Program Performance Review

Self Study Report

Master of Science

in

Mechanical Engineering

at

California State University, Fullerton

May, 2016

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I. Department/Program Mission, Goals and Environment

A. Mission & Goals of the Department and its relation to the University Mission, Goals & Strategy

Consistent with the University's Mission, learning is the first priority in the Mechanical Engineering Department. To implement our mission, we provide the best qualities of teaching, scholarship and professional practice. The department is committed to facilitating the education of the mechanical engineering undergraduate and graduate students by the department's **Program Educational Objectives (PEO)** listed below. The Mechanical Engineering Department's vision is to be recognized as one of the preeminent mechanical engineering programs in southern California. We wish to realize its vision, and accomplish its mission by strengthening the department's partnerships with its stakeholders and the community; enhancing the quality of the Mechanical Engineering program through systematic assessments and feedback; and integrating emerging fields within the curriculum.

The department has established the following Program Educational Objectives (PEO) for the graduate program.

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

The **Student Learning Outcomes (SLO)** in relation to above PEO are listed as follows:

1) **SLO 1**: An ability to apply knowledge of *advanced* mathematics, science & engineering
2) **SLO 2**: An ability to identify, formulate and solve *advanced* engineering problem
3) **SLO 3**: Ability to communicate effectively
4) **SLO 4**: An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Consistent with the University mission statement, the mechanical engineering program Educational Objectives (PEO) focus on *preparing graduates for challenging professions* with knowledge of modern engineering practice, ability to integrate into the local and global workforce, and with continued demonstration of professional skills. Also the PEO directs graduates to assume leadership roles and contribute to the economy of California and the nation, which is consistent with the University's mission of *strengthening relations to communities*

and contributing productively to society. Furthermore, the department's PEO promote enthusiasm for professional growth and career success as professional citizens, *serving as a distinctive resource and catalyst for our surrounding regions*.

As one can see from Table I-1, attainment of SLO through various courses is closely knitted with achieving the PEO of the **Mechanical Engineering (ME)** Department, as a result, fulfilling the University mission and goals.

Table I-1: Relationship of Student Learning Outcomes to Program Educational Objectives

Program Educational Objectives (PEO) / Student Learning Outcomes (SLO)	**PEO 1** **Technical Growth** M.E. graduates will be successful in modern engineering practice, integrate into the local and global workforce, and contribute to the economy of California and the nation.	**PEO 2** **Professional Skills** M.E. graduates will continue to demonstrate the professional skills necessary to be competent employees, assume leadership roles, and enjoy career success and satisfaction.	**PEO 3** **Professional Attitude and Citizenship** M.E. graduates will become productive citizens with high ethical & professional standards, make sound engineering or managerial decisions, and have enthusiasm for the profession and professional growth.
SLO 1 Math, Science, & Engineering	X		
SLO 2 Identify, formulate and solve problems	X		
SLO 3 Communicate Effectively		X	X
SLO 4 Modern Engineering Tools	X	X	

The Master of Science degree in Mechanical Engineering is intended to meet the needs of students who wish to prepare careers in the areas such as, thermos-fluid systems, power & energy, design & manufacturing, and control & automation of electromechanical systems. The program provides training of advanced knowledge within the areas of mechanical engineering to better prepare working with people in other engineering fields and people outside of engineering areas.

This is the first Program Performance Review (PPR) for the Mechanical Engineering Department. Therefore, there are no changes in the graduate program since the previous review.

B. Changes and trends in the discipline and the responds of department to such changes

According to the US Department of Labor data released in February, 2016, the total number of engineers in the US will be increased by 160,000 from 1.51 million in 2010 to 1.67 million in 2020. This represents a change of +10.6%. The mechanical engineering job is anticipated to grow by 21,300 (from 243,200 to 264,000), which is an increase of 8.8%. This is the second fastest growing engineering field, behind civil engineering and ahead of electrical engineering. In addition, American Society of Mechanical Engineers (ASME) conducted a survey among 1,222 engineers in 2011, and listed top two cutting edge fields are *alternative energy* and *biomedical engineering* which are two closely related fields associated with the mechanical engineering. Also, with the increasing demand in advanced manufacturing such as additive manufacturing, and growing interest in unmanned vehicle, the ME Department is undergoing changes to support the need of southern California as well as the nation. In recent years, the department has created three graduate level special courses, including alternative energy and biomechanics which will be proposed as part of the regular course within the curriculum in the future. The **College of Engineering and Computer Science (ECS)** purchased several 3D printers, and CNC machines in the Machine Shop, which is dominantly used by mechanical engineering students, to support graduate student projects. The department has hired 10 faculty members (including new hires for the fall 2016 semester) in the last eight years to support the growing demands of mechanical engineering workforce in the southern California and the nation.

C. Mechanical Engineering Department's priorities for the future

The Mechanical Engineering Department will focus on diversifying the areas of specialization, extending the focus areas to fields such as alternative energy, biomedical device engineering, and advanced design & manufacturing areas to better prepare our graduate students in the workforce after graduation. Our focus will be integrating the state-of-the art practices in mechanical engineering into the graduate curriculum. The program will be modified and adjusted based on the trends in employment and demand in different areas of mechanical engineering.

D. There are no programs currently offered in a Special Session self-support mode in the Mechanical Engineering Department.

II. Department/Program Description and Analysis

A. This is the first Program Performance Review (PPR) for the MS program in Mechanical Engineering. Therefore, there have been no substantial changes from the last review.

B. Structure of the MS program and identification of logic underlying the organization of requirement.

To qualify for admission to a conditionally classified standing, students must meet the CSU requirements for admission to a master's degree program. In addition, applicants must meet the following departmental requirements:

- Bachelor's degree from a regionally accredited institution, e.g., Western Association of Schools and Colleges (WASC)
- Bachelor's degree in mechanical engineering from an institution accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone 410-347-7700

The students must demonstrate potential for graduate study by earning a grade point average of 3.0 or higher from their undergraduate institution. Any student entering the master of science degree program without a B.S. in Mechanical Engineering will also be required to complete courses in the areas where the student is deemed to be deficient, prior to beginning of coursework for the master's degree. Typically the Mechanical Engineering Department assigns no more than 15 units of advisor approved, undergraduate bridge courses for BS degree holders that is not in Mechanical Engineering. These courses are typically taken in the first year of their graduate studies to strengthen the foundation in taking more advanced graduate level mechanical engineering courses.

Study Plan: The study plan consists of adviser-approved upper-division or graduate- level coursework that must be completed with a minimum overall grade-point average of 3.0/4.0. At least half the units required for the degree must be in approved graduate (500-level) courses. Students must complete the Study Plan with the graduate program advisor before they complete 13 units of graduate coursework.

Classified Standing: Students meeting the following additional requirements will be advanced to classified standing and are eligible to take graduate courses for which they are qualified:

- complete all deficiency work, specified by the mechanical engineering graduate program adviser, with a 3.0 GPA or better;
- meet with the graduate program adviser prior to completing 13 units toward the M.S. degree at CSUF to develop a study plan, which must also be approved by the student's graduate program adviser, department chair and Office of Graduate Studies; and
- fulfill the university writing requirement prior to completing thirteen units at CSUF toward the M.S. degree.

MS in Mechanical Engineering Degree Requirements:

Required Course (3 units):

EGME 438: Analytical Methods in Engineering OR
EGME 538: Advanced Engineering

Elective Courses (27 units):

The Mechanical Engineering Department permits students to take these 27 units in any of the following four specializations:

- **Robotics, Controls and Automated Manufacturing**
  - EGME 410: Introduction to Finite Element Method and Applications
  - EGME 411: Mechanical Control System
  - EGME 418: Space and Rocket Engineering
  - EGME 422: Advanced Computer Aided Design
  - EGME 424: Data Acquisition and Instrumentation Using LabVIEW
  - EGME 438: Analytical Methods in Engineering
  - EGME 454: Optimization of Engineering Design
  - EGME 456: Introduction to Mechatronics for Engineers
  - EGME 457L: Intelligent Systems Laboratory
  - EGME 463: Introduction to Robotics
  - EGME 475: Acoustics and Noise Control
  - EGME 480: Human Factors in Engineering
  - EGME 483: Computer Integrated Manufacturing
  - EGME 486: Introduction to Electronic Packaging
  - EGME 511: Advanced Mechanical Vibrations
  - EGME 512: Advanced Mechanical Design and Management
  - EGME 540: Computer Applications in Engineering Design
  - EGME 541: Finite Element Method for Mechanical Engineers
  - EGME 554: Applied Optimal Mechanical Design
  - EGME 576: Advanced Dynamics and Control of Mechanical Systems
- **Design and Materials for Manufacturing**
  - EGME 410: Introduction to Finite Element Method and Applications
  - EGME 411: Mechanical Control System
  - EGME 422: Advanced Computer Aided Design
  - EGME 424: Data Acquisition and Instrumentation Using LabVIEW
  - EGME 438: Analytical Methods in Engineering
  - EGME 447: Piping Selection and Piping Network Design
  - EGME 454: Optimization of Engineering Design
  - EGME 456: Introduction to Mechatronics for Engineers
  - EGME 459: Plastics and Other Non-Metallics
  - EGME 460: Failure of Engineering Materials

EGME 461: Fabrication Methods
EGME 462: Composite Materials
EGME 463: Introduction to Robotics
EGME 475: Acoustics and Noise Control
EGME 480: Human Factors in Engineering
EGME 483: Computer Integrated Manufacturing
EGME 486: Introduction to Electronic Packaging
EGME 512: Advanced Mechanical Design and Management
EGME 530: Advanced Strength of Materials
EGME 540: Computer Applications in Engineering Design
EGME 541: Finite Element Method for Mechanical Engineers
EGME 554: Applied Optimal Mechanical Design

- **Thermal and Fluids Engineering**

EGME 410: Introduction to Finite Element Method and Applications
EGME 417: Computational Heat Transfer
EGME 418: Space and Rocket Engineering
EGME 424: Data Acquisition and Instrumentation Using LabVIEW
EGME 426: Design of Thermal and Fluid Systems
EGME 438: Analytical Methods in Engineering
EGME 447: Piping Selection and Piping Network Design
EGME 451: Heating, Ventilating, and Air Conditioning (HVAC) System
EGME 452: Fluid Machinery
EGME 454: Optimization and Engineering Design
EGME 486: Introduction to Electronic Packaging
EGME 487: Thermal Control of Electronic Packaging
EGME 508: Advanced Inviscid Fluid Flow
EGME 516: Advanced Radiation Heat Transfer
EGME 520: Advanced Viscous Fluid Flow
EGME 526: Advanced Convective Heat Transfer
EGME 536: Advanced Conduction Heat Transfer
EGME 538: Advanced Engineering Analysis
EGME 540: Computer Applications in Engineering Design
EGME 541: Finite Element Method for Mechanical Engineers
EGME 554: Applied Optimal Mechanical Design

- **Power and Energy**

EGME 410: Introduction to Finite Element Method and Applications
EGME 417: Computational Heat Transfer
EGME 418: Space and Rocket Engineering
EGME 424: Data Acquisition and Instrumentation Using LabVIEW
EGME 438: Analytical Methods in Engineering

EGME 447: Piping Selection and Piping Network Design
EGME 451: Heating, Ventilating, and Air Conditioning (HVAC) System
EGME 452: Fluid Machinery
EGME 454: Optimization and Engineering Design
EGME 486: Introduction to Electronic Packaging
EGME 487: Thermal Control of Electronic Packaging
EGME 508: Advanced Inviscid Fluid Flow
EGME 516: Advanced Radiation Heat Transfer
EGME 526: Advanced Convective Heat Transfer
EGME 536: Advanced Conduction Heat Transfer
EGME 538: Advanced Engineering Analysis
EGME 540: Computer Applications in Engineering Design
EGME 541: Finite Element Method for Mechanical Engineers
EGME 554: Applied Optimal Mechanical Design

Among the 27 units of elective requirement, up to 6 units may be taken outside of the Mechanical Engineering Department. Typically, graduate students take these 6 units of courses in other engineering or computer science courses. The department currently does not put restrictions on the number of courses taken outside of the specialization. Because of the interdisciplinary nature in current engineering fields, students are encouraged to take courses in other areas of specialization to gain more well-rounded engineering knowledge, and to better prepare for their career. Therefore, these specialization areas for guidance purpose, without imposing any restriction on the course selections. In addition, some of the 500 level courses are designed to engage students in research which will also prepare them towards the doctoral degree in the future.

Culminating Experience: Subject to approval by the graduate program advisor, students must select one of the following three options to fulfill their master's degree requirement.

- Comprehensive Examination over 5 courses (at least three of which are 500-level)
- EGME 597: Projects (1 to 6 units)
- EGME 598: Thesis (1 to 6 units)

Students enrolling in less than 6 units of Project/Thesis option will be required to take the comprehensive exam. However, students enrolling in 6 units of Thesis or Projects may defend their research work instead of the Comprehensive Exam.

C. Student demand for department's offerings in relation to over-enrollment, under enrollment, and graduation rate.

The trend of application and enrollment in the MS in Mechanical Engineering is shown in the table below. As one can see from the data, acceptance rate into the master's program ranging from 47% to 78% (average of 59.4%) with the percent enrolled among the accepted students ranging from 28% to 56% (average of 38.8%) in the past 6 years. In this time frame, the

number of applicants rose by 336%. Also, the **Full Time Equivalent Students (FTES)** and the headcounts rose by 369%, and 300%, respectively in the same time period. The department is currently experiencing over-enrollment in graduate classes (the class sizes have grown approximately twice as much per class over the last 6 years). This is because the hiring rate of new faculty could not catch up to the growth rate of student enrollment. More students must be enrolled in classes due to shortage of time faculty. It has been catching of a moving target (student enrollment number) that have kept going up in the past 6 years.

Table II-1. Graduate Program Applications, Admissions, and Enrolled

Academic Year	# Applied	# Admitted	% Admitted	# Enrolled	% Enrolled
2010-2011	138	79	57	35	44
2011-2012	157	85	54	26	31
2012-2013	133	81	61	28	35
2013-2014	246	116	47	33	28
2014-2015	465	365	78	203	56

Table II-2. Graduate Program Enrollment in FTES

Academic Year	Enrollment in FTES
2010-2011	9.6
2011-2012	14.8
2012-2013	16.6
2013-2014	15.6
2014-2015	35.4

Table II-3. Graduate Program Enrollment in Headcount

	Headcount Majors		
Academic Year	Master's	Total	FTES per headcount
2010-2011	54.5	54.5	.56
2011-2012	55.5	55.5	.58
2012-2013	60	60	.61
2013-2014	65	65	.59
2014-2015	163.5	163.5	.54

Also, as one can see from the Table II-4, the number of MS degree awarded has slowly increased. However, this number will spike up in the **academic year (AY)** 2016-2017 since large number of students who entered in AY 2014-2015 (252% increase from the previous year) will begin to graduate in AY 2016-2017.

Table II-4. Master's Degree Awarded

Academic Year	Degrees Awarded
2010-2011	21
2011-2012	15
2012-2013	24
2013-2014	25
2014-2015	26

D. Department's enrollment trends based on FTES, faculty allocation, and student faculty ratio

As one can easily from the FTES enrollment trend in Table II-2, and faculty composition in Table II-5, the enrollment is rapidly swinging upward. FTES enrollment is up by 369% in 6 years, and **full time equivalent faculty (FTEF)** allocation is increased by 315% in the same time period. The **student to faculty ratio (SFR)** for the College of ECS is approximately 17.1. Currently the department is composed of 10 full time faculty members, and this number will go up by 2 more starting in the fall 2016. The department definitely must hire more quality full time faculty members (the department needs at least 5 more faculty members in the next 3-4 years) to catch up with the rapidly rising mechanical engineering student enrollment, to deliver high quality education for the students.

Table II-5. Faculty Composition

Year	Tenured	Tenure Track	Sabbaticals at 0.5	FERP at 0.5	Lecturers	FTEF Allocation	FTES Target	Actual FTES
2010-2011	3	1	1	1	8	6.2	11.8	11.8
2011-2012	3	2	0	1	7	7.7	18.2	18.2
2012-2013	3	4	0	1	5	9.3	20.5	20.5
2013-2014	2	4	0	1	7	12.0	19.4	19.4
2014-2015	2	6	0	0	9	19.5	44.2	44.2

E. Plans for curricular changes in the short (3 year) and long (7 year) term

Including 2 faculty hires for the fall 2016, the department has hired 10 tenure-track faculty members since fall 2009. This accounts for 83% of the total number of full time faculty composition. As a result, there will be significant curricular changes in the near future. In the last seven years, the following special courses were approved (offered or will be offered).

- EGME 433: Aerodynamics
- EGME 434: Combustion Systems
- EGME 524: Advanced Thermodynamics
- EGME 531: Random Vibrations
- EGME 563: Human Kinematics in Advanced Mechanical Design
- EGME 571: Alternative Energy Technology & Design

The graduate program has a plan to include these special courses as a part of regular curriculum in the next 3 years. Also, the department is planning to create a 3 unit *graduate writing seminar* class that can fulfill the University writing requirement for graduate students. As a possible long term (seven-year) plan in the curriculum, the department is planning to expand towards the areas of biomedical device engineering and manufacturing engineering fields. There has been a very primitive discussion in the faculty meeting to explore these options.

F. There are no special sessions to be offered by the Mechanical Engineering Department in the future.

III. Student Academic Achievement and Assessment of Student Learning Outcomes (SLO)

A. Department assessment plan and structure

For the MS program in mechanical engineering, assessment of student learning outcomes (SLO) will use two data sets: one direct and the other indirect. *Prior to this academic year, assessment of SLO was never conducted, since it was not required.* However, beginning of this academic year, assessment of SLO, evaluation of the assessed data, and implementation of improvement based on evaluation will be systematically carried out. The following indicates schedule of assessment play cycle.

Table III-1. Assessment Plan Cycle

Year	Activities
AY 2015-2016	Assessment of SLO
AY 2016-2017	Assessment of SLO
AY 2017-2018	Evaluation of assessment data & implementation for continuous improvement
AY 2018-2019	Reassessment of SLO
AY 2019-2020	Reassessment of SLO
AY 2020-2021	Evaluation of assessment data & implementation for continuous improvement

These activities will be carried out by the department's Assessment and Continuous Improvement Committee, currently formed by three full time faculty.

B. SLO and description of methods used to measure student learning; summary of assessment results

The following SLO are created by the ME department in fall 2015.

1) **SLO 1**: An ability to apply knowledge of *advanced* mathematics, science & engineering
2) **SLO 2:** An ability to identify, formulate and solve *advanced* engineering problem
3) **SLO 3:** Ability to communicate effectively
4) **SLO 4:** An ability to use the techniques, skills and modern engineering tools necessary For engineering practice

Direct Assessments: Direct assessment of student learning outcomes is accomplished through the direct evaluation of students' work (e.g., projects, homework, and exam questions) that is required within the ME curriculum. Each required ME course is designed to address at least two or more SLO. In addition, each SLO outcome is addressed in multiple courses. SLO data for each course is collected by a course instructor, typically by a faculty member who teaches the respective course most frequently and who has been identified as the *course coordinator* for that course. Each coordinator identifies the particular assignment, project, or exam question that best reflects achievement of each targeted SLO for that class. The table below illustrates an example of mapping SLO 1 and 2 with an appropriate method of assessment in the EGME 576: Advanced Dynamics and Control of Mechanical Systems.

Table III-2: Example of SLO Assessment Source

SLO for EGME 576	Source of Assessment
Math, Science, & Engineering: SLO1	Final Exam Problem #1
Identify, Formulate & Solve Problems: SLO2	Final Exam Problem #4

After completing the above step for each course, coordinators then assess individual student performance based on a scale of 1-5, with 5 being the best. ***It is emphasized to faculty members that SLO assessment scores must reflect degree of learning on a particular SLO and, therefore, these scores are different and separate from the grades that faculty members assign for a particular course; thus, grades are NOT synonymous with SLO assessment.***

Assessments are measured using the following scale:

- 5: Excellent; 4: Above Average; 3: Average; 2: Below Average; 1: Poor

Each *individual student* is assessed on each assessment score with whole numbers (e.g. 4, 3, or 2). ***Only one source of assessment is used in a particular course to demonstrate attainment of each assigned SLO***. Then, course coordinators report their assessment results for each class using EXCEL spreadsheet such as an example below:

Table III-3: Example of Assessment Rubrics

Student Names	SLO 1	SLO 2	SLO 3
Student A	4	2	3
Student B	2	3	2
Student C	3	3	3
Student D	4	4	4
Student E	3	4	4
Student F	3	3	3
Student G	4	4	3
Student H	1	3	2
Student I	3	4	3
Student J	4	4	4
Student K	3	2	3
Student L	3	2	3
AVERAGE	3.08	3.17	3.08

Indirect Assessment: Each year, the department chair collects survey from current graduate students to obtain feedback via survey regarding program strengths, weaknesses, and suggestions for improvement. In the most recent survey in spring 2016, students also performed a self-evaluation of their degree of success on attaining the program's student learning outcomes (SLO). Assessment criteria and data analysis are the same as the ones described for the direct assessment.

Expected Level of Achievement for SLO: For assessment and evaluation purposes, the achieved target (as recommended by the ME faculty and Industrial Advisory Board members) is set at obtaining average scores of 3.5 or better on a 5.0 scale, and achieving 80% ratings in top three assessment scores (i.e. 70% Excellent or Above Average(AA) ratings) on both direct and indirect measured data.

Summary of SLO Assessment:

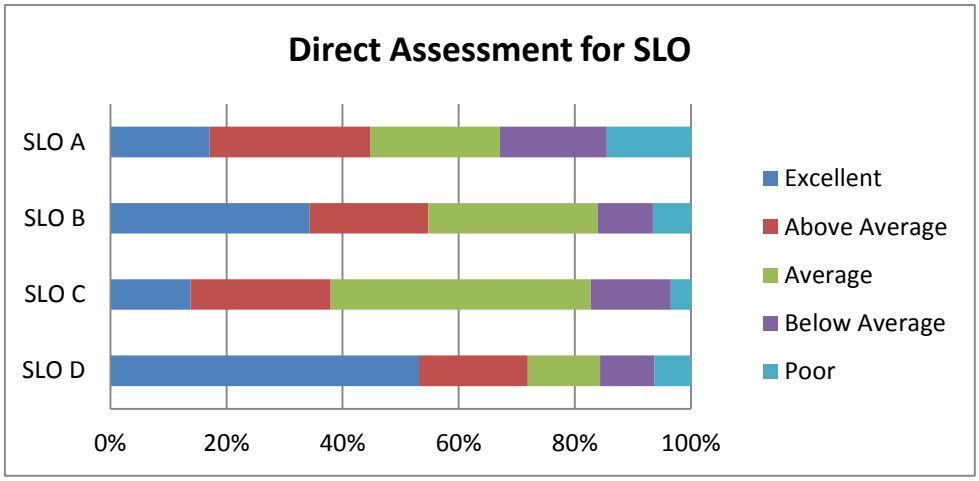

Figure III-1: Direct Assessment Summary of SLO

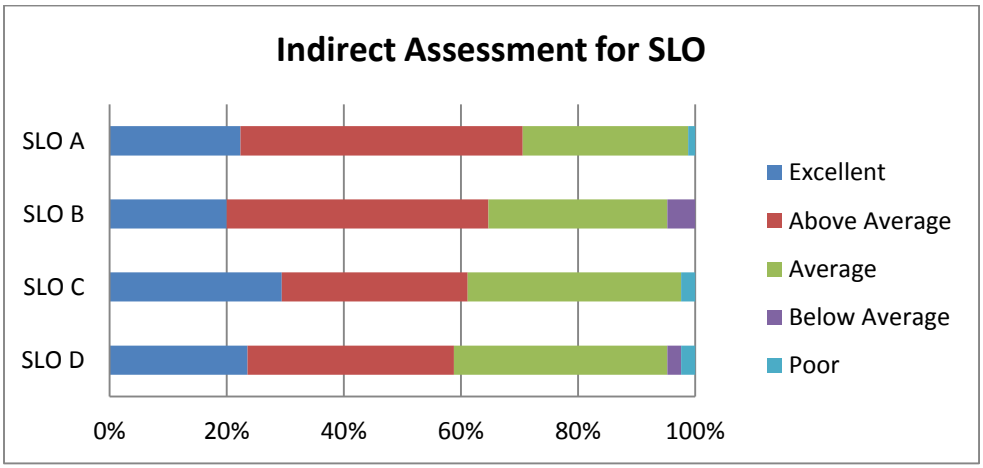

Figure III-2: Indirect Assessment Summary of SLO

Table III-4: Mean Assessment Score Comparison

SLO #	Direct Assessment Mean Score	Indirect Assessment Mean Score
SLO 1	3.14	3.90
SLO 2	3.66	3.80
SLO 3	3.31	3.86
SLO 4	4.03	3.75

As one can see from Figures III-1, III-2 and Table III-4, general assessment results are obtained. For indirect assessment data obtained from graduate student survey, they all meet the expected level of achievement for SLO (3.5 mean, 80% of top three assessment scores). However, in the direct assessment data from student performances on exams, SLO 1 and 3 do not meet the mean score criteria, and SLO 1 does not meet the 80% top three assessment score criteria). This shows faculty members have higher expectations than students, especially on student learning outcomes ability to apply knowledge of advanced mathematics, science & engineering, and ability to communicate effectively. Even before this assessment data summary, it has been repeatedly discussed in a faculty meeting about faculty's concern on students' lack of attainment of SLO 1. Not meeting the expected outcome for SLO 3 can be partially understood, since approximately 70% of mechanical engineering graduate students came to the US after completing his or her undergraduate engineering degrees in overseas.

C. Assessment results to be used to improve teaching and learning practices and overall department effectiveness

As it was mentioned previously, this academic year is the very first year collecting any assessment data for the graduate program since they were not required previously. However, faculty members were concerned with the lack of skills such as SLO 1 and 3 for the last two years even before collecting the assessment data. Interestingly, this concern was indicated in the assessment summary. In order to improve these two SLO, there has been a discussion in a faculty meeting to require one additional analytical engineering course in addition to the current required engineering mathematics course (EGME 438 or 538). In addition, the ME Department is currently in plans to create a *graduate seminar* class as one of the required courses for MS degree, to improve students' communication skills. After taking more assessment data next academic year, implementation of actions necessary to improve SLO will be addressed in the following academic year. Then, reassessment of data will be applied in the following year to test whether the implementation of actions did actually improve SLO assessment scores (*closing the loop in the assessment cycle*).

D. Quality indicator as evidence of effectiveness/success other than SLO

Another indicator other than the SLO as evidence of effectiveness or success identified by the department is *Graduate Written Comprehensive Exam*, which students typically take towards the end of their graduate program. Students choose and declare 5 mechanical engineering courses to be tested, of which at least 3 must be 500 level graduate classes. This open book

exam runs for a total of 3 hours, and students must answer 1 out of 2 questions from each of the five courses. Students must obtain 67% composite score to pass the written comprehensive exam. Students may repeat the exam two more times in subsequent semesters if they fail the exam in the first attempt. This ***written*** comprehensive exam started last semester (Fall 2015), and results for the last two semesters should be much improved. In the fall semester, only 4 out of 8 students passed the exam, and this semester (Spring 2016), only 14 out of 25 students passed.

E. Mechanical Engineering Department does not offer courses and programs via technology (online) or at off campus sites and in compressed schedule.

IV. Faculty

A. Full Time Equivalent Faculty (FTEF) allocation to the department; tenure density

The Department of Mechanical Engineering currently has 10 full-time tenured and tenure-track faculty members. Among the full-time faculty members, 3 are tenured and 7 are tenure-track. There are 2 full professors, 1 associate professor and 7 assistant professors in the department. Because of increased number of student enrollment, the department is expected to continuously hire more tenure-track faculty members in the near future. The current faculty members are very well qualified to cover a whole range of mechanical engineering sub-disciplines, including thermos-fluid sciences, dynamics, control, design and manufacturing, and mechatronics. Faculty vitae will be available in the Appendix VII.

B. Priorities for additional faculty hires

The Department of Mechanical Engineering is seeking priorities for additional hires in the area of biomedical or manufacturing engineering in the near future. 70% of our graduates pursue the area of design and manufacturing, and with the increase in demand for biomedical device engineering, it is necessary to hire faculty members in these areas. The design and manufacture of medical devices are critical to meeting the needs of a growing and aging population. Orange County is widely recognized as the nation's hub for biomedical devices, with dozens of biomedical device companies in proximity to Cal State Fullerton. Orange County boasts one of the nation's highest densities of biomedical and medical device related industries. These firms increasingly recruit employees locally. Career and employment opportunities are abundant in this biomedical-tech cluster (Orange County Community Investment Division). As an industry that creates high wage jobs for thousands of Californians, the success of the medical device industry is crucial for the state's economy as well as that of OC. According to the Bureau of Labor Statistics (BLS), biomedical engineers, including medical device engineers, will see one of the fastest rates of growth in all engineering occupations in the near future, with a 23% increase in jobs expected from 2014-2024 (Bureau of Labor Statistics). Demand for more technologically advanced medical equipment is rising, and manufacturers will rely on the expertise of medical device engineers to meet it. The lowest-paid 10% of biomedical engineers earned $52,680 in 2014, while the highest-paid 10% earned $139,350 that year. The opportunity to contribute positively to the medical and healthcare future can be a source of satisfaction in this profession.

C. Role of full-time or part time faculty and student assistants in the department's curriculum and academic offerings

Typically, full-time faculty as a whole, makes all curricular decisions in faculty meetings, and department chair makes course offerings, typically after consultation with faculty members. For the fall 2015 semester, 29 courses were taught by full-time faculty, while 34 courses were taught by part-time faculty. In spring 2016, full-time faculty taught 27 courses, part-time

faculty taught 36 courses, while one laboratory course was taught by a graduate student (also known as teaching associate) to support the courses. As one can see, there has been more courses taught by part-time faculty in recent semesters, since the rate of full-time faculty hiring could not catch up with the rate of student enrollment growth. The ME Department has hired two additional tenure track faculty members starting fall 2016 semester. Therefore, the tilt of balance will shift more towards full-time faculty. The ME Department will hire more tenure track faculty members in the near future to account for rapid student enrollment.

D. Mechanical Engineering does not have Special Sessions self-support programs.

V. Student Support and Advising

A. Graduate student advisement

Graduate student advising is typically done by the graduate program advisor of the department. The very first advising is conducted immediately following the mandatory graduate student orientation. Students are informed of all the University policies during this first advising session. Before students complete 13 units of graduate coursework, they must complete a study plan with the graduate program advisor, listing all 10 courses (30 units) they plan to take for their degree requirement. They must also pass the **English Writing Proficiency (EWP)** Test, or take an upper division writing course, in lieu of the EWP Test, by the completion of the study plan. After the study plan is approved by the Office of Graduate Studies, students will receive a classified standing. For students who are on academic probation, the graduate program advisor carefully monitors the student's academic progress, and if necessary, recommends students to take special a workshop offered by the Office of Graduate Studies. Each graduate student meets with the graduate program advisor approximately three to four times before the completion of their degree.

B. Opportunities for students with research and internships

Each semester graduate students participate in a career fair event, specifically tailored to students of College of Engineering and Computer Science (ECS). This is where many students obtain internships. Each career fair is represented by over 30 local industries in Orange County and southern California, ranging from companies such as Boeing, Raytheon, Applied Medical, Covidien, and Western Digital. In addition, research or project is done primarily with the full-time faculty of the mechanical engineering department. In recent years, there has been flurry of activities of student-faculty research. Many resulted in research which are indicated in faculty CV in the Appendix of this Self Study Report.

VI. Resources and Facilities

A. Itemization of state and other resources received by the department in the last 5 years.

The Table below lists resources received by the department during the last 5 years.

Table VI-1. Department Resources Received

Year	State Support ($)	Faculty Startup ($)	Grants/Contracts ($)	Development ($) (includes in-kind gifts)
2010-2011	60,963.10	50,000.00	0.00	3,644.94
2011-2012	63,530.61	30,000.00	0.00	11,976.15
2012-2013	72,750.70	122,000.00	271,711.00	66,804.00
2013-2014	40,725.06	0.00	0.00	204,245.00
2014-2015	74,696.06	120,000.00	50,000.00	192,156.00
TOTAL	312,665.53	322,000.00	321,711.00	478,826.09

B. Facilities/equipment used by the department such as laboratories and computer classrooms; prioritization of needs for the future

The ME Department classrooms/laboratory facilities occupy 10 rooms, with a total of approximately 17,500 square feet of total space. Plus there are three smaller rooms equipped with computers and access to the Internet that are assigned as student project. Most classrooms used by the ME students have a capacity 30 to 70 students. There have been several classroom upgrades that include "Smart Classroom" features. This type of classroom features high tech multimedia equipment and instructional computer that include DVD player, multiple projectors, speakers and the Internet access. Instructors can communicate interactively with students through computers in near real time. Recent classroom renovations such as Room CS-304 (Smart Classroom with 48 Dell computer stations), Room E-201 (Figure VI-1, Smart Classroom with dual projectors and 70 student capacity), and Room CS-309 (Figure VI-2 Smart Classroom with 40 Dell computer stations) are where many of mechanical engineering courses are held.

Figure VI-1. Smart Classroom E-201

Figure VI-2 Computer Aided Design Classroom CS-309

Computer-Aided Design Laboratories

The Computer-Aided Design Labs (Rooms CS-304, CS-309) are used in several courses. It supports students' studies on modeling, analysis, simulations, and design of systems or components. In addition to being available for regular courses, the lab is accessible for work on student projects. The labs are continuously updated with top-of-the-line workstations and latest versions of industry-standard software. See Criterion 4, Section B for a complete description of the CS 304 and 309 Computer Labs.

Engineering Machine Shop

There are many undergraduate laboratories (strength of materials lab, fluid and thermal laboratory, dynamics & control laboratory, and power & energy lab) that will not be listed here since these are predominantly used by undergraduate students for analysis of experiments. Graduate students on the other hand utilizes machine shops to actually synthesize mechanical components through the Engineering Machine Shop. It is well equipped with conventional metal working machines and woodworking capabilities. Staffed by a full-time machinist experienced in prototype as well as production processes, the Machine Shop provides fabrication tools and hands-on experience to ME students through design and team projects. New additions to the machine shop include six CNC machines by Haas that worth more than $290,000. These machines include two TL-1 models (conventional/CNC lathes - Figure VI-3), two TM-2 models (conventional/ CNC mills), one SL-20 (turning Center: lathe with auto tool changer) and one VF-3 model (vertical machining center: 5-axis milling machine). Figure VI-4 shows the TL1, TM2, and VF-3 CNC machines. These machines introduce students to production manufacturing technology and prepare them to consider many facets of machining that could not be taught using conventional machines. In addition, students create prototypes using the existing 3D printer to realize a model before heading to actual manufacturing of the project (Figure VI-5).

Figure VI-3 Haas TL-1 Conventional/CNC Lathe

Figure VI-4 Haas TL-1 Conventional/CNC Lathe

Figure VI-5 System Rapid Prototyping Machine

With the mechanical engineering student enrollment tripling in the last five years (both undergraduate and graduate students), a need for more computer rooms and project spaces are becoming ***vital***. Currently, the available research space for faculty and students are becoming

very limited due to rapid enrollment rise accompanied by increased faculty number. Because the campus is landlocked, no easy solution is visible in the near future.

C. Current library resources for the department and needs in the future

Designed to facilitate the delivery of recorded knowledge and information in support of instruction and faculty research, the Library serves as the hub of the University's information and instruction network. The Library also participates in the University's instruction programs and shares its commitment to lifelong learning of students. The University Library's website (http://www.library.fullerton.edu) serves as a gateway to information about library resources and services and is a vital component of the Library's extensive instruction program.

Equipment and Technology

Pollak Library holds just over 1,350,000 volumes and provides access to a wide variety of electronic content, including over 200 databases and nearly 200,000 ebooks. Databases of particular interest to Computer Sciences and Engineering include:

- ACM Digital Library
- Engineering Village
- IEEE Xplore
- Web of Science
- ScienceDirect
- SpringerLink Journals
- OmniFile full Text Mega
- Academic Search Premier
- Access Science
- Compendex
- Wiley Online Library

The Library also utilizes the Summon discovery service which can be accessed through our Basic Search. Summon provides users with access to thousands of journals including many in the fields of Computer Science and Engineering.

Library Facilities

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. A service desk staffed by the Reference Team (librarians and library staff) and Information Technology staff is located on the first floor to assist users with research needs and to provide technical support. Wireless access and docking stations are available throughout Library North and Library South. Electronic resources for the visually disabled are also available.

The Library maintains a number of print and electronic book collections for College of ECS as follows:

Pollak Library print and electronic book collections for College of ECS	
	Current collection holdings
Engineering: Call numbers T - TP	24,099
Chemistry: Call number QD	5,383
Math & Computer Science: Call number QA	22,809
Physics: Call number QC	10,494
Technology: Call number TS	1,591
TOTAL	**64,376**

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

Pollak Library journal collections for College of ECS	
	Current collection holdings
Engineering and Computer Science (including all subcategories, some of which are included below)	7124
Civil Engineering	1004
Information Technology and Computer Science	1797
Electrical Engineering	875
Mechanical Engineering	**451**

VII. Long-term Plans

A. Summary of department's long-term plan

As a long term plan, the department wishes to: 1) recruit more highly-qualified diverse faculty; 2) promote more efficient ways in reallocating the current landlocked research space to support externally funded research; 3) create more financial support for graduate students by providing funding or teaching opportunities within the department; 4) diversify and our teaching and research areas as well as systematically improving the learning assessment strategies to help graduate students to fully contribute in the industry; 5) establish the department as one of the top choices for master's program in mechanical engineering in Orange County and southern California.

B. Long-term plan and how it implements the University's mission, goals and strategies

The long term plan of the department listed above is directly aligned with the University's and the Mechanical Engineering Department's mission and goals. The first long term plan directly aligns with University's Goals and Strategies I: Ensuring the preeminence of learning through recruit and retain a highly-qualified and diverse staff and faculty. The second long term plan aligns closely with University's Goals and Strategies III: Enhancing scholarly and creative activity by supporting faculty research and grant activity that leads to the generation, integration and dissemination of knowledge. The third long term plan follows the University's Goals and Strategies V: Creating an environment where all students have the opportunity to succeed by providing efficient and effective financial aid system. The fourth long term plan matches well with University Goals and Strategies I: Ensuring the preeminence of learning through recruit and retain a highly-qualified and diverse staff and faculty. The fifth long term plan aligns well with University Goals and Strategies II: Providing high quality programs that meet the evolving needs of our students, community and region.

C. Evidence used to measure the department's results in pursuit of its goals

The evidence of faculty productivity through teaching and research, increased financial support for students, and increased enrollment number will be used to measure the department's results in pursuit of the goals. All of these data can be monitored regularly to assess the state of the department.

D. Developing a long-term budget plan in association with the goals and strategies

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 Cal State system differs from how budgeting is done in several 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 Cal State 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 (Full Time Equivalent Students) 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. The allocations within CSUF start with historical data and precedence. This means that in a given fiscal year, the College of Engineering and Computer Science will receive at least what it received the previous year. There have been, however, variations to such allocation during the recent recession. Whereas, the university is funded at an SFR of 20.4, the College of ECS is funded at an SFR of approximately 17.1. The needs of the program to recruit faculty representing sub-disciplinary areas such as thermal systems, controls, manufacturing and engineering design are also taken into consideration during the allocation of funds. The dean negotiates with the central administration for positions based on these factors and distributes faculty positions to different programs. Such an approach has worked as far as faculty positions are concerned. Operational expense and equipment budget does not follow the same pattern. It is also recognized that engineering disciplines require resources beyond the standard FTES model, especially to support maintenance and upgrading of laboratories. In addition, a portion of student fees go to each department each year to help to support routine, ongoing instructional costs such as equipment repairs and replacement, supplies, and special enrichment opportunities (e.g., outside speakers, workshops, and seminars). Funds from miscellaneous course fee can be used to purchase laboratory supplies, instructional equipment and classroom materials. Operationally, the department spends down the miscellaneous course fee first and preserves the general operating funds (with fewer restrictions on spending) for other purposes such as faculty travel. The Department's OE&E budget allocation from the college each year has been sufficient to provide for student graders or student assistants as needed for large lecture classes (>40 students) or large lab classes (>20 students) where there is heavy grading.

However, with the declining proportion of funding that comes from the State of California, it has become necessary to seek supplemental funding in other areas. Previous Director of Development for College of ECS, Mr. Hart Roussel, has been successful in acquiring external funding and in-kind equipment donations to help support various student projects, especially senior design projects. The Dean's discretionary funds have helped major capital projects such as the renovation of E-201 classroom and CS-309 and CS-304 ME Computer Laboratories. The significant improvements in the College Machine Shop also have come from the dean's funds. The department was also successful in receiving over $50,000 over the past two years for Instructionally Related Activity (IRA) from Associated Students Inc., to support expenses for senior design projects and for travel to enter national competitions. Without question, more creative externally funded program or research must be accompanied to align the mechanical

engineering department to fulfilling the mission of our University and continue the momentum of student success that the campus has infused. The biggest struggle that the department is currently faced lies in finding more research space for faculty to generate external grants. Although finding sufficient funding to support costly engineering programs is always a challenge, the combination of State and various sources of non-state outside support has been adequate to provide a quality education for ME students.

APPENDIX II. GRADUATE DEGREE PROGRAMS

Table 5. Graduate Program Applications, Admissions, and Enrolled

Academic Year	# Applied	# Admitted	% Admitted	# Enrolled	% Enrolled
2010-2011	138	79	57	35	44
2011-2012	157	85	54	26	31
2012-2013	133	81	61	28	35
2013-2014	246	116	47	33	28
2014-2015	465	365	78	203	56

Table 6-A. Graduate Program Enrollment in FTES

Academic Year	Enrollment in FTES
2010-2011	9.6
2011-2012	14.8
2012-2013	16.6
2013-2014	15.6
2014-2015	35.4

Table 6-B. Graduate Program Enrollment in Headcount

	Headcount Majors		
Academic Year	Master's	Total	FTES per headcount
2010-2011	54.5	54.5	.56
2011-2012	55.5	55.5	.58
2012-2013	60	60	.61
2013-2014	65	65	.59
2014-2015	163.5	163.5	.54

Table 7. Master's Degrees Awarded

All Master's Enrolled in:	Headcount	% Graduated within 3 years	% Graduated in 4 years	% Graduated in 5 years	% Graduated in 6 years plus 7 year persistence
Fall 2010	28	46.43	57.14	60.71	60.71
Fall 2011	18	77.78	88.89	88.89	88.89
Fall 2012	23	78.26	78.26	78.26	78.26
Fall 2013	24	50	50	50	50
Fall 2014	52	0	0	0	0

Table 8. Master's Degrees Awarded

Academic Year	Degrees Awarded
2010-2011	21
2011-2012	15
2012-2013	24
2013-2014	25
2014-2015	26

APPENDIX III. FACULTY

Table 9. Faculty Composition

Year	Tenured	Tenure Track	Sabbaticals at 0.5	FERP at 0.5	Lecturers	FTEF Allocation	FTES Target	Actual FTES
2010-2011	3	1	1	1	8	6.2	11.8	11.8
2011-2012	3	2	0	1	7	7.7	18.2	18.2
2012-2013	3	4	0	1	5	9.3	20.5	20.5
2013-2014	2	4	0	1	7	12.0	19.4	19.4
2014-2015	2	6	0	0	9	19.4	44.2	44.2

APPENDIX IV. RESOURCES

Table 10. Department Resources Received

Year	State Support ($)	Faculty Startup ($)	Grants/Contracts ($)	Development ($) (includes in-kind gifts)
2010-2011	60,963.10	50,000.00	0.00	3,644.94
2011-2012	63,530.61	30,000.00	0.00	11,976.15
2012-2013	72,750.70	122,000.00	271,711.00	66,804.00
2013-2014	40,725.06	0.00	0.00	204,245.00
2014-2015	74,696.06	120,000.00	50,000.00	192,156.00
TOTAL	312,665.53	322,000.00	321,711.00	478,826.09

APPENDIX IV. FACULTY CURRICULUM VITAE

Faculty CV are provided starting next page.

Full-Time Faculty

Name & Academic Rank

***Andy Bazar**, Professor*
Mechanical Engineering

Education

Ph.D., Industrial Engineering, North Carolina State University, 1974
M.S., Industrial & Systems Engineering, University of Southern California, 1972
B.S., General Engineering, Abadan Institute of Technology, 1965

Academic Experience

California State University, Fullerton, 1990 - Present, Full Time
Professor, Department of Mechanical Engineering, 1997 - Present
Dean, School of Engineering and Computer Science, 1990 - 1997
California Polytechnic State University, Pomona, 1983-1990,
Department Head, Department of Industrial and Manufacturing Engineering
California State University, Fresno, 1978-1983.
Wichita State University, 1974-1978.

Non-academic Experience

Executive Director, Foundation for the Advancement in Manufacturing Education, 1997-1998
Five years industrial experience and 12 major industrial and governmental consulting projects, 1965-1990

Certification or Professional Registration

Professional Engineer (PE), State of California

Current Membership in Professional Organizations

American Institute of Aeronautics and Astronautics (AIAA) until 2013

Honors and Awards

None in the past five years
Many during the 1965-1998 period, including:
Invitation to Vietnam by the Vietnam Ministry of Education and Training for presentation on engineering education in the U.S., 1996. National Educator of the Year, Society of Manufacturing Engineers (SME), 1990. Various awards by several professional societies.
Keynote speaker at the NSF Engineering Education Innovator's Conference, 1997.
Under the auspices of NSF visited German research institutions, universities and industry to discuss and exchange information on the most recent manufacturing technologies, summer 1997.

Service Activities

Taught 22 courses in the Mechanical Engineering Department at CSUF

Developed new courses: EGME 350: Living and Working in Space, EGME 418: Space and Rocket Engineering

Chair of Department Faculty Search Committee

Chair of Department Personnel Committee 2013-2014

Mechanical Engineering Department's Master's Oral Exam Committees

Mechanical Engineering Department's M.S. Thesis Committees

Panelist, Manufacturing Education Panel of National Science Foundation, Design and Manufacturing Grantees Conference, Monterey, Mexico, January 6, 1998.

"FAME and the Concept of Teaching Factory", presented at the National Coalition for Advancement of Manufacturing (NACFAM) meeting, Wyndham Hotel, Los Angeles, California, January 12, 1998.

"FAME: A Model Industry-Government-University Partnership -- Institutionalizing the Success of SCCEME" (with Richard Williams), presented at the NSF Engineering Education Innovators' Conference, April 8, 1997, Arlington, Virginia.

"Southern California Coalition for Education in Manufacturing Engineering" (with Karl Grote) Ho Chi Minh City, University of Technology, Vietnam, August 5-9, 1996.

"Engineering Education in the United States", invited presentation at Vietnam's Ministry of Education and Training, University of Technology, August 6-7, 1996, Vietnam.

Reviewer for engineering books and manuscripts for McGraw-Hill, Prentice Hall, John Wiley & Sons, and the Oxford University Press

Principal Publications and Presentations (Past 5 years)

None in the past 5 years

Space Pioneers, book manuscript, in progress.

75 papers, presentations, and technical reports, 1965-1998

Most Recent Professional Development

Regularly attend national expositions and seminars in the Southern California area.

Visited several major universities, industrial plants, and national expos (Fall 2010)

Works on book manuscript

Full Time Faculty

Name & Academic Rank
***Sagil James**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, University of Cincinnati, Cincinnati, Ohio, 2015
M.S., Mechanical Engineering, University of Cincinnati, Cincinnati, Ohio, 2010
B.Tech, Mechanical Engineering, National Institute of Technology Calicut, India, 2005

Academic Experience
California State University Fullerton, Assistant Professor, 8/2015-Present, Full Time

Non-academic Experience
Larsen and Toubro Limited, Mumbai, India, Product Development Engineer, 08/2005-8/2007, Full Time

Certification or Professional Registration
None

Current Membership in Professional Organizations
None

Honors and Awards
Research Fellowship, University of Cincinnati, 2013
Best Poster Award, Graduate Poster Forum, University of Cincinnati, 2013
University Graduate Scholarship, University of Cincinnati, 2007-2012
Graduate Research Assistantship, University of Cincinnati, 2007-2014

Service Activities
Faculty Search Committee, 12/2015-Present
Reviewer, Journal of Manufacturing Processes, 10/2015-Present

Principal Publications and Presentations (Most important from past 5 years)

1. **S. James**, and M.M. Sundaram, "A Study on the Vibration Induced Transport of Nano Abrasives in Liquid Medium", Powder technology, 2014
2. **S. James**, and M.M. Sundaram, "Modeling of Tool Wear in Vibration Assisted Nano Impact-machining by Loose Abrasives", International Journal of Manufacturing Engineering, vol. 2014, Article ID 291564, 8 pages, 2014, doi:10.1155/2014/291564
3. **S. James**, and M.M. Sundaram, "Molecular Dynamics Simulation Study of Tool Wear in Vibration Assisted Nano Impact-machining by Loose Abrasives", Journal of Micro and Nano-Manufacturing, 2014
4. **S. James**, and M.M. Sundaram, "Modeling of Material Removal Rate in Vibration Assisted Nano Impact-machining by Loose Abrasives", Journal of Manufacturing Science and Engineering, International Journal of Manufacturing Engineering, 2014, doi:10.1115/1.4028199
5. **S. James**, L. Blake, and M.M. Sundaram, "Modeling and Experimental Verification of Nano Positioning System for Nanomanufacturing" International Journal of Manufacturing, Materials and Mechanical Engineering, 2013, Volume 3, Issue 4, Pages 1-13
6. **S. James**, and M.M. Sundaram, "A Molecular Dynamics Study of the Effect of Impact Velocity, Particle Size and Angle of Impact of Abrasive Grain in the Vibration Assisted Nano Impact- machining by Loose Abrasives", Wear, 2013, Volume 303, Issue 1, Pages 510-518
7. **S. James**, and M.M. Sundaram, "A feasibility study of Vibration Assisted Nano Impact-machining by Loose Abrasives using Atomic Force Microscope", Journal of Manufacturing Science and Engineering, December 2012 - Volume 134, Issue 6, Pages 061014 (1-11)
8. M. M. Sundaram, **S. James,** and K.P Rajurkar, "Exploratory Study of Nano Ultrasonic Machining Process" Poster, Workshop on Nano and Micro Manufacturing on May 23, 2013, Dearborn, Michigan
9. **S. James**, and M.M. Sundaram, "Study of Vibration Assisted Nano Impact-Machining by Loose Abrasives (VANILA) Process" 2013 Graduate Poster Forum at University of Cincinnati, Best poster award
10. M. M. Sundaram, **S. James,** and K.P Rajurkar, 2012, "Vibration Assisted Nano Machining By Loose Abrasives", Presented at the CIRP-2012 Collaborative Working Group meeting on Hybrid Processes held at Paris on Wednesday 25th January 2012

Most Recent Professional Development (Past 5 years)

New Faculty Training Program at CSUF, 8/2015-5/2016
Setting up the Advanced Manufacturing Laboratory on Campus, 12/2015-Present
Attended National Science Foundation Day, Pasadena, CA, 2016
Attended AHSIE Grantsmanship Institute, CSUF, 2015
Attended EPICS Model for Community-Engaged Design for University and K12 Students workshop, Northridge, CA, 2015

Full Time Faculty

Name & Academic Rank
***Salvador Mayoral**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., University of California, Irvine, Mechanical and Aerospace Engineering, 2013
M.S., University of California, Irvine, Mechanical and Aerospace Engineering, 2010
B.S., University of California, Irvine, Aerospace Engineering, 2008
B.S., University of California, Irvine, Materials Science Engineering, 2008

Academic Experience
California State University Fullerton, Assistant Professor, Starting August 2014, Full Time
California State University Fullerton, Adjunct Professor, March 2014-Present, Part Time
University of California Irvine, Teaching Assistant, January 2011 - June 2012, Part Time

Non-academic Experience
Sonendo, Inc, Laguna Hills, CA, R&D Engineer II, April 2013 - November 2013, Full Time
Sonendo, Inc, Laguna Hills, CA, R&D Consultant, September 2012 - March 2013, Part Time

Certification or Professional Registration
None

Current Membership in Professional Organizations
American Institute of Aeronautics and Astronautics, 2008-present
Society of Automotive Engineers, 2007-present
American Society of Mechanical Engineers, 2014-present
American Society of Advancing Chicano/Hispanic and Native Americans in Science, 2015-present

Honors and Awards
Recipient of the 2008 Western Region Award of the Sigma Gamma Tau
Recipient of the 2008 UCI Sigma Gamma Tau Award
President of Sigma Gamma Tao Aerospace Engineering Honor Society
Recipient of the Parker Hannifin Scholarship
Recipient of Chancellor's Excellence Scholarship

Service Activities
Mentor: CSUF Graduate Student/Faculty Mentoring Program, 2014 – present
Co-adviser to senior design projects: Titan UAV, Titan Rover, Formula SAE, and Titan X Rocket, 2014 – present
Faculty Adviser: CSUF chapter of the American Institute of Aeronautics and Astronautics, 2015 – present
Faculty Adviser: Student Aerospace Society, 2014 – present
Faculty Adviser: Society of Unmanned Ariel Vehicle Engineers

Advisory Board for the Certified Quality Engineer for Boeing, 2014
Student mentor in the AGEP Summer Competitive Edge program, 2010

Principal Publications and Presentations (Most important from past 5 years)

1. Vo, T., Purohit, K., Nguyen, C., Biggs, B., Mayoral, S., and Haan, J.L., "Formate: an Energy Storage and Transport Bridge between Carbon Dioxide and a Formate Fuel Cell in a Single Device," ChemSusChem. Vol. 8, 22 ed., pp. 3853-3858, 2015.
2. Khader, S.Z. and Mayoral, S., "Development of an Anechoic Wind Tunnel," *Accepted*: Acoustical Society Meeting, Salt Lake City, UT, May 23-27, 2016.
3. Piacenza, J., Mayoral, S., Lin, S., Won, L., and Grooms, X., "Understanding the Impact of Occupancy Trends in Sustainable Housing Designs," *Accepted*: ASME International Design Engineering Technical Conference & Computers & Information in Engineering Conference," Charlotte, NC, Aug. 21-24, 2016.
4. Mayoral, S. and Papamoschou, D., "Prediction of Jet Noise Shielding with Forward Flight Effects," AIAA-2013-0010, 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, Jan. 7-10, 2013.
5. Papamoschou, D. and Mayoral, S., "Modeling of Jet Noise Sources and their Diffraction with Uniform Flow," AIAA-2013-0326, 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, Jan. 7-10, 2013.
6. Papamoschou, D. and Mayoral, S., "Jet Noise Shielding for Advanced Hybrid Wing-Body Configuration," AIAA-2011-0912, 49th AIAA Aerospace Sciences Meeting and Exhibit, Jan. 4-7, 2011 Orlando, FL.
7. Mayoral, S. and Papamoschou, D., "Effects of Source Redistribution on Jet Noise Shielding," AIAA-2010-0652, 48th AIAA Aerospace Sciences Meeting and Exhibit, Jan. 4-7, 2010, Orlando, FL.
8. Papamoschou, D., and Mayoral, S., "Experiments on Shielding of Jet Noise by Airframe Surface," AIAA-2009-3326, 15th Annual AIAA/CEAS Aeroacoustics Conference, May 10-12, 2009, Miami, FL.

Most Recent Professional Development (Past 5 years)

Will be attending the AIAA Aeroacoustics Conference, Lyon, France, 2016
Will be attending the Acoustical Society Meeting, Salt Lake City, Utah, 2016
Attended SACNAS National Conference, Washington D.C., 2015
Updating the CSUF Wind Tunnel Laboratory
Attended AIAA Aerospace Sciences Meeting, Orlando, FL, 2010 & 2011
Attended AIAA Aeroacoustics Conference, Miami, FL, 2009

FULL TIME FACULTY

Name & Academic Rank
***Hossein Moini**, Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, University of California, Santa Barbara, 1986
M.S., Mechanical Engineering, University of California, Santa Barbara, 1981
B.S., Metallurgical Engineering, Arya-Mehr (Sharif) University of Technology, Iran, 1978

Academic Experience
California State University, Fullerton, Full Time
Professor, 1997 – Present
Chairman, Department of Mechanical Engineering, 2005 – 2008
Head, Department of Mechanical Engineering, 2000 – 2003
Associate Professor, 1991- 1997 (Early Promotion)
Assistant Professor, 1988 -1991
Lecturer, August 1987-1988
University of California, Santa Barbara
Numerical Analyst, Department of Geological Sciences, 1987
Lecturer, Office of Summer Sessions, 1986

Non-academic Experience: Consulting
Computer Assisted Engineering, Orange, CA: Stress and modal analyses for a vibrating tubular support.
McGaw, Inc., Irvine, CA: Analysis of polypropylene universal set port for IV solution containers.
Beckman Industrial Corporation, Fullerton, CA: Analysis of contact wires for electromechanical switches.
Engineering Design Optimization Inc., Santa Barbara, CA: Analysis of the forward swept wing X-29 aircraft and optimal design of gears.
Rancho Los Amigos Medical Center, Downey, CA: Design of sensors/actuators for the rehabilitation of patients recovering from brain injury.

Current Membership in Professional Organizations
ASME, ASEE, SAE

Honors and Awards
Outstanding Recognition Award as a teacher scholar, CSUF, 1996.
Outstanding Recognition Award for Creative and Scholarly Activity, CSUF, 1998, and 2001.
ASME Industrial Relations Recognition Award, American Society of Mech. Eng., 1991.
Outstanding Faculty Member Award. CSUF's Student Section of ASME, 1990.
American Society of Mechanical Engineers Membership Development Achievement Award, 1989.
Faculty Appreciation and Service Awards for 25 years of dedicated service at CSUF, 2013.

Service Activities

University Faculty Personnel Committee
Extended Education's LabVIEW Advisory Board
Department's Master's Oral Exam Committees
College of ECS Curriculum Committee
Academic Senate University Advancement Committee
Department Search/Selection Committee (2 terms, served as Chairman for 1 term)
Department Personnel Committee and Department Scheduling Committee
College of ECS Associated Dean Selection Committee
Design Review and Evaluation Team for ME Senior Design Projects
Assisted with organizing the SAE Seminar Series on "Future Vehicle Technologies" at CSUF

Principal Publications and Presentations

- *Coombes, S.*, and Moini, H., "Collaborative Program to Reinvigorate the Aerospace Engineer", *Proceedings of the Sixth Annual AIAA Southern California Aerospace Systems and Technology Conference*, Santa Ana, CA, 2009.
- "Automobile Suspension - Evaluating a Mechatronics Approach", a presentation at the Boeing's Electromechancial Packaging TIG meeting, June 2009 and June 2010.
- "Mechatronics", a presentation at the Boeing's Electromechancial Packaging TIG meeting, May 2010.
- "Mechatronics - Enhanced Quality and Shorter Development Cycle, A Presentation to the Boeing's Electro-mechanical Packaging Technical Interest Group, The Boeing Company, October and November 2008; May 2010, and May 2011.

Most Recent Professional Development

- Attended "Harvesting Energy - Entrepreneurial Opportunities in Clean Tech", Caltech/MIT Enterprise Forum. January 2010.
- Attended "Application of Camtasia Software", A workshop by CSUF Faculty Development Center, June 2010.
- Attended live webinar on "Advanced Physical Modeling Techniques Accelerate the Design of Complex Systems", Sponsored by MapleSoft, June 2010.
- Received the Sabbatical Leave Award for Spring 2016, February 2015.
- Attended "Funding for National Science Foundation Programs for Innovation and Commercialization", by Dr. Barbara Kenny, NSF Program Director, Industrial Innovation and Partnerships Division, UCI, March 2016.
- Attended "Research Festival Day", A day-long event, CSUF Office of Research Development, March 2016.
- Attended "Sharpening Your Visual Presentations", A workshop by CSUF Faculty Development Center, April 2016.
- Attended "Quality Online/Hybrid Teaching: Best Practices in Assessing Student Learning & Using Student Feedback in Online/Hybrid Courses", A workshop by CSUF Faculty Development Center, April 2016.
- Attended "Tech Day", A day-long event, Division of Information Technology, April 2016.

Full Time Faculty

Name & Academic Rank
***Chean Chin Ngo**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, University of Oklahoma, Norman, OK, 2006
M.S., Mechanical Engineering, University of Oklahoma, Norman, OK, 1999
B.S., Mechanical Engineering, University of Oklahoma, Norman, OK, 1997

Academic Experience
California State University, Fullerton, Assistant Professor, 1/2011-Present
University of North Dakota, Grand Forks, Visiting Assistant Professor, 1/2008-12/2010
University of Oklahoma, Norman, Postdoctoral Research Associate, 1/2007-12/2007

Non-Academic Experience
None

Certifications or Professional Registration
None

Current Membership in Professional Organizations
Member, American Society of Mechanical Engineers
Senior Member, American Institute of Aeronautics and Astronautics
Member, American Society for Engineering Education
Associate Member, American Society of Heating, Refrigerating and Air-Conditioning Engineers
Member, Electrostatics Society of America

Honors and Awards
Awardee of 2014 Faculty Recognition: Teaching (Exceptional Teaching Effectiveness)
Faculty-Student Research and Creative Activities Grant, 2012
Named one of 11 semi-finalists for 2010-2011 Outstanding Teaching Award at UND
Members of Tau Beta Pi: The Engineering Honor Society, Pi Tau Sigma Honorary Mechanical Engineering Fraternity and Golden Key National Honor Society

Service Activities
Graduate Program Advisor (April 2012 – present)
ABET Co-Coordinator (Fall 2013 – Spring 2014)
Undergraduate Advisor (Summer 2012, 2013, 2014, 2015)
Faculty Advisor, Tau Beta Pi: The Engineering Honor Society, California Chi Chapter

(Fall 2013 – present)
Faculty Search Committee (Spring 2012; Academic Year 2013-2014; 2014-2015; 2015-2016)
Faculty Hearing Panel (Fall 2012 – present)
ECS At-Large Committee (Spring 2016)
Faculty Senate Graduate Education Committee (2015 – present)
Faculty Senate Information Technology Committee (2011 – 2013)
Reviewer for Journal of Electrostatic (2009 – present)
Judge for 2013 ASME District D South – Student Professional Development Conference (Old Guard Poster Competition), California State University, Long Beach, April 27, 2013
Moderator for 2014 Southern California Conferences for Undergraduate Research, Nov 22, 2014

Principal Publications and Presentations (Most Important from Past 5 Years)

Peer-Reviewed Publication

C. C. Ngo and B. A. Alhabeeb, "Numerical Study on Natural Convection from a Row of Heated Pipes Embedded in an Air-Filled Cavity," *Proceedings of the ASME 2016 Summer Heat Transfer Conference*, HT2016-7173 (Accepted).

C. C. Ngo, M. Sanghvi and J. Patel, "Electrohydrodynamics (EHD)-Induced Flow in Different Channel Configurations," *Proceedings of the 5th Joint US-European Fluids Engineering Summer Meeting*, FEDSM2016-7704 (Accepted).

C. C. Ngo, B. A. Alhabeeb and M. Balestrieri, "Experimental Study on Radiant Floor Heating System," *Proceedings of 2015 ASME International Mechanical Engineering Congress and Exposition*, IMECE2015-51938.

C. C. Ngo and C. G. Peinder, "Flow Simulation of Radiant Floor Heating System Using Hele-Shaw Analogy," *Proceedings of 2014 ASME International Mechanical Engineering Congress and Exposition*, IMECE2014-38733.

Presentations

"Experimental Study on Radiant Floor Heating System," 2015 ASME International Mechanical Engineering Congress and Exposition IMECE, Houston, Texas, November 16, 2015.

"Flow Simulation of Radiant Floor Heating System Using Hele-Shaw Analogy," 2014 ASME International Mechanical Engineering Congress and Exposition IMECE, Montréal, Canada, November 20, 2014.

"Power – Pollution = ?," Journey to Success for Asian American & Pacific Islander Families & Students, California State University, Fullerton, California, November 5, 2011.

Most Recent Professional Development (Past 5 Years)

COMSOL Multiphysics 2-Day Intensive Training, San Jose, California, June 3-4, 2014.
ABET Program Assessment Workshop, Portland, Oregon, April 14, 2013.
2013 ABET Symposium, Portland, Oregon, April 12-13, 2013.
NSF Day, University of Southern California, Los Angeles, California, April 12, 2012.

Full Time Faculty

Name & Academic Rank
***Sang June Oh**, Associate Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, Columbia University, New York, NY, 2004
M.Phil., Mechanical Engineering, Columbia University, New York, NY,1996
M.S., Mechanical Engineering, Columbia University, New York, NY, 1993
B.S., Mechanical Engineering, Columbia University, New York, NY, 1991

Academic Experience
California State University Fullerton, Associate Professor, 8/2015 – Present, Full Time
California State University Fullerton, Assistant Professor, 8/2009 – 8/2015, Full Time
California State University Fullerton, Lecturer, 8/2008 – 8/2009, Full Time
Yale University, New Haven, CT, Postdoctoral Associate, 12/2006 – 8/2008, Full Time
Johns Hopkins University, Baltimore, MD, Postdoctoral Fellow, 3/2005 – 9/2006, Full Time

Non-academic Experience
Defense Security Command of South Korea, Military Analyst and Assistant to Naval Captain, 3/1997-6/1999, Full Time

Certification or Professional Registration
None

Current Membership in Professional Organizations
American Institute of Aeronautics and Astronautics
American Society of Engineering Education

Honors and Awards
Awarded 2015 CSUF Faculty Recognition for Outstanding Service
Awarded 2012 CSUF Faculty Recognition for Outstanding Service
Awarded 2011 CSUF Faculty Recognition for Exceptional Teaching Effectiveness
Received 2009 Cal State Fullerton ASI Outstanding Educator of the Year Award
Received Highest GPA Recognition in 1993 among Mechanical Engineering MS Graduates at Columbia University

Service Activities
CSUF Department Chair of Mechanical Engineering, 8/2015 – Present
CSUF Mechanical Engineering Faculty Search Committee (Six times from Fall 2010 to Present)
CSUF Mechanical Engineering ABET Lead Coordinator, 3/2013 – 10/2014
CSUF Graduation Initiative Committee, 12/2012 – 5/2014
CSUF Academic Standards Committee, 8/2011 – Present

CSUF Mechanical Engineering Academic Support Coordinator Search Committee (Spring 2010, Summer 2013)
CSUF Mechanical Engineering Graduate Program Advisor, 9/2010 – 4/2012
Reviewer for Journal of Intelligent and Robotic Systems, 2011 – 2012
Reviewer for Journal of Intelligent Service Robotics, (2013, 2011)
Reviewer for International Conference on Robotics and Automation, 2011
Reviewer for Symposium on Learning Control, 2009
NSF Grant Proposal Review Panel Member, twice in 2009

Principal Publications and Presentations (Most Important from Past 5 Years)
Publications:

- S.J. Oh and J.T. Woscek, "Dynamic Analysis of Rzeppa and Cardan Joints in Monorail Drive Train System," *International Journal of Mechanical Engineering and Robotics Research*, Volume IV, Issue 1, 2015
- J.S. Bailey and S.J. Oh, "Quaternion Attitude Estimation," *International Journal of Engineering, Sciences, and Management*, Volume IV, Issue II, 2014
- S.J. Oh and H. Luong, "Increasing Production Capacity of Heat Shrink Tubing Operation Through Device Reconfiguration," *International Journal of Engineering Sciences and Management*, Volume III, Issue I, 2013
- S.J. Oh and R. Unnikrishnan, "Infusing Assistive Technology in Undergraduate Engineering Education," *Interdisciplinary Engineering Design Education Conference*, Santa Clara, CA, March, 2012. Full paper published in *IEEE Xplore Digital Library*, 2012

Presentation:

- S.J. Oh, "Assistive Technology from Engineering Perspective," *CSUF Assistive Technology Summit*, 2011

Most Recent Professional Development (Past 5 years)
California Engineering Liaison Council Meeting, Irvine, CA, October, 2015
Workshop on Quality Assurance Training for Online Courses (Quality Online Learning & Teaching), Long Beach, CA, January 2015
ABET Accreditation Coordinator, CSUF, March 2013 to October 2014
Workshop on *Frontiers of Additive Manufacturing Research and Education* (NSF Sponsored), Arlington, VA, June 2013
ANSYS Seminar on Design Optimization of Robust and Quiet Electric Machines, Irvine, CA, November, 2013
ABET Accreditation Symposium and Assessment Workshop, Portland, OR, April 2013
NSF Day, University of Southern California, Los Angeles, California, April 2012
ENGAGE Workshop (NSF Funded) -- Engage Students in Engineering, Denver, CO, May-June 2011

Full Time Faculty

Name & Academic Rank
***Joseph Piacenza**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, Oregon State University, Corvallis, OR, 2014
M.S., Mechanical Engineering, Oregon State University, Corvallis, OR, 2010
M.B.A., University of South Florida, Tampa, FL, 2008
B.S., Mechanical Engineering, University of South Florida, Tampa, FL, 2001

Academic Experience
California State University Fullerton, Assistant Professor, 08/2014-Present, Full Time
Oregon State University, Instructor, 01/2014-06/2014, Part Time
Oregon State University, Graduate Teaching Assistant, 8/2011-12/2013, Part Time

Non-academic Experience
Classic Camber Inc., Pinellas Park, FL, Founder/Operator, 04/2003-08/2010, Full Time
Harris Corporation, Melbourne, FL, Mechanical Engineer, 06/2001-03/2002, Full Time

Certification or Professional Registration
None

Current Membership in Professional Organizations
Society of Automotive Engineers (SAE), 2014-Present
American Society of Mechanical Engineers (ASME), 2010-Present
Society of Manufacturing Engineers (SME), 2011-Present

Honors and Awards
- Advisor for Titan Rocket Engineering Society, 3rd place winner at the 2016 CSUF College of Engineering and Computer Science Student Projects Showcase & Awards.
- Co-PI for Instructionally Related Activity (IRA) grant, $36,480, 2015
- PI for CSUF Junior Faculty Intramural grant, $5,000, 2015
- PI for CSUF Faculty Enhancement and Instructional Dev. (FEID) grant, $4,500, 2015
- Advisor for “Best in College” and “Ed Huizinga Innovative Idea Project” award for Formula SAE at the 2015 CSUF College of Engineering and Computer Science Student Projects Showcase & Awards.
- Advisor for 2014-2015 Mac Short Award for SAE UAV team
- Advisor for Formula SAE in the 2014 OESA Generation Auto Video Contest (1st place)
- Admissions committee member for CSUF’s Startup Incubator, 2014-Present
- Mechanical Engineering Outstanding Grad. Teaching Assistant, Oregon State University, 2013-2014
- NSF travel grant, International Mechanical Engineering Congress & Exposition, 2013
- DARPA FANG Mobility Challenge 1 Finalist, 2013

Service Activities

Interim Director of ECS's *Center for Collaborative Research and Prototype Development* (CCRPD), 2015-Present.

Member of the Bachelor of Science in Engineering/Masters of Business Administration Joint Degree Committee.

Member of the Masters in Engineering Management (MEM) Program Committee.

Faculty advisor for *SAE Formula, Baja*, and *Unmanned Aerial Vehicle*, 2014-Present.

Faculty advisor for the *Student Aerospace Society*, and co-advisor for the *Titan Rocket Engineering Society*, 2015-Present.

Principal Publications and Presentations (Most important from past 5 years)

Peer-Reviewed Journal Papers

1. **J. R. Piacenza**, Mir Abbas Bozorgirad, C. Hoyle, and I. Y. Tumer, "*Robust Topology Optimization of Complex Infrastructure Systems*" In Review: Journal of Computer and Information Science Engineering.
2. **J. R. Piacenza**, J. J. Fields, C. Hoyle, and I. Y. Tumer, "*Quantification of Indoor Environmental Quality in Sustainable Building Designs Using Structural Equation Modeling*," In Second Review: Journal of Design Science.
3. B. DuPont, C. Hoyle, **J. R. Piacenza**, R. Azam, S. Proper, E. Cotilla-Sanchez, D. Oryshchyn, S. Zitney, S. Bossart, 2016 "*An Optimization Framework for Decision Making in Large, Collaborative Energy Supply Systems*," Journal of Energy Resources Technology 138(5).

Peer-Reviewed Conference Papers

1. **J. R. Piacenza**, S. Mayoral, S. Lin, L. Won, X. Grooms, 2016 "*Understanding the Impact of Student Energy Usage in Sustainable Campus Housing Designs*", International Design Engineering Technical Conferences, Charlotte, North Carolina (Accepted).
2. W. Walsh, K. Matthys, J. Long, D. Wagner, I. Powell, M. Cox, **J. R. Piacenza**, 2016 "*Identifying Challenges in the Design and Manufacturing of Small Scale Rocket Engines*", International Design Engineering Technical Conferences, Charlotte, North Carolina (Accepted).
3. Bernal, H. Guido, S. Rautus, J. R. Piacenza, 2016 "*Toward an Experimental Approach for Magnetocaloric Refrigeration*", International Design Engineering Technical Conferences, Charlotte, North Carolina (Accepted).
4. J. R. Piacenza, Mir Abbas Bozorgirad, C. Hoyle, and I. Y. Tumer, 2015 "*Robust Topology Optimization of Complex Infrastructure Systems*", International Design Engineering Technical Conferences, Boston, Massachusetts.

Most Recent Professional Development (Past 5 years)

As Co-Principal Investigator: "Mechanical Design Project I and Mechanical Design Project II" (Co-PI: N. Robson), Instructionally Related Activity (IRA), $36,480, awarded April 2015.

As Principal Investigator: "Exploration of Additive Manufacturing Design Strategies for Commercial Food *Applications*" CSUF Junior Faculty Intramural, $5,000, awarded April 2015.

As Principal Investigator: "Exploration of Additive Manufacturing Design Strategies for Commercial Food *Applications*" CSUF Faculty Enhancement and Instructional Development (FEID), $4,500, awarded May 2015.

Full Time Faculty

Name & Academic Rank
***Nina Robson**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., University of California, Irvine, Mechanical and Aerospace Engineering, 2008
M.S., University of California, Davis, Mechanical and Aeronautical Engineering, 2001
M.S., Technical University of Sofia, Robot and Flexible Manufacturing Systems, 1996
B.S., Technical University of Sofia, Electronics and Automation Engineering, 1994

Academic Experience
Assistant Professor, Mechanical Engineering, CSUF, 08/12 – Present, Full Time
Assistant Researcher, Mechanical and Aerospace Engineering, UCI, 11/11 - Present
Adjunct Assistant Professor, Eng. Tech. and Industrial Distribution, TAMU, 09/11 - Present
Assistant Professor, Eng. Tech. and Industrial Distribution, TAMU, 08/09 - 08/11

Certification or Professional Registration
04/12 Advanced Accident Reconstruction, Texas A&M University, TEEX, Bryan/College Station, TX

Current Membership in Professional Organizations
IEEE, ASME, IAJC, ASEE, SWE, CA2RS

Honors and Awards
09/13 "Design and Implementation of a Titan Rover", NASA Sample Return Robot Challenge, coadvising with J. Huang, EE, CSUF, funded by WD, Total: $7,500, (duration: 1 year).
06/13 "Mechanical Design Projects I and II", funded by Instructionally Related Activities, CSUF, Total: $27,750, (duration: 1 year).
09/12 "Development of a Lightweight Semiconductor Wafer Handling Robot Manipulator", funded by Genmark Automation Inc., Total: $4,800, (duration: 1 year).
09/12 "A Design Methodology for Multi-fingered Robotic Hands with Second-Order Kinematic Constraints", (PI on CSUF sub-award Id # 2013-2908, collaboration between CSUF ($271,711), ISU, UCI), funded by NRI/NSF, Total: $850,000, (duration: 4 years).

Service Activities
Int. Assoc. of Journals and Conferences IAJC, Editorial Review Board, member, 04/14 - Present
CSUF Society of Women in Engineering, faculty advisor, 09/13 - Present
CSUF Campus Initiative UNICEF, faculty advisor, 01/13 - Present
CSUF ASME Student Chapter, faculty advisor, 09/12 - Present
CSUF ECS Student Projects/Professional Practice Committee, member, 09/12 - Present
CSUF Faculty Focus Group, Developing CSUF Research Gateway, member, 04/14
ECS faculty member to discuss research at NSF headquarters in Washington DC, 04/14
CSUF Alumni Association Vision & Visionaries, ME Department representative, 02/14
NSF Graduate Research Fellowship Program, panelist, 12/13 - 02/14

Principal Publications and Presentations (Most important from past 5 years)

1. H. S. Moon, **N. Robson**, R. Langari, Approximating Elbow Constrained Hand Paths via Kinematic Synthesis with Contact Specifications, In: *Advances in Robot Kinematics*, ed. J. Lenarcic and O. Khatib, pp. 375-384, ISBN: 3-319-06697-4, Springer 2014.
2. S. Ghosh, **N. Robson**, Development of a One Degree of Freedom Mechanical Thumb Based on Anthropomorphic Tasks for Grasping Applications, In: *Advances in Robot Kinematics*, ed. J. Lenarcic and O. Khatib, pp. 375-384, ISBN: 3-319-06697-4, Springer 2014.
3. **N. Robson**, J. Allington, G.S. Soh, 2014, "Development of Under-actuated Mechanical Fingers based on Anthropometric Data and Anthropomorphic Tasks", *ASME IDETC*
4. H. S. Moon, **N. Robson**, R. Langari, S. Shin, 2014, "An Experimental Study on the Redundancy Resolution Scheme of Postural Configurations in Human Arm reaching with an Elbow Joint Kinematic Constraint", *Second Middle East Conference on Biomedical Engineering*, pp. 257-260, Doha, Qatar.
5. **N. Robson**, J. Skrobarczyk, A. Wendenborn, 2013, "Development of an Assistive Wrist Brace for a Patient with Cerebral Palsy", *Int. Journal of Eng. Sciences and Management*, vol. 4, issue 1, pp. 22-30.
6. J.J. Buchanan, **N. Robson**, J. Ramos, 2013, "Development of the Link between Perception and Action is Supported by Both Observational Learning and Physical Practice Training Protocols*", Journal of Sport and Exercise Psychology,* supplement v. 35.
7. E. Simo-Serra, A. Perez, H. S. Moon, **N. Robson**, Design of Multi-Fingered Robotic Hands for Finite and Infinitesimal Tasks using Kinematic Synthesis, In: *Latest Advances in Robot Kinematics*, ed. J. Lenarcic and M. Husty, pp. 173-181, Springer 2013.
8. **N. Robson**, S. Ghosh, G.S. Soh, 2013, "Development of a Sensor-Based Glove Device for Extracting Human Finger Motion Data used in the Design of Minimally-Actuated Mechanical Fingers", 3rd *IFToMM International Symposium on Robotics and Mechatronics,* Singapore.
9. G.S. Soh, **N. Robson**, 2013, "Kinematic Synthesis of Minimally Actuated Multi-Loop Planar Linkages with Second Order Motion Constraints for Object Grasping", *ASME DSCC Human Assistive Systems and Wearable Robots*, Stanford Univ., Palo Alto, CA.
10. **Robson**, J. Morgan, H. Baumgartner, 2012, "Mechanical Design of the Standardized Ground Mobile Platform SGMP", *Int. Journal of Modern Engineering, IJME M12-S-16*.
11. H. S. Moon, H. Baumgartner, **N. Robson**, 2011, "Toward a 21 Century Crutch Design for Assisting Natural Gait", *Int. Journal of Innov. Tech. and Creative Eng.*, v.8(1): pp.11-20.
12. **N. P. Robson**, J. M. McCarthy, 2010, "Non-Branching Solutions for the Design of Planar Four Bar Linkages Using Task Velocity Specifications", *Int. Journal of Engineering Research and Innovation*, v.2(2): pp.33-42.
13. **N. P. Robson**, J. M. McCarthy, 2010, "Second Order Task Specifications Used in the Geometric Design of Spatial Mechanical Linkages", *International Journal of Modern Engineering*, v.11:pp.5-11.
14. **N. Patarinsky Robson**, J. M. McCarthy and I. Tumer, 2009, "Failure Recovery Planning for an Arm Mounted on an Exploratory Rover*", IEEE Transactions on Robotics,* 25(6), pp. 1448-1453.

Most Recent Professional Development
NSF Career and ABET workshops, ASEE conference, 06/13

Full Time Faculty

Name & Academic Rank
***Haowei Wang**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, Rensselaer Polytechnic Institute, Troy, NY, 2012
M.S., Mechanical Engineering, Rensselaer Polytechnic Institute, Troy, NY, 2009
B.Eng., Thermal Energy and Power Engineering, Southeast University, Nanjing, China, 2008

Academic Experience
California State University Fullerton, Assistant Professor, 8/2012-Present, Full Time

Non-academic Experience
GE Global Research Center, Niskayuna, NY, R&D Intern, Combustion Laboratory, 5/2010-8/2010, Full Time

Certification or Professional Registration
None

Current Membership in Professional Organizations
American Society of Mechanical Engineering, 2012-present
Combustion Institute, 2012-present

Honors and Awards
Research, Scholarship, and Creative Activity (RSCA) Incentive Grant Award, CSUF, 2015
Faculty Scholarly and Creative Activity Award, CUSF, 2015
Energy Innovations Small Grant Award, California Energy Commission, 2014
Faculty Enhancement and Instructional Development Grant Award, CSUF, 2014
Junior/Senior Intramural Research Grant Award, CSUF, 2013

Service Activities
Faculty Search Committee Chair, 2015-2016
Faculty Search Committee, 2013-2015
Continuous Improvement Committee, 10/2013-Present
Master's Students Exam Committee, 10/2012-Present
ABET Course Coordinator for EGME 333 and EGME 407, 3/2013-Present
EPOCHS Faculty/Student Mentoring Program (Enhancing Postbaccalaureate Opportunities at CSUF for Hispanic Students) Committee, 9/2012-4/2013
Undergraduate Advisor, 1/2015-Present
Reviewer for various journals and funding agencies, 2011-Present
Session Chair, Laminar Flames session at the Spring Meeting of Western States Section of the Combustion Institute, Pasadena, CA, 2014
Instructor, Engineering Innovation - A summer program for high school students offered by Johns Hopkins University and CSUF Partnership, 2013

Principal Publications and Presentations (Most important from past 5 years)

Peer-Reviewed Journal Papers

1. Christopher W. LaMorte, **H. Wang**, "Utilizing Laser Cutting, 3D Printing and 3D Scanning to Create an Affordable Fully Interactive Prototype of Full Size Animatronic Figure," *Journal o Engineering and Architecture*, 3(1), 1-9 (2015).
2. S.H. Won, S. Dooley, P.S. Veloo, **H. Wang**, M.A. Oehlschlaeger, F.L. Dryer, Y. Ju, "The Combustion Properties of 2,6,10-Trimethyl Dodecane and a Chemical Functional Group Analysis," *Combustion and Flame*, 161, 826-834 (2014).
3. **H. Wang**, W. J. Gerken, W. Wang, and M.A. Oehlschlaeger, "Experimental Study of the High-Temperature Autoignition of Tetralin," *Energy & Fuels*, 27, 5483-5487 (2013).
4. M.A. Oehlschlaeger, **H. Wang** and M.N. Sexton, "Prospects for Biofuels: A Review," *Journal of Thermal Science and Engineering Applications*, 5(2), (2013).
5. **H. Wang** and M.A. Oehlschlaeger, "Autoignition Studies of Conventional and Fischer-Tropsch Jet Fuels," *Fuel*, 98, 249-258 (2012).
6. S. Dooley, S.H. Won, J. Heyne, T.I. Farouk, Y. Ju, F.L. Dryer, K. Kumar, C.J. Sung, **H. Wang**, M.A. Oehlschlaeger, V. Iyer, T.A. Litzinger, R.J. Santoro, T. Malewicki, K. Brezinsky, "The Experimental Evaluation of a Methodology for Surrogate Fuel Formulation to Emulate Gas Phase Combustion Kinetic Phenomena," *Combustion and Flame*, 159, 1444-1466 (2012).
7. S. Dooley, S.H. Won, S. Jahangirian, Y. Ju, F.L. Dryer, **H. Wang**, M.A. Oehlschlaeger, "The Combustion Kinetics of A Synthetic Paraffinic Jet Aviation Fuel and a Fundamentally Formulated, Experimentally Validated Surrogate Fuel," *Combustion and Flame*, 159, 3014-3020 (2012).
8. S.M. Sarathy, C.K. Westbrook, M. Mehl, W.J. Pitz, C. Togbe, P. Dagaut, **H. Wang**, M.A. Oehlschlaeger, U. Niemann, D. Seshadri, P.S. Vello, C. Ji, F.N. Egolfopoulos, T. Lu "Comprehensive Chemical Kinetic Modeling of the Oxidation of 2-Methylalkanes from C_7 to C_{20}," *Combustion and Flame*, 158, 2338-2357 (2011).

Peer-Reviewed Conference Papers

9. A. Quilala, H. Zazueta, V. Gonzalez, **H. Wang**, Experimental Study of the Effects of Biodiesel on Engine Performance and Emissions, Spring Meeting of Western States Section of the Combustion Institute, Pasadena, CA, (2014)
10. S.H. Won, S. Dooley, P.S. Veloo, **H. Wang**, M.A. Oehlschlaeger, F.L. Dryer, Y. Ju, Quantification of Molecule Structure Impact on Combustion Properties for Synthetic Diesel Fuel: 2,6,10-Trimethyldodecane, 8th US National Technical Meeting of the Combustion Institute, Salt Lake City, UT, (2013)
11. S. Dooley, S.H. Won, S. Jahangirian, Y. Ju, F.L. Dryer, **H. Wang**, M.A. Oehlschlaeger, An Experimentally Validated Surrogate Fuel for the Combustion Kinetics of S-8, a Synthetic Paraffinic Jet Aviation Fuel, American Institute of Aeronautics and Astronautics, 2012-619, 50th AIAA Aerospace Sciences Meeting, Nashville, TN, (2012)

Most Recent Professional Development (Past 5 years)

Submitted Research Proposals to NSF, 2013 and 2015
Attended Combustion Institute conference, Pasadena, CA, 2014
Set up the Combustion Laboratory on Campus, 8/2012-Present
Advisor on Nationally Funded Student Research (NSF and Dept. of Education), 8/2012-Present
New Faculty Training Program at CSUF, 8/2012-5/2013

Full Time Faculty

Name & Academic Rank
***Hope Weiss**, Assistant Professor*
Mechanical Engineering

Education
Ph.D., Mechanical Engineering, University of California, Berkeley, CA, 2012
M.S., Mechanical Engineering, University of California, Berkeley, CA, 2008
B.S., Mechanical Engineering, Cornell University, Ithaca, NY, 2006

Academic Experience
California State University Fullerton, Assistant Professor, 8/2015-Present, Full Time
Milwaukee School of Engineering, Assistant Professor, 9/2012-6/2015, Full Time

Non-academic Experience
Sandia National Laboratory, Livermore, CA, Technical Intern in Multi-physics Modeling & Simulation Department, 8/2004-12/2004 & 06/2005-08/2005

Certification or Professional Registration
None

Current Membership in Professional Organizations
American Society of Mechanical Engineering
American Society for Engineering Education

Honors and Awards
Chang-Lin Tien Fellowship and Block Grant Award, UC Berkeley, 01/2012-06/2012
Block Grant Award, UC Berkeley, 01/2011-06/2011, 06/2011-08/2011
National Science Foundation Graduate Research Fellow (NSF GRFP) 2007 – 2010
Physical Acoustics Summer School Scholarship 07/2008
Graduate Dean's Fellowship, UC Berkeley 08/2006-06/2007

Service Activities
Undergraduate Academic Advisor, 01/2016-Present
Faculty Search Committee, 08/2015-Present
Master's Students Exam Committee, 08/2015-Present

Principal Publications and Presentations (Most important from past 5 years)

1. Yang, Z., **Weiss**, **H. L.,** Traum, M. J. "Gas Turbine Dynamic Dynamometry: A New Energy Engineering Laboratory Module," Proceedings of the 2013 American Society for Engineering Education (ASEE) North Midwest Section Conference, Fargo, North Dakota, October 17-18, 2013.

2. Traum, M. J., Prantil, V., Farrow, W. C., **Weiss**, **H. L.** "Enabling Mechanical Engineering Curriculum Interconnectivity Through An Integrated Multicourse Model Rocketry Project," Proceedings of the 120th American Society for Engineering Education (ASEE) Conference and Exposition, Atlanta, GA, June 23-26, 2013.
3. **Weiss, H. L**., Selvaraj, P., Okita, K., Matsumoto, Y., Voie, A., Hoelscher, T. and Szeri, A. J. Mechanical clot damage from cavitation during sonothrombolysis. *Journal of the Acoustical Society of America*, 133(5): 3159-3175, 2013.
4. **Weiss, H. L**., Selvaraj, P., Okita, K., Matsumoto, Y., Voie, A., Hoelscher, T. and Szeri, A. Mechanisms of thrombolysis acceleration by cavitation. American Physical Society Division of Fluid Dynamics annual meeting, San Diego, CA, 2012.
5. **Weiss, H. L.**, Ahadi, G., Hoelscher, T., Szeri, A. Cavitation damage during sonothrombolysis using high intensity focused ultrasound. Acoustical Society of America biannual meeting, Seattle, WA, 2011.
6. **Weiss, H. L.**, Ahadi, G., Hoelscher, T., Szeri, A. Cavitation damage in thrombi under high intensity focused ultrasound. Biophysical Society annual meeting, Baltimore, MD, 2011.

Most Recent Professional Development (Past 5 years)

New Faculty Training Program at CSUF, 8/2015-present
"How to Engineer Engineering Education", Bucknell University, 06/2013
Summer Institute for Preparing Future Faculty, UC Berkeley 06/2011-07/2011