and faculty research projects in the areas of GPS and WAAS. It has state-of-the-art equipment including Novatel GNSS/INS receivers, which acquires GPS and GEO signals of WAAS, a Magellan receiver to acquire signal from the Coast Guard, several hand-held Magellan receivers, and three antennas on the roof of the Engineering building.

5. Analog Electronics Laboratory

Room E 403, 20 Stations.

The Analog Electronics Laboratory has 20 stations each with HP module of Timer/ counter, Function generator, Power supply, and Multi-meter. A high- speed 100MHz Digital Scope and banks of decade resistors and capacitors are on each station. Analog and digital IC testers and transistor curve tracers are also available. There are four print servers connected to eight printers for printing hard copies of the oscilloscope screens. A station is assigned to each student to experiment with basic and advanced electronic circuits.

6. Open Computing Laboratory

Room E 421, 16 stations

This laboratory is used for all computing needs of EE majors. It is available while the campus is open. Students may get permission to stay late night and during weekends. The lab has 16 stations equipped with latest PCs loaded with the following software:

Software Packages inE-421	Brief Description of Software
Microsoft Word	Word processor, used to prepare laboratory and project reports
Microsoft Excel	Spreadsheet program, used for creating tables of data for analysis or presentation purposes
Microsoft PowerPoint	Presentation software, used for lectures and some student projects and oral exams
Internet Browser	Internet tools, used for search of information and research on Internet
MATLAB	Used for solution of complicated mathematical problems, numerical analysis, digital signal processing, data presentation and visualization, etc.
MultiSim	Used for mixed mode simulation of analog and digital circuits

QuestSim/Xilinx Project	VHDL Compiler for use with FPGA Boards
L-Edit	VLSI Cell Layout Editor
MicroWind	VLSI Cell Layout Editor & Simulator
OrCAD/Pspice	Analog Device Simulation with Graphical Entry Tools
Extend	Systems Modeling and Simulation
Leonardo Spectrum	Digital Synthesis Tool for Standard Cell
Basic Stamp Editor	Stamp Microprocessor Module Programming Environment

7. VLSI Design Laboratory

Room CS 404, 4 Stations

This laboratory is composed of two areas: VLSI design and VLSI processing. The lab's primary function is to give student practical experience in single-chip VLSI design and the secondary function is to promote research activities in the area of VLSI processing and design.

8. Digital Design and Microcomputer Laboratory

Room CS 406, 43 Stations

For digital logic study, the lab is equipped with proto-boards with LEDs, switches and clock. Students design and put together simple digital circuits using ICs and verify their functionality. When the circuit design becomes too complex, they use MultiSim to simulate and verify the circuit. Additionally, the Digital Design and Microcomputer Lab supports the instruction of various digital design and computer programming classes in Electrical Engineering.

9. Robotics Laboratory

Room E 301, 8 Stations

The EE Robotics Lab is utilized for students to conduct research, experiments and design projects related to Robotics; and also to support instructional activities related to the teaching of EE-559: Robotics. The lab is used to house the student chapter of Institute of Navigation (ION) at CSUF. The lab is equipped with multiple computer workstations, robotic kits, GPS receivers with roof-mounted antennas, laser scanner, robotic sensors, and various equipments and tools for students to implement robotics design projects. Furthermore, this lab is heavily utilized by the department for sponsoring STEM teaching and learning outreach activities and seeking external grants, including federal ones to support such efforts.

10. Optics Laboratory

Room CS 109

The EE Optics/Photonics lab is utilized by faculty and students to work on research and design projects related to optical electronics and communication; and also used to support instructional activities related to the teaching of several technical elective courses including EE-410: Electro-optical Systems, EE-480:Optical Engineering and Communications, and EE-510: Optics and Electromagnetics in Communications. This lab is equipped with an optical table with multiple laser and optical devices, power supplies and the optical spectrum analyzer.

C. Library Resources

The Paulina June and George Pollak Library and a small satellite library located at the Irvine campus provide a full range of services to faculty, students, and community users. The library's staff includes 3 library managers (Dean and Associate Deans), 24 librarians (including part-time librarians), 27 paraprofessionals, and approximately 80 student assistants. The Library's Website (http://www.library.fullerton.edu) serves as a gateway to information about library resources and services as well as a vital component of the library's extensive instruction program.

Pollak Library holds over 1,400,000 books which includes just over 770,000 physical books and over 690,000 electronic books. In addition, the library provides access to over 200 databases.

Databases of particular interest to Engineering and Computer Science include:

- ACM Digital Library
- IEEE *Xplore*
- Web of Science
- ScienceDirect
- SpringerLink Journals
- OmniFile Full Text Mega
- Academic Search Premier
- Wiley Online Library

The Pollak Library has over 500 computers available located throughout the North and South buildings. The library is also home to the Information & Learning Commons (ILC), a main hub for research activities located on Library North first floor. A service desk at the Research Center is staffed by the Reference Team (librarians and library staff), while the Student Genius Center is staffed by the Information Technology staff. Both assist users with research needs and technical support.

The Pollak Library houses the Innovation and Makerspace Center on the second floor of Library North. This center enhances creativity, innovation and talent through advanced technology such as virtual reality, augmented reality, 3D printing, Microsoft Surface Hub, Raspberry Pi, and high-end computing, (https://www.fullerton.edu/it/innovation_makerspace_center/).
In addition, a Data Visualization Center, for analyzing and displaying data, is located adjacent to the existing Innovation/Makerspace Center,
(https://www.fullerton.edu/it/services/data_visualization_center/).

Wireless access and docking stations are available throughout Library North and Library South.

Electronic resources for the visually disabled are also available.

During the spring and fall semesters, the Pollak Library is open roughly 92 hours per week. The Library has somewhat reduced hours during intersession, summer sessions, and fall and spring breaks and is open 24/7 during the weeks of finals. The Library is closed on some national holidays, including Martin Luther King Day, President's Day, Cesar Chavez Day, 4th of July, Memorial Day, Labor Day, Veteran's Day, and Thanksgiving Day. The Library's collections of electronic resources (databases, e-journals and e-books) are available 24/7 from the Library's Website.

The Pollak Library's reference and instruction services are designed to teach students to be information literate, critical thinkers, and intelligent researchers. The mission of the Library's Instruction program is to prepare CSUF students to be successful information seekers in a rapidly changing technological environment.

Students and faculty check out materials using their Titan cards. Most library materials circulate for 10 weeks. However, checked out materials are subject to recall after 10 days if requested by another borrower. Students and faculty can check out up to 100 items. Renewal of library materials can be done in person, via the telephone or online at the Library's Website. For additional details, see http://www.library.fullerton.edu/about/guidelines/privileges.php

The Library maintains a course reserves collection of supplementary course materials provided by faculty in support of course curriculum. The Library accommodates reserves in several formats. Digitized copies of print or audiovisual materials are accessed using course management software available to students and faculty via the campus portal site. Digitized reserves can be accessed at any time. Support for using Titanium, our campus course management software, is provided by The Faculty Development Center (assistance to faculty) and IT Help Desk (assistance to students). Reserves in any format (books, textbooks, sample

projects, etc.) can be borrowed from the course reserves desk during the hours the Library is open. Complete information regarding course reserves can be found on the Library's Website at http://www.library.fullerton.edu/services/course-reserves.php.

ILLiad, a web-based interlibrary loan system, allows students and faculty to request articles, books, and other materials online. ILLiad is used when the requested materials are not in the library. Interlibrary loan staff may obtain requested items from libraries worldwide. Most materials can be borrowed free of charge. Detailed information regarding the Library's Interlibrary Loan services is maintained at the Library's Website at https://www.library.fullerton.edu/services/interlibrary-loan.php

The Library also maintains reciprocal borrowing arrangements that allow CSUF students, faculty, and staff to go directly to other libraries and borrow the resources they need in person. Reciprocal arrangements exist among the sister institutions in the California State University system and with several institutions in the local area, including Biola, Cerritos College, Hope International University, Marymount College, Santiago Canyon College, and the Southern California University of Health Sciences.

As mentioned above, the Library has a significant collection of materials that support the study and research required by the College of Engineering and Computer Science. The Library welcomes input from faculty on the selection and purchasing of resources and materials that support the curriculum and, as funds permit, the research needs of the faculty. The 23-campus California State University system now uses an integrated platform – Ex Libris Alma with the Ex Libris resource discovery system, Primo. This has provided an increased efficiency and equity for sharing of items among campuses.

Through collaboration with the California State University system as a whole, as well as local subscriptions, the Library provides access to resources essential to the study of Engineering and Computer Science, such as the ACM Digital Library, IEEE *Xplore*, Web of Science, and others listed above.

Through an established approval plan, a Demand-Driven Acquisition (DDA) program, selections by the Engineering librarian, and faculty requests, books in both print and electronic formats are added regularly.

Current monograph holdings are as follows:

Pollak Library Print and Electronic Book Collections for Engineering and Computer Science		
	Current Collection Holdings (Print & E)	**Electronic DDA**
Engineering: Call numbers T – TP	25,200 (17,639 & 7,561)	5,787
Chemistry: Call number QD	7,633 (6,376 & 1,257)	1,047
Math & Computer Science: Call number QA	20,791 (16,481 & 4,310)	4,359
Physics: Call number QC	10,433 (7,958 & 2,475)	1,886
Technology: Call number TS	1,306 (1,095 & 211)	122

The Library also maintains a number of journal subscriptions relevant to Engineering and Computer Science as follows:

Pollak Library Journal Collections for Engineering and Computer Science	
	Current Collection Holdings
Engineering and Computer Science (including all subcategories, some of which are included below)	8,485
Civil Engineering	1,083
Electrical Engineering	2,209
Electrical Engineering	1,198
Chemistry	1,455
Math & Computer Science	5,425
Physics	2,570
Technology	310

VII. Long-term Plans

A. Summary of Long-term Plan

The MSEE program's long-term plan includes addition of new courses to keep up with the demands of the industry, employment of new faculty with expertise in the areas of high demand, continuous improvements of the program quality, use of modern facilities and equipment, and increasing enrollment.

B. Long-term Plan on Implementation of the University's, Department's and Program's Mission and Goals

The mission and goals of the department are compatible with those of the college and the university. We plan to review our mission, goals, and learning outcomes on a three-year cycle.

After each cycle of the review, if needed, we will improve/modify our mission and goals to match those of the university, inputs from our constituencies, and the demands of the industry.

C. Evidence of Support of Department Goals

The evidence of successful implementation of the program goals is measured by surveys, examinations, and monitoring of several variables. Those include successful employment of our alumni, surveys of their employers, review of procedures and policies, review of course contents, and monitoring the quality of the student learning. Collection of the assessment data (both direct and indirect), analysis of the measured data from extensive surveys, exams, projects, and appropriate interpretation of the analyzed data will provide insight to the level of program quality and student learning, and leads to performing continuous improvement based on the indicators.

D. Long-term Budget Plan

As part of the California State University (CSU) system, the main source of financial support comes from the State of California. The budgeting systems in the CSU system differs from how budgeting is done in many universities in the east coast, most private universities and all private businesses. In these institutions, budget process involves the proposal by operating units for funding based on projected needs for the upcoming year followed by administrative scrutiny of the proposal and funding decision by central administration.

In the CSU system, the funding process may be better described as "allocation" as opposed to "budgeting." The Governor and the Legislature in Sacramento allocates a certain sum to operate the California State University System. Then the Chancellor allocates a certain number to CSUF, one of the 23 campuses within the system. The allocation is loosely based on the number of FTES per campus. The formula for these allocations is complicated and is not uniform. Therefore, there is some uncertainty about how much funding will be available during each year. **Because of this dependency on state budget and associated uncertainty, it is very challenging for the department to make long-term budget plans.** Nevertheless, the College of Engineering and Computer Science has recently hired an academic resource manager to help the college for developing long-term budget plans.

VIII. Appendices

Appendix 1. Data Tables Associated with the Graph given in the Figures 2 to 6.

Table 1: Returning and New Graduate Students Enrollment Trend (for Figure 2)

Year	Returning Students	New Students
Fall 2016	127	58
Fall 2017	100	51
Fall 2018	89	29
Fall 2019	50	19
Fall 2020	38	25
Fall 2021	41	17

Table 2: International and Domestic Student Percentages (for Figure 3)

Year	International Students (%)	Domestic Students (%)
Fall 2016	83.2	16.8
Fall 2017	77.5	22.5
Fall 2018	78	22
Fall 2019	60.9	39.1
Fall 2020	33.3	66.7
Fall 2021	22.4	77.6

Table 3: Master's Degrees Awarded (for Figure 4)

Year	Degrees Awarded
2011-12	66
2012-13	41
2013-14	36
2014-15	51
2015-16	139
2016-17	108
2017-18	74
2018-19	67
2019-20	43
2020-21	21

Table 4: Returning and New Undergraduate Students Enrolment Trend (for Figure 5)

Year	Returning Students	New Students
Fall 2016	429	168
Fall 2017	409	121
Fall 2018	385	124
Fall 2019	326	88
Fall 2020	284	82
Fall 2021	275	56

Table 5: Annualized Headcount of Graduate Students (for Figure 6)

Year	Annualize Headcount
2015-16	231
2016-17	173.5
2017-18	146.5
2018-19	107
2019-20	65.5
2020-21	59
2021-22	58

Appendix 2. Graduate Degree Program Data

Table 1: Graduate Program Applications, Admissions, and Enrollments

Fall	# Applied	# Admitted	# Enrolled
2016	378	187	58
2017	280	221	51
2018	217	148	29
2019	132	85	19
2020	129	88	25

Table 2: Graduate Program Enrollment by Headcount and FTES

Academic Year (Annualized)	Headcount	FTES	FTES per Headcount
2016-2017	174	106.6	0.61
2017-2018	147	91.1	0.62
2018-2019	107	66.9	0.63
2019-2020	66	37.3	0.57
2020-2021	59	35.3	0.60

Table 3: Graduation Rates for Master's Programs

All Master's Entered in Fall:	Cohort	% Graduated		
		In 2 Years	**In 3 Years**	**In 4 Years**
2015	64	73.4%	90.6%	90.6%
2016	58	75.9%	89.7%	89.7%
2017	51	58.8%	76.5%	78.4%
2018	29	62.1%	79.3%	N/A
2019	19	36.8%	N/A	N/A

Table 4: Graduate Degrees Awarded

College Year	Degrees Awarded
2016-2017	108
2017-2018	74
2018-2019	67
2019-2020	43
2020-2021	20

Appendix 3: Faculty

Table 1: Faculty Composition[1]

Fall	Tenured	Tenure-Track	Sabbaticals at 0.5	FERP at 0.5	Full-Time Lecturers	Actual FTEF
2016	10	0	1.0	0.5	1	11
2017	10	0	0.0	0.5	0	10
2018	10	0	0.0	0.5	1	11
2019	10	0	0.5	0.5	0	10
2020	10	0	0.0	1.0	0	10

[1] Headcount of tenured, tenure-track, sabbaticals at 0.5, and FERP at 0.5 includes full-time and part-time faculty. Headcount of lecturers only includes full-time faculty.

Appendix 4: EE Labs and Resources

Legend	Existing equipment before last visit	**Black**
	Added stations or equipment of the same kind	**Green**
	New equipment	**Blue**

Electrical Circuits Lab (room E-303, for lab course EE-203L):

The Electrical Circuits Lab supports the instruction of EE-203L. EE-203L is an introductory circuit lab course for multiple majors including EE, CpE and ME. EE-203L is also a gateway lab course for the more complex circuits and electronics lab in the BSEE curriculum.

Room E303 for Electrical Circuits Lab (EE-203L)				
# Unit	**Description**	**Manufacturer**	**Model #**	**Comment**
16	Main frame	Tektronics	TM 504	
16	Digital Counter	Tektronics	DC504A	
16	Function Generator	Tektronics	FG 503	
16	Digital Multimeter	Tektronics	DM 502A	
16	Power Supply	Tektronics	PS 503A	
20	Digital Scope	Tektronics	TDS-3012B,3012	100 MHz
20	Digital Multimeter	Agilent	34401A	6 1/2 digital meter
20	Triple output power supply	Agilent	E3630A	0-6v(2.5A),0-20v(0.5A)
20	Function Generator	Rigol	LXI	2 Channel 30 MHz Function/Arbitrary Waveform Generator
20	Multimeter	SIMPSON	260	
20	100mv, 0~25 mA	Amp meter		
80	Resistor Box	W.R.E.	ARD-41	
40	Capacitor Box	I.E.T.	CS-300	
20	Inductor Box	I.E.T.	LS-400A	
8	Computer	Dell Optiplex	GX-620	
8	Printer	HP Officejet Pro	6230	
1	DLP Projector	Viewsonic	PJ560D	Instructor's presentation cart
1	Computer	Dell	280	

Analog Electronics Lab (room E-403, for lab courses EE-303L and EE-310L):

The Electronics Lab supports the instruction of EE-303L and EE-310L. These two courses are gateway labs to the BSEE cumulating experiences in senior design; and are used to evaluate students on critical learning outcomes such as teamwork abilities, ability to design and conduct experiments, to analyze and interpret data, and also to communicate effectively. EE-303L and EE-310L are also used for students to meet the upper-division writing requirements in BSEE.

Room E403 for Analog Electronics Lab (EE-303L, EE-310L)				
# Unit	**Description**	**Manufacturer**	**Model #**	**Comment**
1	Curve Tracer	Tektronics	177	
1	Curve Tracer	Tektronics	3700	
16	Main frame	Tektronics	TM 504	
16	Digital Counter	Tektronics	DC504A	
16	Function Generator	Tektronics	FG 503	
16	Digital Multimeter	Tektronics	DM 502A/511	
16	Power Supply	Tektronics	PS 503A	
20	Resistor Decade Box	IET	RS-200	
13	Transformor Box			(6V-0-6V)
20	Digital Scope	Tektronics	TDS-3012-B	100 MHz
20	Digital Multimeter	Agilent	34401A	6 1/2 digital meter
20	Triple Power Supply	Agilent	E3630A	0-6v(2.5A),0-20v(0.5A)
20	Function Generator	Rigol	LXI	2 Channel 30 MHz Function/Arbitrary Waveform Generator
20	Multimeter	Simpson	260	Anylog Meter
8	computer for printer	Dell	GX 280	
4+4	Printer for scope	HP	3000 & 5650	Color printer Deskjet
1	Instrictor computer	Dell	Optiplex 740	
1	Projector	Viewsonic	PJ650	

EE Senior Design Projects Lab (room E-302, for senior design course EE-485):

The EE Senior Design Lab supports the instruction of EE Senior Design Projects class: EE-485. This cumulating experience is required for all BSEE students so that they will develop the ability to synthesize the knowledge and apply the skills they gain through the BSEE coursework to solve complex, real-world engineering problems, and become sophisticated on all required student outcomes 1 through 7.

In addition, E-302 is not only used as an instructional lab for EE senior design projects but also a research lab for faculty-guided student independent research projects. Several faculty members in EE Department had secured grants in the past to support student research and design projects conducted in this lab.

Room E302 for Senior Design Lab (EE-485)				
# Unit	**Description**	**Manufacturer**	**Model #**	**Comment**
1	Laserjet Printer	HP	4100N	
11	Computer	Dell	Precision T1700	Intel i7, 8GB, 250GB SSD, 24" monitor
1	Spectrum Analyzer	Rigol	DSA-832E	
12	Digital Scope 100 MHz	Tektronics	TDS-3012-B	
5	Function Generator	Tektronics	AFG 3021	
4	Digital Multimeter	Agilent	34401A	
12	Power Supply	Agilent	E3630A	
7	Digital Scope 150MHz	Agilent	DSO 3152A	
1	Pulse Generator 50 MHz	Wavetek	801	
6	Multimeter	HP	3468B	
2	Triple Out-put Power Supply	HP	6235A	
6	Function Generator	Elenco	GFG-8016G-D	
1	Spectrum Analyzer 9KHz-3GHz	Advantest	R3131A	
1	Signal Generator 9KHz-1.1GHz	Rohde&Schwarz	SML01	
1	Digital Scope 400 MHz	Tektronics	TDS 380	
1	DC Power Supply	BK Precision	1761	
2	SignalGenerator 100KHz-150MHz	Elenco	SG-9000	
2	LCR meter	HP	4261A	
1	Power load (150w)	Kikusui	PLZ 150w	
1	Logic Analyzer	Tektronics	TLA 704	
1	VHF Oscillator	HP	3200B	
4	Voltmeter	HP (old)	400E/3400A	
1	Soldering Station	Hako 926	926	
4	Soldering Station	Oki	PS-800	
3	Main Frame	Tektronics	TM 503B	
3	Function Generator	Tektronics	FG 503	
3	Digital Multimeter	Tektronics	DM 511	
3	Power Supply	Tektronics	PS 503A	
1	Computer			Instructor's Computer
1	Overhead projector			

Electrical Machinery Power Lab (room E-402, for lab course EE-313L):

The Electrical Power Lab supports the instruction of EE-313L. The course is to teach students about Electrical Machines and Power including the use of transformers, and electromechanical systems such as AC and DC machines.

Room E-402 for Power Lab (EE-313L)				
# Unit	**Description/ Specifications**	**Manufacturer**	**Model #**	**Comment**
18	AC 120/208V Resistance- Load		RLC-100	
18	AC-DC Power Supply		BPS-101	
9	3 & 4 Point DC Starter		DCMS-100	
9	DC Motor		DCM-100	
9	Dynamometer		DYN-100-DM	
9	3-phase Induction Motor		IM-100	
9	3-phase Synchronous Machine		SM-100-3	
9	3-phase Synchronous Alternator		SA-100-3	(can use Synchronous Machine instead)
8	Powerstat Variable Autotransformer (Variac)		116BT-3	3-phase 240V 60Hz 0-280V output 10A 4.8kVA
8	Single-Phase Resistance Load		pn 0905	Switchable from 15 to 150 ohm
8	Simpson Analog Multimeter		260	
7	Simpson (Amp-Clamp)		150-2	Clamp-on AC Current Adapter
7	DC Ammeter		931	Ranges: 0-5A 0-0.5A 0-0.05A
6	DC Ammeter		931	Ranges: 0-10A 0-1A 0-0.1A
7	DC Voltmeter		931	Ranges: 0-75V 0-30V 0-7.5V
9	DC Voltmeter		931	Ranges: 0-150V 0-15V 0-3V
8	AC Voltmeter		433	Ranges: 0-150V 0-75V (150V - 3,396 ohm, 75V - 1,696 ohm)
9	AC Voltmeter		433	Ranges: 0-300V 0-150V (300V - 13,710 ohm, 150V - 6,861 ohm)
8	AC Ammeter		433	Ranges: 0-10A 0-5A 0-1A (impedance @ 60Hz: 10A - 0.03, 5A - 0.07, 1A - 0.37)

7	AC Ammeter		433	Ranges: 0-3A 0-1.5A 0-0.75A (impedance @ 60Hz: 3A - 0.18, 1.5A - 0.43, 0.75A - 0.75)
5	Wattmeter		432	0-150W 0-75W
7	Wattmeter		432	0-300W 0-150W
8	Current Transformer		461	Ranges: 100:1 50:1 25:1 10:1
9	Strobotac		1538A	Ranges: 24,000-150,000rpm 4,000-25,000rpm 670-4,170rpm 110-690rpm
15	4-Winding Isolation Transformer		N-64AC	(1:1) 500VA 115V
5	Digital Stroboscope	Lutton	DT 2269	
10	5A --- AC Current Meter			
10	5A --- DC Current Meter			
8	Current Transformer	Hampton	CT-100	
4	Power Meter	GwINSTEK	GPM-8212	

GPS and Navigation Lab (E-402B)

The GPS and Navigation Lab in EE supports the instruction of EE-483L: GPS Lab. Additionally, the lab is utilized to support student research and design projects related to the area of GPS and Navigation.

Room E-402B for GPS Lab (EE-483L)				
# Unit	Description/ Specifications	Manufacturer	Model #	Comment
1	Color Laserjet Printer	HP	2600n	
11	Computer: Intel i7, 8GB RAM, 250GB SSD, 24" monitor	Dell	Precision T1700	
2	GPS Receiver	Novatel	Propak-V3	
1	GPS Receiver	Novatel	Flex6	Flex6-G2L-BOG-TTR
4	GPS Receiver	Novatel	Propak-V6	
1	GPS Receiver	Magellan	DLX-10	

Computer Open Lab (room E-421, for independent and group study uses):

The EE computer open lab provides a place for students to have independent and/or group study uses.

Room 421 for Computer Open Lab				
# Unit	**Description/ Specifications**	**Manufacturer**	**Model #**	**Comment**
16	Computer: Intel i7, 8GB RAM, 250GB SSD, 24" monitor	Dell	Precision T1700	
1	Laser Printer 600	HP	M601	

Micro-computing Lab (room CS-402, for lab courses EE-215, EE-280 and EE-281):

CS-402, the Micro-computing Lab supports the instruction of various digital design and computer programming classes in Electrical Engineering. It is also a dual-use computer lab/lecture classroom in order to support the increased use of computers and engineering software in current EE curriculum.

Room CS402 for Computing Lab (EE-215, EE-280, EE-281)				
# Unit	**Description/ Specifications**	**Manufacturer**	**Model #**	**Comment**
37	Computer: Intel i7, 8GB RAM, 250GB solid state drive, 27" monitor	Dell	Precision T1700	
20	FPGA board	Digilent	Nexys 4 DDR	
37	Micro-controller Board	EVBplus	Edubase V2/Tiva	

Microprocessor & Digital Design Lab (room CS-406, for lab courses EE-215, EE-245L, EE-280 and EE-281):

The Microprocessor & Digital Design Lab supports the instruction of various digital design and computer programming classes in Electrical Engineering. Having skills in digital design and computer programming is critical for the EE students nowadays to succeed in the profession. The use of this lab especially helps EE to address those accreditation criteria related to the use of modern engineering tools and techniques.

Room CS406 for Digital Logic and Microcomputer Lab (EE-215, EE-245L, EE-280, EE-281)				
# Unit	Description/ Specifications	Manufacturer	Model #	Comment

43	Computer: Intel i7, 8GB RAM, 250GB solid state drive, 27" monitor	Dell	Precision T1700	
25	Logic Box			
4	Logic Analyzer	Tektronics		Changed Agilent logic analyzers to Tektronix logic analyzers
43	FPGA board	Digilent	Nexys 4 DDR	
43	Micro-controller Board	EVBplus	Edubase V2/Tiva	

Robotics Lab (E-301)

The EE Robotics Lab is utilized for students to conduct research, experiments and design projects related to Robotics; and also to support instructional activities related to the teaching of EE-559: Robotics. The lab is also used to house the student chapter of Institute of Navigation (ION) at CSUF.

Room E-301 for Robotics Lab				
# Unit	**Description/ Specifications**	**Manufacturer**	**Model #**	**Comment**
1	Laserjet Printer	HP		
8	Computer: Intel i7, 8GB RAM, 250GB SSD, 24" monitor	Dell	Precision T1700	
4	GPS Receiver	Navcom	SF-3050	
8	Kinect Sensor	Microsoft	Kinect for PC	
8	Robotic Arm	Lynxmotion	4 degree Arm	
8	Mobile Robot Kit	VEX	Education Kit	
1	Laser Scanner	SICK	LMS 200	

Optics/Photonics Lab (CS-109)

The EE Optics/Photonics lab is utilized by faculty and students to work on research and design projects related to optical electronics and communication.

Room CS109 for Optical Lab				
# Unit	**Description/ Specifications**	**Manufacturer**	**Model #**	**Comment**
1	Coherent Innova 100 10W Argon Ion Laser	Coherent	Innova 100	
1	Coherent CR-599 Dye Laser	Coherent	CR-599	
1	TMC Optical Table	TMC		
1	Research Electro-Optics Laser 30025 1.5mW 633nm	Research Electro-Optics	30025	
1	Coherent FieldMaster Power Meter Model DM	Coherent		
1	Newport Power Meter 1815C	Newport	1815C	
1	Newport Power Meter 1918C	Newport	1918C	
1	Newport Laser Diode Driver Model 505B	Newport	505B	
1	Tektronix Modular instrument (Dual DC Power Supply / Digital Multimeter/ Function Generator	Tektronix		
1	HP Universal Counter 5316A	HP	5316A	
1	Racal Dana Digital Multimeter 5001	Racal Dana	5001	
1	HP DC Power Supply Harrison 6200B	HP	6200B	
1	HP DC Power Supply 6281A	HP	6281A	
1	HP Optical Spectrum Analyzer 70952B (600-1700nm)	HP	70952B	

Appendix 5: Annual Operating Budget of the Department

Table 1: ECS Financial Support

Year	OE&E Allocation (baseline funds)	*UEE Allocation (approximate) - SELF Support	Equipment/Lab Allocation (approximate)	Equipment/Lab Allocation (approximate)	Total
2014-15	19,095	30,366	-	6,949	56,410
2015-16	14,277	28,598	88,298	36,078	167,251
2016-17	14,000	24,971	83,531	63,395	185,897
2017-18	12,000	9,372	-	37,935	59,307
2018-19	12,000	11,490	103,461	26,130	153,081
2019-20	25,200	12,000	-	21,465	58,665
2020-21	12,000	-	-	1,686**	13,686**
2021-22	29,500	-	-	30,075	59,575

*University Extended Education

** $20,349.99 additional was purchased with Philanthropic funding (out of the Begovich account) instead of CCF funding

Appendix 6. Curriculum Vitae of Faculty

Full-Time Faculty

Computer Engineering Faculty Teaching EE Courses

Adjunct Faculty

1. **Name:** **Maqsood A. Chaudhry, Ph.D.**

2. **Education**

Ph.D.,	Electrical Engineering, University of California, Irvine,	1989
M.S.,	Electrical Engineering (Specialization in System Engineering), California State University Fullerton,	1982
B.Sc.,	Electrical Engineering, University of Engineering and Technology, Lahore, Pakistan,	1978

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering, 2004 – Present, Full-time.
California State University, Fullerton, Associate Professor, Electrical Engineering, 1995 – 2004, Full-time.
California State University, Fullerton, Assistant Professor, Electrical Engineering, 1990 – 1995, Full-time.
California State University, Fullerton, Lecturer, Electrical Engineering, 1984 – 1990, Part-time.
University of California, Irvine, Lecturer, Electrical Engineering and Computer Science, 1986 – Present. Part-time.

4. **Non-academic Experience:**
None.

5. **Certifications or Professional Registrations:**
None**.**

6. **Current Membership in Professional Organizations:**
Eta Kappa Nu, Tau Beta Pi, Phi Beta Delta.

7. **Honors and Awards**

Distinguished Engineering Educator Award, 2004, Orange County Engineering Council.

Boeing A. D. Welliver Fellow, 2002.

Outstanding Faculty Recognition, 2001-02, California State University, Fullerton.

Mentor of the Year, 1999-2000, College of Engineering and Computer Science, California State University, Fullerton.

8. Service Activities

Academic Year 2019 – 2020.

- Member Department Personnel Committee.
- Member Department Search Committee.
- Member Department Curriculum Committee.
- Member Assessment and Continuous Improvement Committee.
- Member Thesis Defense Committee.
- Graduate Advisor for Electronics and Circuit Theory Specialization.

Academic Year 2018 – 2019.

- Member Department Personnel Committee.
- Member Department Search Committee.
- Graduate Advisor for Electronics and Circuit Theory Specialization.

Academic Year 2017 – 2018.

- Member Department Personnel Committee.
- Graduate Advisor for Electronics and Circuit Theory Specialization. Academic Year 2016 – 2017.
- Graduate Advisor for Electronics and Circuit Theory Specialization.
- Chair Thesis Defense Committee.

Academic Year 2015 – 2016.

- Member Department Personnel Committee.
- Member Department Curriculum Committee.
- Member Graduate Committee.
- Chair Thesis Defense Committee.
- Graduate Advisor for Electronics and Circuit Theory Specialization.

9. Important Publications and Conference Presentations during the Past Five Years

Chaudhry M., "Computational Conformal Mapping in Education and Engineering Practice", Accepted for presentation in Computing Conference, London, U.K., June 2020

10. Recent Professional Development Activities

Received training required to be member of the department search committee.

1. **Name:** **David J. Cheng, Ph.D.**

2. **Education**

Ph.D.,	Physics,	University of California, Irvine, Solid State Physics,	1975
M.S.,	Physics,	University of California, Solid State Physics,	1972
B.S.,	Physics,	National Taiwan University,	1968

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering, 2007 – Present, Full-time.
California State University, Fullerton, Associate Professor, Electrical Engineering, 1985 – 2007, Full-time.
California State University, Fullerton, Chair, Electrical Engineering Department, 1997-2001 and 2014 – 2017, Full-time.
California State University, Fullerton, Associate Dean, School of Engineering and Computer Science, 1987 – 1988, Full-time.
University of California, Irvine, Assistant Professor, Electrical Engineering, 1983 – 1985, Full-time.
California State University, Long Beach, Associate Professor, Electrical Engineering, 1977 – 1983, Full-time.
University of California, Irvine, Senior Research Fellow, Electrical Engineering, 1975 – 1977, Full-time.

4. **Non-academic Experience (Last Five Years)**

None.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

IEEE, APS, AAAS, IAE

7. **Honors and Awards**

- "IEEE Millennium Medal Awards," for outstanding professional achievements", 2000
- "Honorable Professorship" from several Universities in Taiwan and China since 2000.
- "Outstanding Leadership and Service Award", IEEE USA
- "Outstanding Professional Achievement Award", North American Taiwanese Professor Association (NATPA) 2001
- "Outstanding Creativities, Teaching and Services Awards", CSUF several times.

8. **Service Activities**

- Chairman, Professional Activities Council for Engineers, IEEE OC, 1996 - Present

- Coordinator, Los Angeles Council of Engineers and Scientists (LACES), 1996
- Coordinator, IEEE Los Angeles Council (10 sections, 14,000 members), 1994-1996
- Chairman, IEEE Orange County Section (4,000 members), full-time, 1994-1996
- President, Asian American Faculty and Staff Association, CSUF, 1994 – 2010

University Committee Memberships:

- Faculty Affairs (FAC), International Education (IEC), Professional Leave (PLC),
- Outstanding Professor (OPC),Research (URC), Library Committee (ULC)

Department Committee Memberships:

- Personnel Committee (alternate), Schedule, Curriculum, Undergraduate and graduate
- Adviser, IEEE Student Chapter Faculty Advisor

9. Important Publications and Conference Presentations during the Past Five Years

- Directed Radiation for Far-Field Wireless Power Transfer, Mutasem Alsharqi, Mohammed Hilfi, David Cheng, International Journal of Computer Applications, June 2020.

- DC Shunt Motor Control using Wavelet Network, Mohammed Kamil Hilfi, David Cheng, International Journal of Computer Applications, July 2014.

- Mobile Robot- Dynamic Model Controlling using Wavelet Network, Mohammed Kamil Hilfi, David Cheng, International Journal of Computer Applications, June 2014.

10. Recent Professional Development Activities

- Significant professional society activities- IEEE, American Physical Society and AAAS.
- Wrote proposal on self study project funded by grant from Directed Energy Professional Society, $2.5K, 2019.

1. **Name:** **Mohinder S. Grewal, Ph.D., P.E.**

2. **Education**

Ph. D.	Electrical Engineering, University of Southern California, 1974 Specialization: Control Systems and Computers
M. S.	Applied Mathematics, University of Michigan, Ann Arbor, 1970
M. S.	Electrical Engineering, University of California, Los Angeles Specialization: Computer and Control Systems
B. S.	Electrical Engineering, Punjab University, India Specialization: Power Systems

3. **Academic Experience**

California State University, Fullerton, Professor Emeritus, Electrical Engineering, 2016 – Present, Full-time.

California State University, Fullerton, Professor, Electrical Engineering, 1983 – 2016, Full-time.

California State University, Fullerton, Associate Professor, Electrical Engineering, 1979 – 1983, Full-time.

California State University, Fullerton, Assistant Professor, Electrical Engineering, 1975 – 1979, Full-time.

California State University, Fullerton, Chair, Electrical Engineering, 1980 – 1987, Full-time.

4. **Non-academic Experience (2013 – present)**

- Consultant, part-time.
  - Kymeta Corporation (Kalman Filtering Consultant Associates), Dec. 2015- January 2016.
  - Raytheon Corp., GPS OCX (GPSIII), June 2016-March 2017 (Part-time)
- Invited Lecturer, part-time.
  - Raytheon Corporation (October 2016, March/April 2017) on "GPS & Kalman Filtering with MATLAB®, to present state of the art navigation algorithms and techniques to practicing engineers.
  - "Application of Kalman Filtering to GPS, INS, & Navigation," Esterline CMC Electronics, Montreal Canada, June 2015 (5 days), and Boeing Aerospace, Oklahoma City, Oklahoma, 2014 (5 days).
- Instructor, part-time: "Application of Kalman Filtering to GPS, INS, & Navigation," 40 hr. short course sponsored by Kalman Filtering Consultant Associates, to engineering professionals (local, national and international), from private and government sectors.
- Expert Witness (Part-time, 2013 to present)
  - O'Melveny & Myers LLP. Area of Kalman filtering. CyWee Group Ltd. v. Google LLC, C.A., December 2018 to present.
  - Cooley LLP. Area of Kalman filtering, Patent analysis. CyWee Group Ltd. v. Apple Inc., Case No. 3:14-cv-01853-HSG. January 2016-February 2017.
  - Covington & Burling, LLP. On inertial trackers consisting of two IMUs, acoustic range measurements and extended Kalman filter error estimator. Elbit Systems of America, LLC vs Thales Visionix, Inc., March 2015 to December 2016.

5. Certifications or Professional Registrations

Registered Professional Engineer, State of California, CS 1398

6. Current Membership in Professional Organizations

- Senior Member, IEEE, Society of Automatic Control
- Member, Institute of Navigation (ION)
- Fellow, Institute for Advancement of Engineering

7. Honors and Awards (2013 – present)

- SHER-E-PANJAB Award for Contributions to GPS, 15th Anniversary of Sher-E-Panjab Newspaper, to professionals from the worldwide Punjabi community who distinguished themselves by significant accomplishments in their respective fields, December 13, 2014.

8. Service Activities (2013 – present)

- 2017 to present: Member, CSUF University Committee, Outstanding Professor.
- 2013 to present: Member, Department Graduate Committee
- 2013-2017, Graduate Advisor to Electrical Engineering students.
- Session Chair: "MEMS, Timing and Micro PNT Session," January 29, 2014, 2014 International Technical Meeting of the Institute of Navigation (ION).
- Reviewer, Refereed Journals and Other Publications

9. Important Publications and Conference Presentations during the Past Five Years

- Refereed Journal Paper: "Practical Design and Implementation Methods for Kalman Filtering for Mission Critical Applications," *NAVIGATION*, 2019, https://doi.org/10.1002/navi.283. Spring 2019 issue, pp 239-249.
- Book*: Kalman Filtering Theory and Practice Using MATLAB®, 4th Edition*, Wiley & Sons, 2015. Principal author, co-authored with Angus P. Andrews .
- Book: Simplified Chinese Edition: *Global Navigation Satellite Systems, Inertial Navigation, and Integration 3rd Edition.* Wiley & Sons, 2015. Principal author, with co-authors Angus P. Andrews and Chris G. Bartone.
- Book: *Global Navigation Satellite Systems, Inertial Navigation, and Integration 4th Edition.* Wiley & Sons, 2020. Principal author, with co-authors Angus P. Andrews and Chris G. Bartone.
- Invited Book Chapter: "Global Navigation Satellite Systems (GNSS) Theory and Practice: Evolution, State-of-art, and Future Pathways," Chapter 23, Volume I, *Remote Sensing Handbook*, Dr. Prasad S. Thenkabail, Ph.D. ,Ed., CRC Press, Nov. 2015, pp.481-492, ISBN9781482218015.

10. Recent Professional Development Activities

- Consulting activities provide state-of-the-art development in my field.
- Expert Witness activities require study and development in areas peripheral to and complimentary to my field, keeping application skills sharp.
- Attended presentations at ION GNSS+ 2019 Conference, September 17-20, 2019

1. **Name:** **Dr. Karim Hamidian**

2. **Education**

   Doctorate Degree in Electronics Engineering, University of Padova, Italy, 1981.

3. **Academic Experience**

   California State University, Fullerton, Professor, Electrical Engineering, 1997 – Present, Full-time.
   California State University, Fullerton, Associate Professor, Electrical Engineering, 1991 – 1997, Full-time.
   California State University, Fullerton, Assistant Professor, Electrical Engineering, 1987 – 1991, Full-time.
   California State University, Fullerton, Lecturer, Electrical Engineering, 1984 – 1987, Full-time.
   California State University, Fullerton, Acting Associate Dean, College of Engineering and Computer Science, 1992 – 1993, Full-time.
   California State University, Fullerton, Chair, Electrical Engineering Department, 1993 – 1998, Full-time.

4. **Non-academic Experience**

   - Provided Lecture in Electronic Communications to a Group of Working Engineers At Monolithic Solutions, Inc. Irvine, 2009, Part-time.
   - Omegatech Company, Consulting Engineer: Provided consulting services in specifying and installation of computer hardware for various business operations. Jan. 1985 - July 1987, Part-time.
   - General Electronics Co., Italy, Electronic Design Engineer. Designed and developed AC to DC converters and small signal amplifiers. April 1982 - Sept. 1982

5. **Certifications or Professional Registrations**

   None.

6. **Current Membership in Professional Organizations**

   - Member of Electrical Engineering Honor Society: Eta Kappa Nu
   - Member of The Order of the Engineer

7. **Honors and Awards (Last 5 Years)**

   - Recipient of "FACULTY ADVISOR of DISTINCTION," MARCH 5, 2019, CSUF.
   - Recipient of Achievement Award Titled, "Nobel Scientist in Wireless Communications and Coding," RULA (Research Under Literal Access Awards), International Awards Summit, India, 2018.
   - "In Recognition of Your Service to the Electrical Engineering Department" College of Engineering and Computer Science, California State University, Fullerton," 2015.
   - "In Recognition of Your 30 Years Outstanding Service to California State University, Fullerton," Award was given by the President of the University, 2015

8. **Service Activities**

I have actively participated in numerous university, school and department committees. This includes University GE Committee, Library Committee, University Review Committee and more. For several years, I was the chair or a member of department personnel committee (DPC), ABET committee, Assessment Committee, Graduate Studies Committee (GSC), Department and College Curriculum Committee, Department Scheduling Committee, and College and Department Standards Committees (DSC).

9. Important Publications and Conference Presentations during the Past Five Years

- Hamidian. Karim and Mohamed Wurod Q. "Performance Enhancement of MIMO – MGSTC using a New Detection and Decoding Technique," IEEE -Future of Information and Communication Conference (FICC) 2018, April 2018, Singapore.
- Wurod Qasim Mohamed Karim Hamidian, "Reliability Enhancement without Employing STCs of a 3× 3 MIMO Communication System Using a Parallel Decoding Technique," International Conference on Engineering Technology and their Applications (IICETA), May 8-9, 2018, Iraq.
- Karim Hamidian, Wurod Qasim, "A New Detection and Decoding Technique for (2×N_r) MIMO Communication Systems," International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), July 2018, Volume 6 Issue 7, PP: 109 –113.
- Karim Hamidian, Wurod Qasim, Book titled "Advances in Information and Communication Networks," Springer Nature, Switzerland, AG, January 2019. The IEEE–FICC Singapore's conference was published as a book chapter in the above mentioned book. It seems this is the conference proceedings under different name.
- Wurod Qasim Mohamed and Karim Hamidian, "A parallel Detection and Decoding Technique for MIMO Communication Systems." The IIER International Conference on Applied Science and Engineering," February 6-7, 2019, Istanbul, Turkey.
- Wurod Qasim Mohamed and Karim Hamidian, "Novel Detection and Decoding Technique to Optimize Performance in MIMO Communication Systems," Gyancity Journal of Engineering and Technology, Vol.5, No.1, pp. 34-46, January 2019. This paper is a revised updated version of the paper published in Iraq's conference proceedings.
- Wurod Qasim Mohamed and Karim Hamidian, "A parallel Detection and Decoding Technique for MIMO Communication Systems," International Journal of Electrical, Electronic and Data Communication (IJEEDC), IRAJ Vol.7 Issue 5, May, 2019. This paper is a revised and updated version of the paper published in Istanbul's conference proceedings.

10. Recent Professional Development Activities

Conference presentations.

1. **Name:Hassan H. Hashemi,Ph.D.**

2. **Education**

Ph.D.,	Engineering,	UCLA,	1977
M.S.,	ElectricalEngineering,	Universityof Houston,	1973
B.S.,	ElectricalEngineering,	Universityof Houston,	1971

3. **Academic Experience:**CSUF, Professor, 1993 – Present
   CSUF, Associate Professor, 1990 – 1993
   CSUF, Assistant Professor, 1986 – 1990
   CSUF, Lecturer, 1983 – 1986

4. **ServiceActivities (Last7 Years)**

Academic Year 2016 –2017
- Member of College Curriculum
- Chair of the EE Department PersonnelCommittee
- Chair of the Department Curriculum

Academic Year 2018 –2019
- Chair of the EE Department PersonnelCommittee

Academic Year 2019 –2020
- Member of ECS At-Large Committee
- Graduate Advisor for the Field of ControlSystems
- Chair/Member of M.S. Oral Exams and DefenseCommittees

Academic Year 2020 –2021
- Member of ECS At-Large Committee
- Graduate Advisor for the Field of ControlSystems
- Chair/Member of M.S. Oral Exams and DefenseCommittees

Academic Year 2021 –2022
- Graduate Advisor for the Field of ControlSystems
- Chair/Member of M.S. Oral Exams and DefenseCommittees

5. Publications (Last 7 Years):

- "Flight Control System Using Neural Networks," Proceedingsof theWorldCongressonEngineering, pp.73 - 78,2021. This peer-reviewed publication was co-authored with one of my graduate students.

- "Nonlinear Adaptive Flight Control Using Neural Networks Controller," submitted for publication in a peer-reviewed journal. This peer-reviewed publication was co-authored with one of my graduate students.

6. Professional Development Activities (Last 7 Years):

- WESTEC, Los Angeles Convention Center, Los Angeles, California,2015.
- CX, San Francisco, California, 2019.
- xRS, San Francisco, California, 2019.

1. **Name:** **Jidong Huang, Ph.D.**
2. **Education**

Ph.D.,	Electrical Engineering, Ohio University,	2007
M.S.,	Computer Engineering, Graduate School, Chinese Academy of Sciences,	2002
B.S.,	Educational Technology, Central China Normal University,	1999
	Emphasis: Electronics and Computer Technology	

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering, 2017 – Present, Full-time.

California State University, Fullerton, Chair, Electrical Engineering Department, 2021 – Present, Full-time.

California State University, Fullerton, Graduate Program Advisor, Electrical Engineering, 2018 – 2021, Full-time.

California State University, Fullerton, Acting Chair, Electrical Engineering Department, 2017 – 2018, Full-time.

California State University, Fullerton, Associate Professor, Electrical Engineering, 2013 – 2017, Full-time.

California State University, Fullerton, Assistant Professor, Electrical Engineering, 2009 – 2013, Full-time.

California State University, Fullerton, Lecturer, Electrical Engineering, 2007 – 2009, Full-time.

4. **Non-academic Experience**

Senior GPS Software Design Engineer, NavCom Technology Inc, John Deere, Jan. 2007 – Aug. 2007, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

Senior Member: IEEE; **Member:** Institute of Navigation (ION); **Member:** ASEE

7. **Honors and Awards (Last Five Years)**
   - Outstanding Research & Scholarly Activities Award, 2018-19, California State University, Fullerton, Nov. 2018
   - Best Paper, 1st place, Entrepreneurship & Innovation Track, *124th ASEE Annual Conference and Exposition*, Columbus, OH, Jun. 2017
   - 2nd Place, (as faculty advisor), the 2017 All America Micromouse Robotic Races, at UCLA, Los Angeles, CA, May 2017
   - Outstanding Teaching Award, 2016-17, California State University, Fullerton, Oct. 2016
8. **Service Activities (Last Five Years)**
   - **Editorial Board Member:** GPS Solutions, March 2010 to Present
   - **Journal Reviewer:** GPS Solutions; NAVIGATION; Measurement Science and Technology; IEEE Transactions on Education; IET Journal of Radar, Sonar and Navigation; and etc.
   - **Center Director:** CSUF ECS Center for Navigation, Jan. 2020 to present
   - **Lab Director:** Robotics Laboratory, Electrical Engineering, Aug. 2011 to present
   - **Faculty Advisor:** Institute of Navigation, CSUF Student Chapter, Aug. 2008 to present
   - **Member of Committees in CSUF Academic Senate:**

- Planning, Resource and Budget Committee, 2021 to present; University Research Committee, 2017 to 2021; Faculty Development Center Board, 2017 to 2019; Professional Leaves Committee, 2016 to 2017

- **Member of Committees in EE Department:**
  - Assessment and Continuous Improvement Committee, Graduate Committee, Department Personnel Committee, Curriculum Committee

9. Selected Publications and Conference Presentations during the Past Five Years

1. Mayoral, S., Linton, A., Yousefi, H., Huang, J., Implementing Elements of Engineering Design into Calculus, *Proceedings of the 128th ASEE (American Society on Engineering Education) Annual Conference*, July 2021
2. Bein, D., Huang, J., Bai Y., Kurwadkar, S., Reina P., Lessons learned from the first-year enrichment program for engineering and computer science students in the ASSURE-US Program, *Proceedings of the 128th ASEE (American Society on Engineering Education) Annual Conference*, July 2021
3. Al-attabi, A., Huang, J. (In press, 2021), Signal Denoising via Spectral Graph Filtering using a Harmonic Filter with Kalman Filter for Uncertain Observation and/or Process Noise, In press, Journal of Engineering and Applied Sciences
4. Huang, J., S. Kurwadkar, D. Bein, Y. Bai & S. Mayoral: Improving STEM Education for Lower-division College Students at HSI by Utilizing Relevant Sociocultural and Academic Experiences: First Year Results from ASSURE-US Project, *Proceedings of the 127th ASEE (American Society on Engineering Education) Annual Conference*, Jun. 2020
5. Al-attabi, A., Huang, J. (2019) Investigation on the use of graph signal processing for an intelligent taxis transportation system to study human activities, Journal of Engineering and Applied Sciences, 14(2), pp. 526-533
6. Huang, J., J. Kuscera, J. Jackson, P. Nair & A. Cox-Petersen: Using Business Entrepreneurship Practices to Engage Middle School Students in STEM Learning: Three Years Perspective, *Proceedings of the 125th ASEE (American Society on Engineering Education) Annual Conference and Exposition*, Salt Lake City, UT, Jun. 2018
7. Li, Z. & Huang, J.: Study on the use of Q-R Codes as Landmarks for Indoor Positioning: Preliminary Results:, *Proceedings of IEEE/ION Position, Location and Navigation Symposium (PLANS) 2018*, Monterey, CA, Apr. 2018
8. Huang, J., J. Jackson, P. Nair, & A. Cox-Petersen: Using Lean Start-Up Approach to Integrate Engineering Education with Entrepreneurship Practices at Middle Schools, *Proceedings of the 124th ASEE (American Society on Engineering Education) Annual Conference and Exposition*, Columbus, OH, Jun. 2017

10. Recent Professional Development Activities

- **NSF IUSE-HSI Grant: ASSURE-US,** served as the lead Co-PI on this NSF-funded IUSE-HSI project. Role: Co-PI (DUE-1832536, $1,496,967, 10/2018 –09/2023)
- **NSF ITEST Grant: STEM-Inc,** served as PI on this NSF-funded ITEST project. Role: PI (DRL-1433851, $1,025,260, 09/2014 – 08/2018)
- **External Grants & Intramural Research Funds,** received approx. $600K in research awards, grants, and in-kind equipment donations from private companies, such as Raytheon, NavCom technology, and Western Digital; and various CSUF intramural sources to support research activities in Navigation System Design, Robotics and Intelligent Systems (2010 - present)
- **Active Conference Publications and Presentations** in ASEE, ION, IEEE, AERA meetings

1. **Name:** **Shahin D. Shahi, Ph.D.**

2. **Education**

Ph.D.,	Biomedical Engineering, University of Southern California, 1984
M.S.,	Biomedical Engineering, University of Southern California, 1980
M.S.,	Physics, University of Tabriz, Iran, 1977

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering,
1997 – Present, Full-time.
California State University, Fullerton, Associate Professor, Electrical Engineering,
1992 – 1997, Full-time.
California State University, Fullerton, Assistant Professor, Electrical Engineering,
1987 – 1992, Full-time.
California State University, Fullerton, Lecturer, Electrical Engineering,
1985 – 1987, Full-time.
University of Southern California, Post-doctorate, Biomedical Engineering
1984 – 1985, Full-time.

4. **Non-academic Experience**

None.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

IEEE.

7. **Honors and Awards**

- Distinguished faculty member, ECS, CSUF 2014-2015.
- Recognition as first NASA Administrator's Fellow from California, 2004-2006.
- Faculty Mentor for NASA/Harret Jenkin Pre-doctoral Fellowship Program (JPFP), 2003-2010 .
- UNCFSP/NASA NSTI Research Cluster award, sponsored by the United Negro College Fund Special Programs (UNCFSP), $98000, 2008-2012.
- NASA Administrator Grant, $25000, 2005.
- NASA Administrator Grant, $125000, 2004.
- Honorific campus recognition award and grant of CSUF Teacher/Scholar in Residence and Founding Carnegie Faculty,1999-2001.
- Lockheed Martin Research award, 1998.

- Inter-Americas High-Technology Partnership award, Department of Education (DOE), 1997.

8. Service Activities

- President and organizer of the Orange County of National Technical Association, and CSUF, June 13, 2008.
- Reviewer, IEEE Transaction on Biomedical Engineering, BME,West Educational Publishing,
- Reviewer, NSF Graduate Research Fellowship Program Competition, 2010.
- Conference Committee Member, Pathways to success, Iranian-American Women's Leadership Irvine, Ca. January 30, 2011, and February 2010.
- Conference Committee Member and reviewer for World Congress on Engineering and
- Computer Science Conference, San Francisco, October 2009.
- Reviewer, World Multi-Conference on Systemic, Informatics Conference, Orlando, FL,2009.
- Recognition as Founding CSUF Faculty of Carnegie Academy for the Scholarship of
- Teaching and Learning, Committed to Excellence in Teaching and Learning, 2000-2001.

9. Important Publications and Conference Presentations during the Past Five Years

None.

10. Recent Professional Development Activities

Sabbatical leave, "Using Statistical and Machine-Learning Methods to Design the Resilient and Adaptive Networks With Intrusion Detection" and "Control Systems for Multiple Telescope Interferometry", Fall 2019.

1. **Name:** **Mostafa Shiva, Ph.D.**

2. **Education**

Ph.D.,	Electrical Engineering,	University of Southern California, 1982
M.S.,	Electrical Engineering, Communication,	University of Southern California, 1977
B.S.	Electrical Engineering,	Tehran University, 1976

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering,
1995 – Present, Full-time.
California State University, Fullerton, Associate Professor, Electrical Engineering,
1986 – 1995, Full-time.
California State University, Fullerton, Assistant Professor, Electrical Engineering,
1983 – 1986, Full-time.
California State University, Fullerton, Lecturer, Electrical Engineering,
1982 – 1983, Full-time.
California State University, Fullerton, Chair, Electrical Engineering Department,
2001 – 2013, Full-time.
University of Southern California, Adjunct Professor, Electrical Engineering,
1992 – Present, Part-time.

4. **Non-academic Experience**

None.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

Life Member of IEEE.

7. **Honors and Awards**

None.

8. **Service Activities**

Advisement of Students:

I have advised many graduate students majoring in communications and signal processing area, and many undergraduate students upon request.

M.S. Comprehensive Exam:

I have prepared tests for our M.S. graduate students taking the MS Written Comprehensive Examination in the digital signal processing area and have evaluated the results.

Department

- Member of the Department Personnel Committee (2015-2016)

- Current member of Department Curriculum Committee
- Participated in the department at Welcome to Fullerton Day events.
- Participated in the department students' project presentations.
- Advised/Helped the IEEE student club with the design of their trebuchet for the Pumpkin Launch event.

College

- School Commencement: I have been present during all the EE Department commencement ceremonies and practices.
- Current member of College Curriculum Committee

9. <u>Important Publications and Conference Presentations during the Past Five Years</u>

- Updated the Circuit's Laboratory (EE-203L) manual several times on the following dates: 12/07/2015, 10/19/2016, and 07/06/2017.

- Wrote a new updated lab manual for EE-313L, Power Laboratory, in 2016. The manual existed only in print form and included tens of major mistakes. Additionally, detailed safety procedures and data tables were missing. The manual was subsequently updated on the following dates: 50/30/2017, 06/08/2018, and a new updated version will be finished this semester.

- Invited Lectures: Short course on Digital Signal Processing, Tianjin Normal University, China, June 29 – July 11, 2014.

10. <u>Recent Professional Development Activities</u>

Updating lab manuals.

1. **Name:** **Fleur T. Tehrani, Ph.D., P.E., Fellow, IET**

2. **Education**

Ph.D. Electrical Engineering, University of London, London, England, 1981. Emphasis on systems and control engineering and their applications in biological systems.
M.Sc. Communications Engineering, University of London, London, England, 1977. Emphasis on digital communications and signal processing.
D.I.C. Diploma of Membership of Imperial College, Communications Engineering, University of London, London, England, 1977.
B.S. Electrical Engineering, Arya-Mehr (Sharif) University of Technology, Tehran, Iran, 1975.

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering, 8/1994 – Present, Full-time.
California State University, Fullerton, Associate Professor, Electrical Engineering, 8/1991 – 8/1994, Full-time.
California State University, Fullerton, Assistant Professor, Electrical Engineering, 8/1985 – 8/1991, Full-time.

4. **Non-academic Experience**

None.

5. **Certifications or Professional Registrations**

1993-Present: Registered Professional Engineer in Electrical Engineering, California License#E014242

6. **Current Membership in Professional Organizations**

- Fellow of the National Academy of Inventors (NAI)
- Fellow - The Institution of Engineering and Technology (IET), formerly known as the Institution of Electrical Engineers (IEE)
- Fellow - Institute for the Advancement of Engineering
- National Life Member- Sigma Delta Epsilon, Graduate Women in Science, Inc., (GWIS)
- Senior Member - The Institute of Electrical and Electronics Engineers (IEEE)
- IEEE Society of Engineering in Medicine and Biology

7. **Honors and Awards**

- Fellow of the National Academy of Inventors (NAI)

- Fellow of the Institution of Engineering and Technology (the IET)
- Fellow of the Institute for the Advancement of Engineering (IAE)
- National Life Member of Graduate Women in Science (GWIS)
- Recipient of two NASA Fellowships and Research Recognitions Awards in 1995 and 1996.

8. Service Activities

- Invited panelist for the National Science Foundation (the NSF), the National Institute of Health (the NIH) and the American Association for the Advancement of Science (AAAS).
- Co-chair of the International Conferences on Computational Biology of the International Association of Engineers (IAENG).
- Reviewer of many refereed journals associated with the IET, IEEE, and Hindawi.
- Editorial board member of several refereed journals.

9. Important Publications and Conference Presentations during the Past Five Years

Granted Patents

- Tehrani, Fleur T., Automatic Control System for Mechanical Ventilation for Active or Passive Subjects, UK Patent No. GB2472116, granted on April 28, 2015.
- Tehrani, Fleur T., Weaning and Decision Support System for Mechanical Ventilation, Canadian Patent No. 2651287, issued on November 24, 2015.
- Tehrani, Fleur T., Automatic Control System for Mechanical Ventilation for Active or Passive Subjects, Canadian Patent No. 2769336, issued on March 8, 2016.
- Tehrani, Fleur T., Automatic Control System for Mechanical Ventilation for Active or Passive Subjects, US Patent No. 9604021, issued on March 28, 2017.

Publications

- Tehrani, Fleur T., Abbasi, Soraya, "Continuous Positive Airway Pressure treatment of premature infants; application of a computerized decision support system," *Computers in Biology and Medicine*, volume 62, pp. 136-140, 2015.
- Fleur T. Tehrani, A simple approach for solving cubic equations, *The Mathematical Gazette*, volume 100, no. 548, pp. 225-232, 2016.
- Fleur T. Tehrani, Computerized decision support for differential lung ventilation., *Healthcare Technology Letters*, volume 6, no. 2, pp. 37-41, 2019.

10. Recent Professional Development Activities

Sabbatical Leave, "Analysis of the Respiratory Control in Chronic Obstructive Pulmonary Disease (COPD) and Childhood Factors Affecting the Development of the Disease", Spring 2020

1. **Name:** **Raman Menon Unnikrishnan, PhD, Fellow, IEEE**

2. **Education**

Ph.D. (EE)	University of Missouri-Columbia	Electrical Engineering, 1975
MSEE	South Dakota State University	Electrical Engineering, 1972
BSEE	University of Kerala, India	Electrical Engineering, 1966

3. **Academic Experience**

California State University, Fullerton, Professor, Electrical Engineering and Computer Engineering, 2016 – present, Full-time.

California State University, Fullerton, Dean, College of Engineering and Computer Science, 2001 – 2016, Full-time.

Rochester Institute of Technology, Head, Electrical Engineering Department, 1991 – 2001, Full-time.

Rochester Institute of Technology, Associate Dean, College of Engineering, 1989 – 1991, Full-time.

Rochester Institute of Technology, Professor, Electrical Engineering, 1975 – 2001, Full-time.

4. **Non-academic Experience**

Consulting: Xerox, Eastman Kodak, Chloride Electronetworks and American Locker Corp.
Invited Reviewer/consultant: NSF, DOE, Intel, 1975-2001, Part-time.

5. **Certifications or Professional Registrations:** None

6. **Current Membership in Professional Organizations:** IEEE, ASEE, ASEI, TBΠ, HKN

7. **Honors and Awards**

- *"Distinguished Visiting Professor of Engineering,"* Narsee Monjee Institute of Management Studies, Mumbai, India, (2019-present).
- ASEE Electrical and Computer Engineering Division's *Distinguished Educator Award*, 2016
- "2009 Distinguished Engineer Award," South Dakota State University, April 2009.
- Elected "Fellow" of IEEE, January 2007.
- Missouri Honor Award for *Outstanding Service to Engineerin*g, University of Missouri-Columbia, 2006.
- CSUF Chicano/Latino Faculty and Staff Association Certificate of Recognition, 2005.
- IEEE "*Third Millennium Award"* 2000.
- **RIT Eisenhart Award for Outstanding Teaching** "*in recognition of conspicuous success in the enhancement of teaching and learning, conveying the high respect and admiration of the institute community,"* May 1991.
- **Xerox Corporation**'s Professional Excellence Award "in *appreciation of the professionalism and support to the development and quality of innovative educational programs at Xerox."* 1986.

8. **Service Activities** A Sample: Accreditation Activities

- 2018-present IEEE Alternate Commissioner, EAC, ABET

- 2016-2018 Chair, IEEE Committee for Accreditation Activities
- 2015-2018 Member, IEEE Fellows Selection Committee (Education Society)
- 2009-2014 "Mentor" to India by *The Washington Accord* representing the US & ABET.
- 2008-2013 Commissioner, Engineering Accreditation Commission
- 2004-present PEV/Team chair: Commission for Accreditation Activities, UAE
- 1996-present IEEE program evaluator for electrical and computer engineering
- 2009-present ASEE program evaluator
- 2010-present ABET PEV Training support facilitator
- 1996-Present ABET International PEV (Over 35 programs- US & Abroad)

9. <u>Important Publications and Conference Presentations during the Past Five Years</u>

- Bin Cong, Christopher Ryu and Raman Unnikrishnan, *"Make your Data Work: Infusing CMMI Culture in Data Analysis for ABET Accreditation,"* Accepted for presentation at the June 2020 ASEE Conference, Montreal, Canada.
  - R. Unnikrishnan, *"A conversation about Accreditation Criteria and the Upcoming Changes*," Presentation, National University of Science and Technology, Muscat, Oman, January 10, 2018.
  - R. Unnikrishnan, "*Changing Accreditation Criteria: The Times They Are a-Changin',"* Keynote Address, Fourth International Conference on Transformations in Engineering Education, IUCEE (Indo Universal Collaboration for Engineering Education) Vardhaman College of Engineering, Hyderabad, January 6-8, 2017.
  - R. Unnikrishnan, *"Engineering Education- A World Perspective,"* Keynote Address, Fourth Int. Conf. on Transformations in Engineering Education, IUCEE, RK University, Rajkot, India, January 9-12, 2017.
- "Utilization of Data for Ensuring Student Success and Enabling Continuous Improvement," *Continuous Improvement of Academic Programs (and Satisfying ABET Along the Way): The Elizabeth Judson Memorial Symposium*, Materials Science and Technology 2015 Deformation and Transitions at Grain Boundaries symposium, Columbus, Ohio, October 4-8, 2015. Presentation authors: Edward Sullivan, Raman Menon Unnikrishnan and Hye Sun (Sunny) Moon. (Invited presentation.)
- Program Criteria Training for Electrical, Computer and Telecommunication Engineering, ICACIT (Instituto de Calidad y Acreditación de Programas de Computación), Lima, Peru, June 2015. (Invited presentation.)

10. <u>Recent Professional Development Activities</u>

- March 2017-June 2017: $14,000 grant for course redesign, CSU Chancellor's Office. Studied the primary issues for the occurrence of large numbers of failing grades in EGEE 203 Electric Circuits course at CSUF.

Computer Engineering Tenured/Tenure-Track Faculty Teaching EE Courses

1. **Name:** **Kenneth John Faller II, Ph.D.**

2. **Education**

Ph.D.,	Electrical Engineering, Florida International University (FIU),	2009
M.S.,	Computer Engineering, Florida International University (FIU),	2006
B.S.,	Computer Engineering, Florida International University (FIU),	2003

3. **Academic Experience**

California State University, Fullerton, Associate Professor, Computer Engineering
2017 – Present, Full-time.
California State University, Fullerton, Assistant Professor, Computer Engineering
2011 – 2017, Full-time.

4. **Non-academic Experience**
   - NASA, Structural Acoustics Branch, Postdoctoral Researcher, Spatial Audio Research, 2009 – 2011, Full-Time

5. **Certifications or Professional Registrations**
   - Planning for Monitoring and Evaluation Certificate, Philanthropy University (UC Berkeley - Haas School of Business), 2019
   - Fundamentals of Project Management Certificate, Philanthropy University (UC Berkeley - Haas School of Business), 2019

6. **Current Membership in Professional Organizations**
   - IEEE (2004-Present); Also member of Circuits and Systems, Computer, Solid-State Circuits, and Communications societies
   - Tau Beta Pi, The Engineering Honor Society (2005-Present)

7. **Honors and Awards**
   - CSUF 2016 Recognition of Outstanding Achievements in Research
   - CSUF 2015 Recognition of Outstanding Achievements in Service
   - CSUF 2015 Outstanding Titan Advisor Award
   - CSUF 2014 Recognition of Outstanding Achievements in Teaching

8. **Service Activities**

Community Service
   - Faculty Mentor, CSUF (STEM)2 Summer Research Experience, Summer 2012, 2015, and 2016
   - Faculty Mentor, Summer International Research Institute (SIRI), Summer 2015 and 2016

Professional Services
   - Manuscript Reviewer, IEEE Transactions on Education (ToE), Spring 2012 to Present
   - Reviewer, John Browning Memorial Scholarship, Spring 2016

University/College Service
   - College Curriculum Committee – 2019 – Present

- Computer Engineering Program Departmental Personnel Committee (DPC) Chair – 2019 – Present
- ECS At-Large Committee – 2016 – Present
- Graduate Education Committee – 2017 – Present
- Undergraduate Academic Advisor

9. Important Publications and Conference Presentations during the Past Five Years

- [1] J. Piacenza, K. J. Faller II, B. Regez, and L. Gomez, "Investigating Cyber-Physical Threats of Numerically Controlled Manufacturing Processes," in ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC), 2020.
- [2] J. R. Piacenza, K. J. Faller II, M. A. Bozorgirad, E. Cotilla-Sanchez, C. Hoyle, and I. Y. Tumer, "Understanding the Impact of Decision Making on Robustness during Complex System Design," ASCE-ASME J. Risk Uncertain. Eng. Syst. Part B Mech. Eng., 2019.
- [3] K. Faller II, J. Riddley, and E. Grubbs, "Automatic Blind Source Separation of Speech Sources in an Auditory Scene," in 51st Asilomar Conference on Signals, Systems, and Computers (ACSSC), 2017.
- [4] V. Ahir, N. Robson, K. Faller II, and N. Garrett, "Development of a Virtual Reality Environment for Upper Limb Rehabilitation for Post-Stroke Patients," in 29th CSU Annual Biotechnology Symposium, 2017.
- [5] K. Faller II, S. A. Rizzi, and A. Aumann, "A Real-Time Simulation Environment for use in Psychoacoustic Studies of Aircraft Community Noise," in Audio Engineering Society (AES) Convention 141, 2016.

10. Recent Professional Development Activities

- CSUF Academic Advisors' Professional Development Conference – April 26, 2016
- CSUF University Assessment Forum – April 21, 2016
- Faculty Recruitment Training – September 19, 2014

1. **Name:** **Michael A. Turi, Ph.D.**

2. **Education**

Ph.D.,	Electrical and Computer Engineering, Washington State University,	2013
B.S.,	Computer Engineering, Washington State University,	2007

3. **Academic Experience**

California State University, Fullerton, Assistant Professor, Computer Engineering
2015 – Present, Full-time.

Pacific Lutheran University, Visiting Assistant Professor, Computer Engineering
2013 – 2015, Full-time.

4. **Non-academic Experience**

- Petabi Inc., Software Engineering Contractor, Modify software to support 10 Gbps packet generation, Summer 2015, full-time
- Petabi Inc., Software Engineering Contractor, Design software to store 10 Gbps packets to disk, Summer 2014, full-time
- Marvell Semiconductor Inc., Sr. Software Engineering Intern, Designed e-reader pixel update RTL, Summer 2011, full-time
- Naval Air Warfare Center-Aircraft Division, Naval Research Enterprise Intern Program (NREIP) Intern, Reviewed Small Business Innovative Research (SBIR) contract proposals of optical CDMA, Summer 2010, full-time
- IHP-Innovations for High Performance Microelectronics GmbH, Hardware Intern Engineer, Designed autonomous data aggregator processor, Summer 2008, full-time
- Micron Technology Inc., Intern, Hardware/software interface designer, Summer 2006, Summer 2005, full-time

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

- IEEE (2004-Present); Also member of Circuits and Systems, Computer, Solid-State Circuits, and Communications societies
- Tau Beta Pi, The Engineering Honor Society (2005-Present)

7. **Honors and Awards**

- Recognized at the Fall 2018 Faculty Development Center (FDC), Faculty Recognition Event for Research
- Recognized as a Faculty Advisor of Distinction at Spring 2018, Career & Academic Advising Faculty Recognition Celebration
- Best Paper Award from the 7th Annual Computing and Communication Workshop and Conference (CCWC), Jan. 2017

8. **Service Activities**

- Journal Reviewer (2012, 2014-2019) and Technical Committee Member or Conference Reviewer (2010-2012, 2014-Present)

- Conference Track Co-Chair for Track 11, Digital Integrated Circuits, 2019 IEEE Int. Midwest Symp. Circuits Syst.
- Conference Session Chair for 2017 IEEE 7th Annual Computing and Communication Workshop and Conference (CCWC)
- Member of the Faculty Development Center (FDC) Board (Fall 2019-Spring 2021)
- Member of Computer Engineering Program Continuous Improvement Committee (Fall 2018-Present)
- Member of Computer Engineering Program Undergraduate Committee (Fall 2017-Present)
- Member of Computer Engineering Program Faculty Search Committee (Fall 2018-Spring 2019, Fall 2015-Spring 2016)
- Member of Computer Engineering Program ABET Accreditation and Continuous Improvement Committee (Fall 2017-2018)
- Computer Engineering Program Undergraduate Academic Advisor (Spring 2017-Spring 2018)
- Member of Computer Engineering Program Scholarship Committee (Spring 2017)

9. Important Publications and Conference Presentations during the Past Five Years

- Effective low-leakage 6T and 8T FinFET SRAMs: Using cells with reverse-biased FinFETs, near-threshold operation, and
- power gating, M. A. Turi, J. G. Delgado-Frias, IEEE Tran. Circuits Syst. II: Exp. Briefs, vol.67, no.4, pp.765-769, Apr. 2020.
- Full-VDD and near-threshold performance of 8T FinFET SRAM cells, M. A. Turi and J. G. Delgado-Frias, Integration, the
- VLSI Journal, vol. 57, no. 2, pp. 169-183, Mar. 2017.
- SEU tolerance of FinFET 6T SRAM, 8T SRAM and DICE memory cells, A. S. Sajit and M. A. Turi, in Proc. IEEE 7th Ann.
- Computing Communication Workshop Conf., pp. 313-317, Jan. 2017.
- An implemented, initialization algorithm for many-dimension, Monte Carlo circuit simulations using Spice, M. A. Turi and
- J. G. Delgado-Frias, in Proc. IEEE 7th Ann. Computing Communication Workshop Conf., pp. 56-59, Jan. 2017.

10. Recent Professional Development Activities

- Participated in Hackster.io workshop webinar: Integrating ARM Cortex-M soft CPU IP into FPGAs (2019)
- Participated in Faculty Development Center (FDC) Workshops (2018-2019)
- Member of 2017-2018 CSUF Faculty/Graduate Student Mentoring Program
- Member of 2017-2018 Open Educational Resources (OER) Ambassador Program

Electrical Engineering Adjunct Faculty

1. **Name:** **Tannazsadat Ashofteh, MSEE**

2. **Education**

M.S.	Electrical Engineering, California State University Fullerton,	2016
B.S.	Electrical Engineering, Shiraz University,	2010

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering
2014 – Present, Part-time.

4. **Non-academic Experience**
   - Senior Electrical Designer/Electrical BIM Lead: The Austin Company, 08/2019 – Present, Full-time.
   - Electrical Design Engineer: PBS Engineers, 06/2018 – 08/2019, Full-time.
   - Electrical Engineer: IMEG Corp, 06/2016 – 06/2018, Full-time.

5. **Certifications or Professional Registrations**
   None.

6. **Current Membership in Professional Organizations**
   None.

7. **Honors and Awards**
   None.

8. **Service Activities**
   None.

9. **Important Publications and Conference Presentations during the Past Five Years**
   None.

10. **Recent Professional Development Activities**
    - Certificate, Industrial Unit Design – Electricity Section (Construction Electrical Installation Design)
    - Certificate, Industrial Unit Design – Electricity Section (MV & LV Board Design)
    - Certificate, Primary and Architectural and Electrical AutoCAD
    - Certificate, Industrial Unit Design – Electricity Section (Lighting Design Software Calculux & Dialux)

1. **Name:** **Austin Chen, Ph.D.**

2. **Education**

Ph.D.	Electrical Engineering, University of Florida, Gainesville, FL	2010
P.D	Electrical Engineering, Columbia University, New York City, NY	2007
M.S.	Electrical Engineering, Columbia University, New York City, NY	2004
B.S.	Electrical Engineering, Purdue University, West Lafayette, IN	2003

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering
2014 – Present, Part-time.

4. **Non-academic Experience**

- Technical Manager, SiBEAM/Lattice Semiconductor, CA, 2017–Present, Full-time.
- Technical Lead/Project Manager, Nokia Networks, CA, 2013–2015, Full-time.
- RF Module Lead/Staff RFIC Design Engineer, Skyworks Solutions, 2015–2017, Full-time.
- Senior RFIC/PA Design Engineer, Skyworks Solutions, Newbury Park, CA, 2010–2013, Full-time.
- Millimeter-wave IC Researcher, Bell Laboratories, Alcatel-Lucent, Murray Hill, NJ, 2006–2007, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

IEEE.

7. **Honors and Awards**

- Extraordinary Teaching Award, Columbia University, New York City, NY, 2006-2007

8. **Service Activities**

- Industry Advisory Board (IAB), California State University, Northridge, 2013-Present

9. **Important Publications and Conference Presentations during the Past Five Years**

- Tomkins, E. Juntunen, A. Poon, H. Golestaneh, H. Shakoor, G. Temkine, G. Nabovati, N. Gilanpour, **A. Chen**, A. Sargsyan, N. Smith, A. Ali, K. Law, B. Lynch, C. Farnsworth, A. Lau, C. Hansen, N. Costa, A. Rashidian, M. Supinski, and K. Riley, "A 16-element phased-array transceiver in 130-nm SiGe BiCMOS for fixed wireless access covering the full 57–71 GHz band" in IEEE Radio Wireless Week (RWW), San Antonio, TX, Jan. 2020. (invited paper).
- Y. Yuan, C. Lu, **A. Y.-K. Chen**, C.-H Tseng, and C.-T. M. Wu, "Multi-target concurrent vital sign and location detection using metamaterial-integrated self-injection-locked quadrature radar sensor, vol. 67, no. 12, pp. 5429–5437, Dec. 2019, *IEEE Transactions on*

Microwave Theory and Techniques (TMTT).

- Y. Yuan, C. Lu, **A. Y.-K. Chen**, C.-H Tseng, and C.-T. M. Wu, "Noncontact multi-target vital sign detection using self-injection-locked radar sensor based on metamaterial leaky wave antenna," in *IEEE MTT-S International Microwave Symposium (IMS)*, Boston, MA, Jun. 2019, pp. 148–151.

10. Recent Professional Development Activities

- National Science Foundation (NSF) panelist/reviewer, 2020
- Member of Industry Advisory Board (IAB), CSU, Northridge, 2013-Present
- Local Arrangements Chair (LAC) and Technical Program Committee (TPC), IEEE Silicon Monolithic Integrated Circuits in RF Systems (SiRF) Conference, 2012-2013
- Technical Program Committee (TPC), IEEE Radio Wireless Week (RWW), Silicon Monolithic Integrated Circuits in RF Systems (SiRF) Conference, 2011-Present
- Reviewers of IEEE Journal of Solid-State Circuits (JSSC), IEEE Transactions on Microwave Theory and Techniques (TMTT), IEEE Microwave and Wireless Components Letters (MWCL), IEEE Transactions on Circuits and Systems II (TCAS II), IEE Electronics Letters (EL), Journal of Electromagnetic Waves and Applications (JEMWA), Progress in Electromagnetic Research (PIER), 2008-Present

1. **Name:** **Myles Cupp, MSEE**

2. **Education**

M.S.	Electrical Engineering, California State University Fullerton,	2015
B.S.	Electrical Engineering, California State University Fullerton,	2014

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering
2014 – Present, Part-time.

4. **Non-academic Experience**

The Walt Disney Company, Control Systems Engineer, 2014 - Present, Full-time

5. **Certifications or Professional Registrations**

Licensed P.E., State of California, Electrical Engineering

6. **Current Membership in Professional Organizations**

Tau Beta Pi

7. **Honors and Awards**

None.

8. **Service Activities**

Historical Swordfighting Instructor.

9. **Important Publications and Conference Presentations during the Past Five Years**

None.

10. **Recent Professional Development Activities**

Enrolled in Systems Engineering Ph.D. Program, Colorado State University, Fall 2020

1. **Name:** **James Garner, MSEE, MBA**

2. **Education**

MBA,	Pepperdine University,	1982
MSEE,	California State University, San Diego	1976
BSEE,	California State University, San Diego	1975

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering, 2016 – Present, Part-time.

California State University, Long Beach, Lecturer, Electrical Engineering, 2018, Part-time.

4. **Non-academic Experience**

- MacroVantage, President, Semiconductor Equipment, 2009 – 2018, Full-time.
- SMC Corporation, General Manager, Semiconductor Equipment, 1998 – 2009, Full-time.
- Cyber Systems, Manager, Aircraft Instrumentation, 1983 - 1989, Full-time.
- Hughes Aircraft, Technical Director, Weapons Systems & Analysis, 1976-1983, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

American Vacuum Society.

7. **Honors and Awards**

None.

8. **Service Activities**

American Vacuum Society, Chapter Chairman.

9. **Important Publications and Conference Presentations during the Past Five Years**

None.

10. **Recent Professional Development Activities**

- Attending teaching seminars, CSUF, 2019
- Developing new course materials for EE courses.

1. **Name:** **Yitsen Ku, Ph.D.**

2. **Education**

   Ph.D, Computer and Communication, National Taipei University of Technology, 2014
   M.S, Electrical Engineering, California State University Fullerton, 2005
   B.S, Electronics Engineering, Tam-Kang University Taiwan, 1986

3. **Academic Experience (Last Ten Years)**

   California State University, Fullerton, Lecturer, Electrical Engineering,
   2019 – Present, Part-time.
   Taipei University of Technology, Assistant Research Professor, Electrical Engineering,
   2016 – 2019, Full-time.
   Taipei University of Technology, Adjunct Assistant Professor, Electrical Engineering,
   2014 – 2016, Part-time.
   DeLin University of Technology, Adjunct Assistant Professor, Electrical Engineering,
   2014 – 2015, Part-time.
   MingChi University of Technology, Adjunct Assistant Professor, Electrical Engineering,
   2013 – 2016, Part-time.
   ChingKuo Institute of Management & Health, Adjunct Assistant Professor, IT,
   2009 – 2016, Part-time.
   LeeMing Institute of Technology, Adjunct Assistant Professor, Electrical Engineering,
   2009 – 2016, Part-time.

4. **Non-academic Experience**

   - Photo King USA, Planning Engineer, 09/1996-08/2000, Full-time.
   - Control Optics, Taiwan, Sales Manager, 09/1994-12/1996, Full-time.
   - Gotop Information Inc., Computer Textbook Writer, 02/1991-present, Part-time.
   - Comptec Computer Company, Test Engineer, 07/1985-11/1985, Full-time.

5. **Certifications or Professional Registrations**

   None.

6. **Current Membership in Professional Organizations**

   None.

7. **Honors and Awards**

   None.

8. **Service Activities**

   None.

9. **Important Publications and Conference Presentations during the Past Five Years**

   - Yuh-Shyan Hwang, Jiann-Jong Chen, Jyun Yang, and Yitsen Ku, "A Low-EMI Continuous-Time Delta-Sigma Modulation Buck Converter with Transient Response Eruption Techniques," in IEEE Transactions on Industrial Electronics, vol. 67, no. 8, pp. 6854-6863, Aug. 2020
   - Jiann-Jong Chen, Yuh-Shyan Hwang, Jun-Yi Lin, and Yitsen Ku, "A Dead-Beat-Controlled Fast-Transient-Response Buck Converter with Active Pseudo Current-Sensing Techniques," IEEE Trans. On Very Large Scale Integration (VLSI) Systems, Vol. 27, No. 8, pp 1751-1759, August 2019.
   - San-Fu Wang, Hua-Pin Chen, Yitsen Ku, and Yi-Chun Lin, "Versatile Tunable Voltage-Mode Biquadratic Filter and Its Application in Quadrature Oscillator," Sensors, Vol. 19, No. 2349, pp 1-21, May 2019.

- Chia-Cheng Lei, Yuh-Shuan Hwang, Jiann-Jong Chen, and Yitsen Ku, "New hysteresis-current-controlled buck converter with AC sensing techniques," Electronics Letters, Vol. 55, No. 7, pp 400-402, April 2019.
- Jiann-Jong Chen, Yuh-Shyan Hwang, Chih-Shiun Jheng, Yi-Tsen Ku, and Cheng-Chieh Yu, "A Low-Electromagnetic-Interference Buck Converter With Continuous-Time Delta-Sigma-Modulation and Burst-Mode Techniques," IEEE Trans. on Industrial Electronics, Vol. 65, No. 9, pp. 6860-6869, September 2018.
- Jiann-Jong Chen, Yuh-Shyan Hwang, Chia-Hao Chang, Yi-Tsen Ku, and Cheng-Chieh Yu, "A Sub-1μs Fast-Response Buck Converter with Adaptive and Frequency-Locked Controlled Techniques," IEEE Trans. on Industrial Electronics, Vol. 66, No. 3, pp. 2198-2203, May 2018.
- Jiann-Jong Chen, Yuh-Shyan Hwang, Jian-Han Chen, Yi-Tsen Ku, and Cheng-Chieh Yu, "A New Fast-Response Current-Mode Buck Converter With Improved I2-Controlled Techniques," IEEE Trans. on Very Large Scale Integration (VLSI) Systems, Vol. 26, No. 5, pp. 903-911, May 2018.
- Jiann-Jong Chen, Yuh-Shyan Hwang, Hao-Hung Chai, Yi-Tsen Ku, and Cheng-Chieh Yu, "A Sub-1μs Ultra-Fast-Response Buck Converter with Improved Analog-Voltage-Dynamic-Estimation Techniques," IEEE Trans. on Industrial Electronics, Vol. 65, No. 2, pp. 1695-1699, February 2018.
- Yuh-Shyan Hwang, Jiann-Jong Chen, Rong-Lian Shih, and Yi-Tsen Ku, "A 2-μs Fast-Response Step-Up Converter With Efficiency-Enhancement Techniques Suitable for Cluster-Based Wireless Sensor Networks," IEEE Transactions on Very Large Scale Integration (VLSI) Systems, Vol. 36, No. 1, pp. 216-220, January 2018.
- 17. Jiann-Jong Chen, Yuh-Shyan Hwang, Jian-Fong Liou, Yi-Tsen Ku, and Cheng-Chieh Yu, "A New Buck Converter with Optimum-Damping and Dynamic-Slope Compensation Techniques," IEEE Trans. on Industrial Electronics, Vol. 64, No. 3, pp. 2373-2381, Mar. 2017.

10. <u>Recent Professional Development Activities</u>

- Suitable for IoMT I2 Mode Buck Converter with AOT and PLL Technologies Integrated Circuit Design, USD 17,967 (NTD 548000), Taiwan Ministry of Science and Technology, Yitsen Ku, 2018/08/01 to 2019/07/31
- The integrated circuit design of a voltage mode and a current mode adaptive on-time buck converter suitable for IoT, Yitsen Ku, USD 21,700 (NTD 663,000), Taiwan Ministry of Science and Technology, 2016/08/01 to 2017/07/31
- The integrated circuit design of an auto-reset voltage-regulated fly-back converter for dynamic escape guidance system, Yitsen Ku, USD 23,610 (NTD 729,280), Taiwan Ministry of Science and Technology, 2018/06/01 to 2019/05/31
- Reviewer: IET Circuits, Devices & Systems; IEEE Industrial Electronics, Manuscript number; Microelectronics Journal; Journal of Energy Storage; Journal of Power Electronics; IEEE Access, etc.

1. **Name:** **Lan K. Nguyen, Ph.D.**

2. **Education**

Ph.D.	Electrical Engineering,	University of Idaho,	2006
M.S.	Electrical Engineering,	University of Southern California,	1991
B.S.	Electrical Engineering,	Cornell University,	1983

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering
2017 – Present, Part-time.

4. **Non-academic Experience**

- CORPORATE ENGINEER II, LinQuest Corporation, 04—present, Full-time.
- ENGINEER/SCIENTIST, Boeing, Integrated Defense Systems, 02 – 04, Full-time.
- PRINCIPAL DSP ENGINEER, TDK Semiconductor Corp. 01 – 02, Full-time.
- SENIOR STAFF ENGINEER, Hughes Space and Communications, 98 – 01,Full-time.
- STAFF ENGINEER, Raytheon/Hughes Naval and Maritime Systems, 92-98, Full-time.
- MEMBER of TECHNICAL STAFF, Hughes Aircraft Company, 90-92, Full-time.
- ENGINEER SCIENTIST, Mc Donnell Douglas 86-90, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

• IEEE, Senior Member
• INCOSE, ESEP

7. **Honors and Awards**

- 2010 Enhanced Polar System (EPS) MVP Award
- 2011 EPS Team Award
- 2011 EPS 3rd Quarter Award

8. **Service Activities**

- Conference Technical Program Committee (TPC):
  - 2013-2016 IEEE Global Communications Conference (GLOBECOM)
  - 2016, 2017 IEEE International Conference on Communication (ICC)
  - 2016 IEEE Advanced Satellite Multimedia Systems/Signal Processing for Space Communications (ASMS/SPSC)
  - 2013, 2015, 2016, 2018, 2019 IEEE Military Communications (MILCOM)
- CONFERENCE SESSION CHAIR
  - 2013, 2014, 2015 IEEE GLOBECOM
  - 2011, 2014, 2016 IEEE MILCOM
- IEEE ACTIVITIES
  - IEEE Orange County Communication and Signal Processing Chapter
    - 2016-Current: Chapter Chair
    - 2016-2018: Treasurer

- Previous positions held (2010-2015): Vice Chair, Programs Chair

9. Important Publications and Conference Presentations during the Past Five Years

- [C1] Nguyen, L. K.; Tringe, J. W.; Bolsner, C. Brunnenmeyer, D., "An Algorithmic Approach to Highly Resilient SATCOM," Proceedings of the IEEE Military Communication Conference (MILCOM' 19), Norfolk, VA, Nov. 12-15, 2019.
- [C2] Nguyen, L. K.; Wells, R. B.; Nguyen, D. H. N.; Tran, H. N., "Outage Probability and Performance of Moderate-Length Codes under Partial-Band Noise Jamming (PBNJ)," Proceedings of the IEEE Military Communication Conference (MILCOM' 19), Norfolk, VA, Nov. 12-15, 2019.
- [C3] Weiss, E.; Chung, L.; Nguyen, L. K., "A MBSE Approach to Satellite Clock Time and Frequency Adjustment in Highly Elliptical Orbit," Proceedings of the IEEE Military Communication Conference (MILCOM' 19), Norfolk, VA, Nov. 12-15, 2019.
- [C4] Nguyen, L. K.; Wells, R. B.; Nguyen, D. H. N.; Tran, H. N., "Outage Probability and Constrained Capacity of Moderate-Length Codes for Gaussian Mixture over AWGN Channel," Proceedings of the IEEE Military Communication Conference (MILCOM' 18), Los Angeles, CA, Oct. 29-31, 2018.
- [C5] Nguyen, L. K.; Wells, R. B.; Nguyen, D. H. N.; Tran, H. N., "Outage Probability Analysis of the Protected Tactical Waveform (PTW) on the Return Link," Proceedings of the IEEE Military Communication Conference (MILCOM' 17), Baltimore, MD, Oct. 23-25, 2017.
- [C6] Nguyen, L. K.; Wells, R. B.; Pham, K. D., "Impact of Satellite Transponder Nonlinearities on the Performance of Protected Tactical Waveform (PTW) for the Return Link (RL)," Proceedings of the IEEE Military Communication Conference (MILCOM' 16), Baltimore, MD, Nov. 1-3, 2016.
- [C7] Nguyen, L. K.; Schonhoff, J. L.; King, R. C; Axford, R. A., "Antenna Handover for the Wideband Anti-Jam Modem (WAM)," Proceedings of the IEEE Military Communication Conference (MILCOM' 16), Baltimore, MD, Nov. 1-3, 2016 (Restricted Session).
- [C8] Nguyen, L. K.; Wells, R. B.; Le-Ngoc, T., "Power Allocation for Shared and Frequency Hopped Transponder," Proceedings of the IEEE Military Communication Conference (MILCOM' 15), Tampa, FL, Oct. 26-28, 2015.
- [C9] Nguyen, L. K.; Vorwerk, R. K., "End-to-End Tracking Performance for the Enhanced Polar System (EPS)," Proceedings of the IEEE Military Communication Conference (MILCOM' 15), Tampa, FL, Oct. 26-28, 2015.
- [C10] Nguyen, L. K., "Input Power Assignment for Nonlinear Distorted Multicarrier Transponder," Proceedings of the IEEE Military Communication Conference (MILCOM' 15), Tampa, FL, Oct. 26-28, 2015 (Restricted Session).

10. Recent Professional Development Activities

- Developing new materials for EE courses.
- Active in conference programming, publication and presentations.

1. **Name:** **Peter Widmann, Ph.D.**

2. **Education**

PhD,	Physics,	University of Houston,	1988
BS,	Physics and Math,	Loyola Marymount University,	1981

3. **Academic Experience**

Fullerton College, Assistant Professor, Physics
2018 – Present, Full-time.

California State University, Fullerton, Lecturer, Electrical Engineering
2016 – Present, Part-time.

Fullerton College, Adjunct Professor, Physics
2004 – 2018, Part-time.

Mt San Antonio College, Adjunct Professor, Physics
2016 – 2018, Part-time.

4. **Non-academic Experience**

- Northrop Grumman, project manager and engineering manager, 2005-2016, Full-time.
- COI-Ceramics, senior engineer/project manager, 1999-2005, Full-time.
- Northrop Grumman, senior engineer, 1987-1999, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

None.

7. **Honors and Awards**

None.

8. **Service Activities**

- CSUF EE dept, Industry Advisory Board, 2015-2016

9. **Important Publications and Conference Presentations during the Past Five Years**

None.

10. **Recent Professional Development Activities**

- Wrote proposal and mentored seniors on self study project funded by grant from Directed Energy Professional Society, $2.5K, 2019.

1. **Name:** **Jim D. Yu, MSEE**

2. **Education**

M.S.	Electrical Engineering, California State University Fullerton,	2007
Certificate	Electronics Technology, Irvine Valley College	2002
B.S.	Mechanical Engineering, California State University Fresno,	1989

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering
2015 – Present, Part-time.

Irvine Valley College, Adjunct Faculty, Electronics Technology
2008 – Present, Part-time.

4. **Non-academic Experience**

- TC Machine Design – Design Engineer, 2018 – present, Full-time.
- Delphi Display Systems – Design Engineer, 2010 – 2018, Full-time.
- Source Scientific LLC – Design Engineer, 2007 – 2008, Full-time.
- Kingston Technology – Design Engineer, 1992 – 2005, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

None.

7. **Honors and Awards**

None.

8. **Service Activities**

None.

9. **Important Publications and Conference Presentations during the Past Five Years**

None.

10. **Recent Professional Development Activities**

- Currently working on developing military weapons systems for the U.S. government.

1. **Name:** **Dachun Zhao, Ph.D.**

2. **Education**

Ph.D,	Physics, The City University of New York,	2004
M.Phil,	Physics, Graduate school of The City University of New York,	2003
M.S,	Electrical Engineering, Cal. State Univ. Fullerton,	2009
M.A,	Physics, Indiana University of Pennsylvania,	1998
M.S,	Physics, East China University of Science and Technology,	1992

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering,
2014 – Present, Part-time.
Center for Photonic Materials and Devices, Fisk University, Post-doc Research Associate,
2005, Full-time.

4. **Non-academic Experience**

None.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

- International Member of American Association for the Advancement of Science (AAAS)
- Member of New York Academy of Science
- Member of American Physical Society

7. **Honors and Awards**

- Top grade award of Shanghai Vacuum Sci. & Tech. Association. (1992). (Project: Structure and properties of ZnO utrafine particles (UFP) films)
- First prize of Univ. Graduate student thesis, (1992)
- (Title: Study of Optical, electrical, and surface properties of functional materials films)
- The excellent physics award (fellowship) (1991)

8. **Service Activities**

None.

9. **Important Publications and Conference Presentations during the Past Five Years**

None.

10. **Recent Professional Development Activities**

- Attending teaching seminars, CSUF, 2019

1. **Name:** **Yun Zhu, Ph.D.**

2. **Education**

Ph.D.	Electrical Engineering, University of California, Irvine	2013
M.S.	Mechanical and Electrical Engineering, Xiamen University	2007
B.S.	Mechanical and Electrical Engineering, Xiamen University	2000

3. **Academic Experience**

California State University, Fullerton, Lecturer, Electrical Engineering
2014 – Present, Part-time.

4. **Non-academic Experience**
   - Broadcom Inc, Senior R&D Test Engineer, 03/2011 -Present, Full-time.

5. **Certifications or Professional Registrations**

None.

6. **Current Membership in Professional Organizations**

IEEE.

7. **Honors and Awards**
   - "Phi Tau Phi" Scholarship Western America Chapter, 2012;
   - "Best Student Paper Award" by SPIE in APOC (Asia-Pacific Optical Communications) Conference, Shanghai, China, Nov.-2005.

8. **Service Activities**
   - Associate Editor, IEEE Magnetics Letters (Impactor Factor: 1.978), Dec. 2016 to 2017
   - Review Experiences
     - As an Senior Editorial Review Board Member for IEEE Magnetics Letters;
     - As an active reviewer for the following journals: Applied Physics Letters; Journal of Physics D: Applied Physics; Journal of Applied Physics, IEEE Transactions on Magnetics; IEEE Magnetics Letters, Journal of Progress In Electromagnetics Research (PIER), IEEE Antennas and Wireless Propagation Letters, and Electronics Letters.

9. **Important Publications and Conference Presentations during the Past Five Years**
   - Chen S Tsai, Rong W Mao, Shirley C. Tsai, Kaveh Shahverdi, Yun Zhu, et al.," Faraday Waves-Based Integrated Ultrasonic Micro-Droplet Generator and Applications", Micromachines, 8(2), 56 (2017).
   - Chen S Tsai, Rong W Mao, Shih K Lin, Yun Zhu, et al., "Ultrasound-driven Megahertz Faraday Waves for Generation of Monodisperse Micro Droplets and Applications", Physics Procedia, 70, 872-875, (2015)
   - Y. Zhu, K. H. Chi, and C. S. Tsai, Magnonic crystals-based tunable microwave phase shifters, Applied Physics Letters, 105, 022411 (2014).
   - Kai H. Chi, Yun Zhu, and Chen S. Tsai. "Confinement of Magnetostatic Forward Volume Waves in Two-Dimensional Magnonic Crystals with Line Defects". Journal of Applied Physics, 115 (10), 17D125, 2014.

- C. S. Tsai, R. W. Mao, S.K.Lin, Y. Zhu, S. C. Tsai, Faraday instability-based micro droplet ejection for inhalation drug delivery, Technology, 02, 75 (2014).

10. Recent Professional Development Activities

- Active journal publications and reviewing.
- As a DVT engineer at HSIP (High-speed Interconnect Products) group, ING (Infrastructure and Networking Group) business unit in BroadCom with major duties and responsibilities as follows.
    - Develop comprehensive test plans and strategies for post-silicon analog electrical parameters of physical layer(PHY) SerDes (Serializer and Deserializer) of high-speed broadband Mix-signal ASIC;
    - Design, setup and perform DVT of analog electrical parameters of high speed SERDES, Mix-signal ASIC, PLL.