



**Self-Study Report for
Academic Programs in the
Department of Computer and Electrical Engineering and Computer Science**

Programs	Computer Engineering, Electrical Engineering and Computer Science
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The self-study report covers the following programs in the Department of Computer and Electrical Engineering and Computer Science:

Bachelor of Science Programs

- Bachelor of Science in Computer Science
- Bachelor of Science in Computer Engineering
- Bachelor of Science in Electrical Engineering

Master of Science Programs

- Master of Science in Computer Science
- Master of Science in Computer Engineering
- Master of Science in Electrical Engineering
- Master of Science in BioEngineering

Doctor of Philosophy programs

- Doctor of Philosophy in Computer Science
- Doctor of Philosophy in Computer Engineering
- Doctor of Philosophy in Electrical Engineering

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A. Mission and Purpose of the Programs

The mission of the Department of Computer and Electrical Engineering and Computer Science (CEECS) is to provide high-quality education to our undergraduate and graduate students so that they are well prepared to achieve success in their profession. The objective of our program is to impart strong fundamental and applied knowledge in the three disciplines covered under our program, which are computer engineering, electrical engineering and computer science. We aim to find a balance of adhering to the mathematical and scientific fundamentals of our disciplines while also following their evolution and reflecting them in our offered curriculum and student training. We emphasize critical thinking, problem solving and teamwork; and stress the significance of lifelong learning.

The mission of the CEECS Department is in direct alignment with the mission and vision of Florida Atlantic University (FAU) which is recognized as a university of first choice for

- excellence in undergraduate education and the student experience,
- comprehensive graduate education,
- visionary and globally relevant research; and
- transformative engagement with its global communities.

FAU's Strategic Plan <http://www.fau.edu/provost/files/approved.plan2015.pdf> articulates its vision and mission.

The CEECS Department offers baccalaureate, masters and PhD degrees in each one of its three programs. Regardless of the degree level, our overall educational objective is that our students are ready on graduation

- to contribute to the workforce of the profession, and
- to advance their knowledge and engage in continuous professional development.

These goals can be achieved by conducting research and integrating research results with teaching at all levels.

A.1 Mission and Purpose of the BS Programs

The mission of the BS programs in the Department of Computer and Electrical Engineering and Computer Science is consistent with the mission of the College and the University.

- To produce graduates with a strong grasp of fundamentals and knowledge in technical specialty areas, and an appreciation of the power of collaborative effort applied to problem solving.
- To offer courses and programs which stimulate innovation and enhance the ability of graduates to achieve high levels of professional development and to succeed in a competitive marketplace.
- To conduct research in selected areas and to integrate research results with teaching activities.
- To provide service to the engineering profession and community and forge strategic alliances with other professions.

The programs' purpose is to prepare students to provide students with a sound education in computer and electrical engineering and computer science for careers in the computer and electrical-related industry and academia.

A.2 Mission and Purpose of the MS Programs

The additional mission of the MS programs in the in the Department of Computer and Electrical Engineering and Computer Science is

- To offer graduate courses and programs which stimulate innovation and enhance the ability of graduates to achieve high levels of professional development and to succeed in a competitive marketplace.

The program's purpose is to prepare students to perform basic research, to prepare students for career advancement in industry, and to prepare students for doctoral study in their discipline.

A.3 Mission and Purpose of the PhD Programs

The mission of the PhD programs is consistent with the missions of the baccalaureate and master's programs with the added goal of increased in depth knowledge and understanding of advanced technical topics. We also make it a goal that our Ph.D. graduates will be able

- To teach university courses and conduct original research.
- To conduct independent, translational or original research that makes recognizable positive change in technology and its use for the wellbeing of humanity and the environment.
- To impart an appreciation of the power of collaborative effort applied to problem solving.

The programs' purpose is to prepare students to perform original research in their area of specialization, and to prepare students for successful careers in academic teaching and research and in industrial research.

B. Previous External Reviews

B.1 Undergraduate Programs

The BS programs in the CEECS department were reviewed by the Accreditation Board for Engineering and Technology (ABET) Commission in 2014 and they are all accredited. The CEECS continuous improvement effort has been focused on integrating design into all the BS programs in the Department. Major changes, since the last ABET visit, include extending the engineering design course sequence to include Computer Science students, thus expanding its multidisciplinary aspect, and developing a Computer Science program that is completely online. A detailed discussion of the continuous improvement effort for the BS programs is given in section C.1.3 Continuous Improvement of this report.

C. Academics

C.1 Bachelor of Science Programs

C.1.1 Goals and Student Learning Outcomes

The Department of Computer and Electrical Engineering and Computer Science (CEECS) makes it a goal that within three to five years of graduation, graduates exhibit the following professional characteristics:

- **Career advancement:** They have successfully utilized their education and training in analytical ability, engineering design and development, communication and human interaction to the practice of the profession of computer engineering, electrical engineering and computer science.
- **Professionalism:** They exhibit a commitment to apply ethical standards, and professional and social responsibility in their engineering career.
- **Lifelong learning:** They continue to develop their knowledge and skills toward their graduate education, and/or other professional development that enables them to adapt to technological and cultural changes.

The student outcomes of the undergraduate programs in CEECS, are designed to achieve the following program goals required by ABET:

- a. An ability to apply knowledge of mathematics, science and engineering
- b. An ability to apply design and development principles in conducting experiments, analyzing results, and construction of hardware or software systems of varying complexity
- c. An ability to apply mathematical foundations, engineering or computer science theory in the modeling and design of a system, component, or program to meet desired needs with realistic constraints and tradeoffs
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively

- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

C.1.2 Assessment of Student Learning Outcomes

In 2013, the CEECS Department established an assessment plan for its BS program and the plan has been expanded and improved each subsequent year. The assessment plan and report which form the basis for the current review is for the academic years 2013-2017. The plan articulated specific goals for student learning (learning outcomes), which provide the basis for the assessment of all CEECS instructional programs. For brevity, only results from the most recent academic year are published in this report. Detailed descriptions for other academic years can be found in the FAU IEA database.

Every semester, the CEECS Department conducts an internal evaluation of all its BS courses by analyzing data acquired by the Student Outcome Assessment (SOA) survey designed to measure how well students reach the intended outcomes. Each semester the Program Assessment Committee reviews these forms and recommends, in a report, appropriate corrective actions to the Department Chair. The Chair then reviews this report, presenting to the general faculty changes that are suggested by the report when appropriate. An example of the SOA form is shown in Table 1.

The SOA form has two parts. In the first part, for each outcome, we list the assignments and tests used for assessing an outcome, the results of the direct assessment as well as the instructor's perception of the student performance in terms of the outcome. In the second part, the instructor summarizes continuous improvement plans for the course and recommendations.

Table 1. Sample Derived from the Student Outcome Assessment Form

Student Outcome Assessment (SOA)

COP 2220 – Intro to Programming in C (Fall 2016) T. Sorgente

Part A: Computer Engineering (CE) Program outcome (b) is measured

Total number of students in 2 sections of the class: 187

Program Outcome	Tool	PSG	IP
(b)	Programming Assignments	.3	4
	My programming lab online tool	78.2	
	Lab	80.7	
	Lab quizzes	72.89	
	Exam	76.29	
	Final Exam	64	
	Weighted Average	74	

Explanation of Table 1:

The Program Outcome (b) is the outcome that is being evaluated. It is “An ability to apply design and development principles in conducting experiments, analyzing results, and construction of hardware or software systems of varying complexity.” The assessment tools used are listed in the column Tool. This course shows 6 types of assessment tools. The Percent Satisfactory Grade (PSG) is the percentage of students who received a satisfactory grade on this outcome. In this course, only 0.3% of students were able to show an ability to apply design and development principles on their programming assignments. IP stands for Instructor’s Perception on how well this outcome was achieved. It is on a scale of 5 (very well achieved) to 1 (not achieved at all). The complete form is given in Appendix A.

Part B of the SOA is given in

Table 2. It consists of a brief report of the data of Part A and the instructor's recommendations for improvement. Table 3-Table 5 summarize, for each program, the average over courses of the assessment results of each outcome. Each table is organized to show the average percent of students receiving S in a given outcome and the Average Instructor Perception on how well this outcome was achieved for all the indicated courses. Assessment data before spring 2015 was collected in a different manner therefore it is not included in these tables. However, these can be accessed in the FAU IEA database.

Table 2. Part B of the Student Outcome Assessment Form

PART B: CONTINUOUS IMPROVEMENT:

Analysis:

In this course we measure student achievements of the following outcome:

(b) An ability to apply design and development principles in conducting experiments, analyzing results, and construction of hardware or software systems of varying complexity.

Students had four large programming assignments, 5 smaller programming assignments with quizzes, 10 weeks of My Programming Lab online homework, and 2 exams related to these outcomes, as presented in the Table above.

Instructor's Recommendations:

Students were given smaller programming assignments to practice each new concept covered in the lecture, these assignments were followed by an online quiz. Students were given 10 weekly online, interactive My Programming Lab assignments to further practice concepts learned the prior week in lecture. In addition, students were given four large, more interesting game themed programming assignments help the student practice the skills covered in the lectures. These larger assignments were broken up into 2 submissions, 1 the algorithm and 2, the code. A midterm was given and a cumulative final exam is given at the end of the semester.

This is an introduction to a challenging subject and not all students remain committed to the required effort needed for success in this course.

Additional TA lab hours were provided this semester for walk-in assistance.

Additional TA lab topic sessions were introduced next semester.

Helpful step by step instructions were provided for each of the larger programming assignments in an effort to encourage students to work through the process individually to learn the concepts.

The size of the classes (95 and 92 students) were too large.

The semester began with 187 students and 156 were left in the class to take the final exam, 10 students did not show up for the final exam.

The students who attended class and completed assignments were very successful.

Table 3. BSCE Major Assessment Summary

The average SAO % and average AIP score for the BSCE program for all outcomes
Spring 2015 - Fall 2016

Outcome	Spring 2015			Fall 2015			Spring 2016			Fall 2016		
	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.
(a)	74	84	4	87.5	83.2	3.5	70.3	85	4	53.6	87	4.2
(b)	54.7	75	4.1	66.4	82	4.2	50.4	82	3570	61	80	4
(c)	45.1	90.2	4.1	59.2	90	4.5	47.7	84	4.1	57	83	4.2
(d)	39.2	90.8	4.4	36	95	5	39.6	0.8	4.2	39.2	88.5	4.6
(e)	46	94	4.6	59.2	84.8	4.2	48.1	86	4.2	52.6	80	4.1
(f)	35	91	4.3	32	100	5	38.7	91.1	4.3	31.6	87	4.8
(g)	33.4	92	4	36	98	5	45.5	87.9	4.4	35.8	89	4.5
(h)	49.2	93.2	4.2	60.5	99	4.5	52	91	4.5	43.7	90	4.3
(i)	36.6	94	4.3	32	100	4	40.6	89	4.1	31.6	88	4.1
(j)	58	100	5	32	100	4	22	98	5	31.5	95	5
(k)	42.7	91.7	4.5	33	91	4.3	33.2	85.2	4.2	31.5	90	4

Table 4. BSEE Major Assessment Summary

The average SAO % and average AIP score for the BSEE program for all outcomes
Spring 2015 - Fall 2016

Outcome	Spring 2015			Fall 2015			Spring 2016			Fall 2016		
	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.	Ave Class Size	Ave % Achv	Ave Instr. Pcpt.
(a)	39.4	68	3.8	37	83	4.2	42.6	77	4.5	38	81	4.2
(b)	36.8	83	4	33.6	81	4.1	28.4	81.3		37	77.8	4
(c)	39.6	91	4.5	38	68.4	4	34.7	87.8	4.3	60.2	81.3	4.2
(d)	37.3	86	4.6	26.5	87	5	30	89	4.6	33.7	88	4.5
(e)	36	89	4.1	37.5	91	4.7	33.8	90	4	60.2	84	4.2
(f)	39.5	90	4.7	32	100	5	28.3	89.1	4.8	25.6	88	4.8
(g)	32.6	92	4.1	36	98	5	33.2	88	4	25.6	89	4
(h)	32.6	90	4.3	60.5	99	4.5	33.2	88	4.7	25.6	87	4.5
(i)	32.6	93	4.5	32	100	4	28.3	89	4.5	25.6	90	4.5
(j)	39.5	98	5	32	100	4	33.2	95	4.7	25.6	95	5
(k)	32.6	91	4.3	33	91	4.3	33.2	91	4.2	25.6	92	4.3

Table 5. BSCS Major Assessment Summary

The average SAO % and average AIP score for the BSCE program for all outcomes
Spring 2015 - Fall 2016

Outcome	Spring 2015			Fall 2015			Spring 2016			Fall 2016		
	Ave Class Size	Ave % Achv	Ave Instr. Pcpt	Ave Class Size	Ave % Achv	Ave Instr. Pcpt	Ave Class Size	Ave % Achv	Ave Instr. Pcpt	Ave Class Size	Ave % Achv	Ave Instr. Pcpt
(a)	74	85	4	87.5	83.2	3.5	70.3	85	4	53.6	87	4.2
(b)	43	95	4.7	59.2	84.8	4.2	58.6	84	4.2	63.2	74	4
(c)	43	94.6	4.2	59.2	90	4.5	52.5	82	4	65.5	82	4.1
(d)	27.3	96.6	4.3	36	95	5	51.3	92.2	4.3	44.3	94.1	5
(e)	27.3	94.6	4.3	32	100	5	55.5	97.2	4	32	92	5
(f)	27.2	93.7	4	36	98	5	55	88.6	4.6	38	90	4.7
(g)	49.2	93.2	4.2	60.5	99	4.5	72	96	4.3	56	95	4.5
(h)	26	98.5	4.5	32	100	4	78	98	4	32	95	4
(i)	37.6	95.6	4.6				44.5	85.4	4.5			
(j)	37.7	90.4	4	89	87	4	33	63	2	53	81	4
(k)	57.2	84.5	4	66.4	82	4.2	50.4	82	3.9	61	80	4

C.1.3 Continuous Improvement

Continuous improvement of the academic program may be implemented as large scale curricular changes or as course specific content and delivery. Change takes place due to evolution in science and technology, technological focus, availability of jobs, needs of the technology industry and student demographics. To invoke and implement improvement, we work in a feedback system with input from various sources.

Input from the CEECS Industry Advisory Board is based on the performance of our alumni and is the result of long-term observation. We also learn from the IAB about the required skill sets and knowledge that they desire in their employees; how we should educate the next generation students for next generation technologies and long-term future technological advances that faculty research can lead.

Our short-term improvement in course content, assessment and delivery methods is implemented nearly at a per-term rate and is based on closely scrutinized assessments methods developed in response to ABET demands. The improvement process in the CEECS department is illustrated in Figure 1. Student outcomes provide information derived from student assessments and give us metrics with which we measure our distance from the Program Objectives. They are used to give instructors feedback on how to teach and what to emphasize. Needed changes can usually be implemented next time the course is taught which is usually in one term.

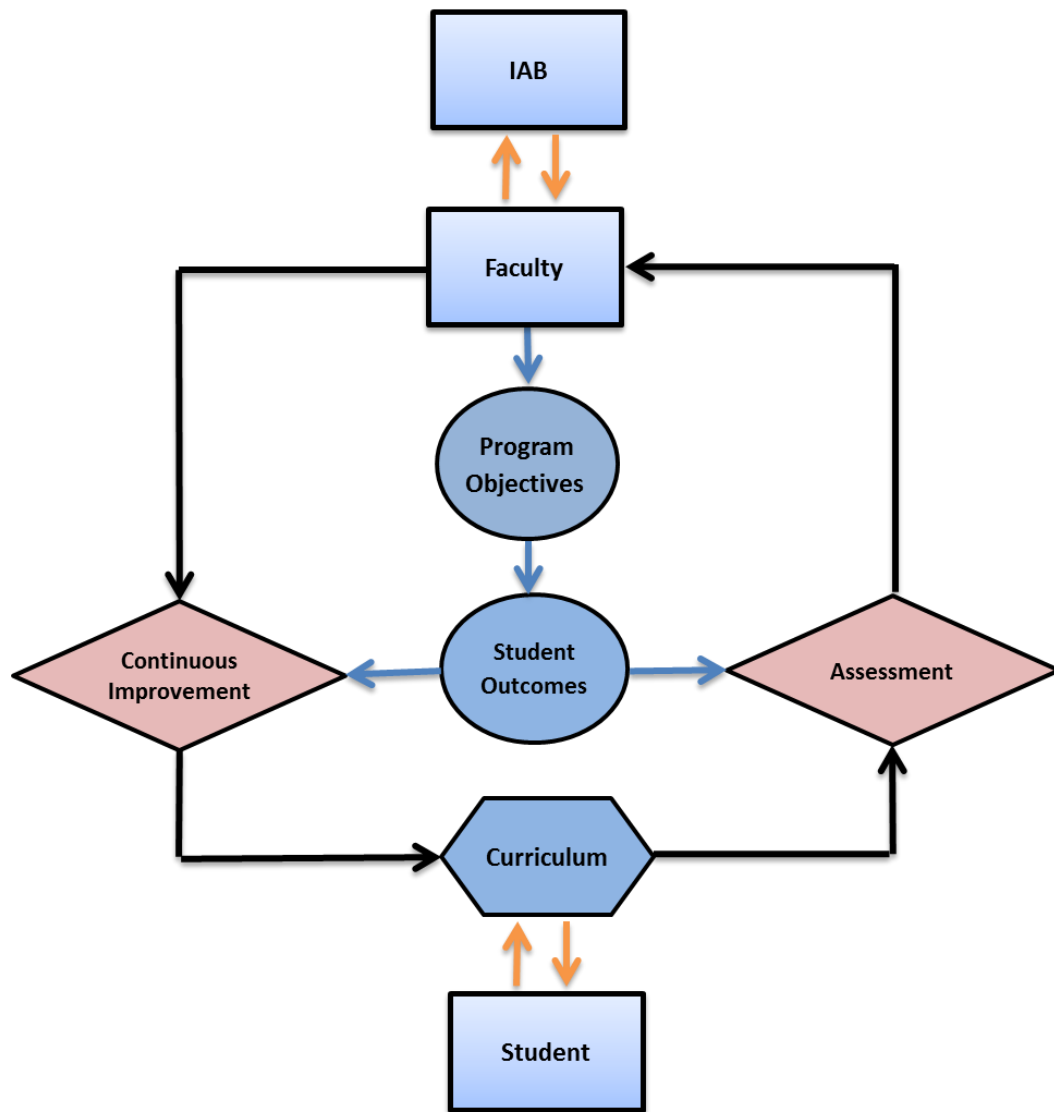


Figure 1. Overall Assessment Scheme

The assessment tools are summarized in Table 6.

Table 6. Assessment Tools and Frequency

Method	Frequency	Comments
Direct Assessment	Every term	Excluding summer terms
Continuous Improvement Review	Every term	Excluding summers. Indicative courses are reviewed in terms of Student Learning Outcomes
SPOT Evaluation	Every term	
CE UG Committee's Assessment	Every month	The committee meets every month excluding summers
Capstone Project Demonstration	Every term	
IAB Survey	Occasionally	The new IAB committee was formed in Spring 2014
EBI Assessment	Every year	Conducted by the college for each program
Exit student meeting	Every term	
Alumni Survey	Occasionally	

Frequency of the Assessment Processes

- The direct assessments, including gathering SAFs, SAOFs, and COAs for indicative courses, are performed each term, excluding summer terms. This is a major component of the Continuous Improvement Review Process by the faculty.
- Continuous Improvement Review in terms of the Student Learning Outcomes, by individual faculty members and under the coordination of the CE Undergraduate Program Committee for indicative courses, is conducted every term excluding summer terms.
- SPOT evaluations are administered every term by the University's Office of Institutional Effectiveness Assessment (IEA) (<http://www.fau.edu/iea/>).
- CE Undergraduate Committee evaluation of individual courses and the entire curriculum is done at least once a term. This is another important component of the Continuous Improvement Review Process by the faculty.
- Senior Project Demonstration is done three times a year. The demonstration is open to public. Students and faculty are given comments and ratings for each project in order to determine the winning capstone projects.
- IAB (employer) and alumni surveys are given occasionally.

- Educational Benchmarking Institute (EBI) assessments are performed annually in the College of Engineering and Computer Science, which includes the assessment of individual programs in the college.
- Exit student meetings with the Chair are conducted every term.

Major continuous improvement effort can be summarized in the following actions taken by the programs:

In the program level, an effort is made to enhance students' design experience and broaden the breath of the curriculum. In our department, during some of the Industry Advisory Board (IAB) meetings, members of the IAB also emphasized the importance of engineering design to industry needs. More specifically, it was pointed out that presently there is a shortage of entry-level engineers who are confident with analog circuit design, RF and mixed signals and systems and embedded system design. It was further pointed out that recent growth in software systems and digital solutions must be balanced with hardware know-how. Another important force that prompted the department to attempt to integrate more design components into its curriculum was ABET accreditation. In addition, the department has since encouraged students to participate in both hardware and software design competitions both in and outside campus.

The capstone design course sequence offered at our department consists of two 3-credit courses: Engineering Design I and Engineering Design II, which have been taken by both Electrical and Computer Engineering Students.

Engineering Design I covers technical topics such as Interfacing Microcontrollers, Sensors and Actuators, PCB Design, and 3D Printing, as well as nontechnical topics that include Innovation and Creativity, Brainstorming, Design Principles, Patents and Intellectual Properties, and Oral and Written Communication Skills. The latter topics also contribute to the engineering program educational outcomes specified by ABET.

Engineering Design I starts with a 6-week mini-project which prepares students to work with a multi-disciplinary team to complete a specified task using available resources. The objective of the exercise is to train the students to have the concepts of constraints, time management, team spirit, planning and execution, among others. An example of a completed project is a "singing" ball which is passed around in a "musical chairs" style until it stops playing music. The person who has the ball is "penalized" to either sing or act in front of the group. Another example is a lost-and-found system, which embodies a set of tracking devices that can be used to sound an alarm in order to locate missing items throughout a house. To promote innovation and creativity, a competition is conducted as part of the class where students vote on the winning project.

The main focus of Engineering Design I is that of developing a proposal for the main design project. At the beginning of the semester students are asked to engage with local industry, healthcare professionals, and elderly and ailing people in order to identify needs that may be addressed in the senior design. To encourage students to identify real-world issues in assistive

technology and to promote social awareness, a related assignment, shown in Table 7, is given at the beginning of the semester. A number of brainstorming sessions are then held to encourage students first to explore and then to narrow down the topics. Project pre-proposals submitted by the students are reviewed by the instructor and selected for further development. Throughout the semester every team is required to make presentations to update the faculty on the progress of their proposals. A final formal oral presentation and a written project proposal are required at the end of the semester. The proposal must contain the problem statement, the rationale of the project, market survey, alternate designs and decision using a design matrix, design details (hardware, software, interfacing, and challenges), implementation plan including deliverables, Gantt and personnel charts, and a budget. The teams implement their project through the succeeding semester in Engineering Design II.

Table 7. A Sample Assignment that Promotes Social Awareness

Assignment 1
Propose a design project to help people with disabilities in the following areas:
<ul style="list-style-type: none">• Students who have learning disabilities• Persons who have severe physical or mental disabilities• Elderly who suffer Alzheimer's and other illnesses
You need to interview with caretakers to get first-hand information on what are needed, what are available in the market, and what you are proposing to do. Provide references for the ideas and devices that you think are worth mentioning.
The format for this essay is strictly required:
<ul style="list-style-type: none">• Title and name• Who have you contacted? Give name and contact information of the person(s).• Give a statement on the objective of the design, and followed by a description on why the design is needed.• Write a section on what is available on the market.• Write a section summarizes the functionalities of your design with only verbal descriptions. You may itemize these functionalities.• References

In Engineering Design II, each team completes the project proposed in Engineering Design I. There are three semester milestones, each reached after approximately five weeks. At every milestone, each team delivers a presentation to the entire class to demonstrate its progress to date, emphasizing the challenges and potential bottlenecks encountered. As a guideline, the first milestone marks the time detailed designs with iterations of synthesis and analysis are finalized,

and materials have been acquired. At the second milestone, every group must demonstrate a working prototype, and identify remaining issues, including barriers for the completion of the project. The climax of the design is reached at the last milestone, when every project must be completed including a project report, which documents implementation details, including testing and evaluation results and discussions for future improvements. At this time, all design projects are demonstrated to the public. Projects are evaluated based mainly on the following three categories: Creativity, Challenge and Completeness (3Cs).

Observers of the projects may include university faculty and staff members, end-users, and industry representatives. Results of the evaluations are used for two distinct purposes: 1. Assign a grade for the project, and 2. Rank the projects for Capstone Project Awards. Only instructors' evaluations are considered for grading the projects. Criteria to evaluate each design project have been evolving over the years based on inputs from students, faculty and employers. In addition, evaluation results from the general public, including students, are used for choosing award winning projects. Since all the students and other people who observe the projects are involved in the process, and since the students from the design class know that their final products may benefit the society, and since there is a competition, students in the design class tend to be more enthusiastic about their endeavor. Since 2015, design projects from all engineering departments have been exhibited at the FAU Tech Runway, a public-private partnership to foster technology innovation and start-ups. Each time, more than 500 people from different sections of the local community attended the half-day event. Representatives of the local industry expressed high acclaim for the presented projects.

A major curriculum change in the recent years is to require Computer Science students to take a design course sequence (EGN4950C and EGN4952C) together with their peers majored in Electrical and Computer Engineering. The change is made possible by eliminating a mandate two semester foreign language courses. Starting this academic year, the design course sequence becomes a truly interdisciplinary endeavor.

Another systematic effort is to improve students' educational experience in the middle years. As is well documented, early days engineering curriculum based on having the freshmen and sophomore years full of mathematics and sciences background, created severe retention problems. Important as it is that new coming engineering students interact with engineering professors from the first semester, it is equally important to continue that interaction in almost every single semester that follows. Some of this interaction may unavoidably involve electrical and computer engineering courses that are mostly analysis and almost no design, such as the first circuits course. However, the more design we persistently have the students do the more positive the interactions become. Sophomore level design-rich courses are Logic Design and Intro to Microprocessors. Both require only an introductory computer programming course (such as Intro to C) as prerequisite and both do not have excessive math prerequisites. This allows these two computer engineering courses to be taken at the sophomore year. Offering design at the sophomore year involves proper curriculum planning and undergraduate advising. Clearly,

students should be encouraged to take the required programming course either at the end of the freshmen year or at the beginning of the sophomore year. The programming course itself can have only mild design contents. However, it meets the goal of continuous interaction between engineering instructors and TAs and second year engineering students.

Using Electrical Engineering as an example, many junior level electrical engineering basic courses (such as Circuits 2, Electronics 1, Electromagnetic Fields and Waves and Linear Systems) are analysis-rich but typically have very small design contents. This is well compensated by having the junior level electrical engineering students pursue electrical engineering lab courses (such as Electronics Lab 1 and Electronics Lab 2, as we call them at FAU). Other late junior year EE courses, such as Control Systems 1, Introduction to DSP and Communication Systems have significant design contents.

C.1.5 Lower Level Prerequisite Courses

The lower level state-approved prerequisite courses for all the BS programs include math courses (up to Calculus III and Differential Equations for the CE and EE programs and up to Calculus II, discrete math for the CS program) and basic science courses (Engineering Physics I and II with labs, as well as Chemistry with lab?). For more details, please refer to the University catalog: <http://www.fau.edu/academic/registrar/FAUcatalog/engineering.php#cse>

C.1.6 Limited Access

The BS programs in CEECS are not limited access programs; they are open to all students admitted to FAU. The College has been approved for differential admission requiring minimum 3.6/4 GPA and 3/4 in the required math courses (Pre-calculus and higher). It will be implemented in Fall 2018.

C.1.7 Admission Criteria

Incoming BS majors in CEECS must meet the admissions criteria established by the University as described in the University catalog:

<http://www.fau.edu/academic/registrar/FAUcatalog/admissions.php#ug>

C.1.8 Enrollment Information

Headcount for all BS majors in the CEECS department over the recent years is given in Table 8.

Table 8. BS Enrollment Data

Major	Semester					
	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017
	#	#	#	#	#	#
Computer Engineering	152	150	160	155	169	173
Computer Science	255	265	318	394	452	418
Electrical Engineering	180	186	181	179	193	186

C.1.9 Average Class Size and Faculty/Student Ratio

The enrollment data for the fall semester of each year for the undergraduate majors in the CEECS department is downloaded from the FAU departmental class schedule page. The average class size data in the fall semesters in the CEECS department over the last five years is given in Table 9. There was a jump in the class size due to two reasons. The first reason is that the enrollment in the department, especially in the computer science program, increased dramatically due to the successful CAPTURE program. The second reason is the reduced funding for adjunct instructors in the department, therefore the number of sections offered for large enrollment courses such as Introduction to Programming in C, Foundations of Computer Science and Introduction to Logic Design have been reduced in recent years.

Table 9. Average Undergraduate Class Size

Semester	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017
# per class	35	34	41	48	48

The current faculty size of the CEECS Department is 42 full-time faculty members, 3 of which are full-time instructors. The remaining 39 faculty members include the Associate Dean for Academic Affairs of the College of Engineering and the Department Chair.

During the 2015-2016 academic year, there were 916 undergraduate (Computer Engineering, Computer Science, and Electrical Engineering combined) students enrolled in our department

(IEA Assessment Dashboard, excluding pre-professional students) and 226 graduate students. This gives a student- faculty ratio of about 28.

C.1.10 Curriculum

The curricula of the programs in CEECS are detailed in the University catalog:

<http://www.fau.edu/academic/registrar/FAUcatalog/engineering.php#cse>

Outlines of the individual programs are tabulated in the next subsections.

BS in Computer Science Curriculum

Degree Requirements

The minimum number of credits required for the Bachelor of Science degree with major in Computer Science is 120 credits. This degree will be awarded to students who satisfy all admission and degree requirements for the department. The tables given below outline the program curriculum.

Specific Degree Requirements	
General Education (1)	
Foundations of Written Communication	6
Foundations of Society and Human Behavior	6
Foundations of Global Citizenship	6
Foundations of Humanities	6
Subtotal	24

Mathematics and Science (1) (Lower Division)		
Calculus with Analytic Geometry 1 (3)	MAC 2311	4
Calculus with Analytic Geometry 2 (3)	MAC 2312	4
General Physics for Engineers 1 (3)	PHY 2048	3
General Physics Lab 1 (3)	PHY 2048L	1
Physics for Engineers 2 (3)	PHY 2044	3
General Physics Lab 2 (3)	PHY 2049L	1
Discrete Mathematics (3)	MAD 2104	3
Science (4)		4
Additional Math Elective		3

Subtotal	26
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Core Courses

All students must take the following core courses, which total 43 credits:

Computer Science Core (2)		
Introduction to Programming in C	COP 2220	3
Foundations of Computer Science	COP 3014	3
Introduction to Logic Design	CDA 3201C	4
Data Structures and Algorithm Analysis*	COP 3530	3
Introduction to Internet Computing	COP 3813	3
Computer Operating Systems	COP 4610	3
Stochastic Models for Computer Science	STA 4821	3
Introduction to Database Structures	COP 3540	3
Introduction to Microprocessor Systems	CDA 3331C	3
Formal Languages and Automata Theory	COT 4420	3
Design and Analysis of Algorithms	COT 4400	3
Principles of Software Engineering	CEN 4010	3
Engineering Design 1	EGN 4950C	2
Engineering Design 2	EGN 4952C	3
Subtotal		43
Computer Science Electives (4)		
Free Electives (4)		6
Total		120

Computer Science Electives

To satisfy the computer science (CS) elective requirement, all students must take 9 credits chosen from Computer Science and Computer Engineering upper-division courses that are not in the above CS core (students can take EGN 4040 and ISM 4133 for CS elective credit). In order to provide advanced content, as well as programming experience in a language other than C/C++, one of these elective courses must be: COP 4020, COP 4593, COP 4703 or CAP 4630. Students seeking a specialty may consider concentrating on one of the following groups of courses; additional courses from these groups may be taken as other electives (note that 5000-level or 6000-level CS courses can be taken as CS electives).

Internet Technology		
Introduction to Data Communications	CNT 4104	3
Introduction to Data and Network Security	CNT 4403	3
Component Program with .NET	COP 4593	3
Applied Database Systems	COP 4703	3
Web Services	COP 4814	3

Applications		
Introduction to Artificial Intelligence	CAP 4630	3
Computer Animation	CAP 4034	3
Mobile Apps Projects	COP 4655	3

Software Engineering		
Software Engineering Project	CEN 4910	3
Python Programming	COP 4045	3
Object-Oriented Design and Programming	COP 4331	3
Advanced Systems Analysis and Design	ISM 4133	3

System Performance		
Introduction to Queueing Theory	MAP 4260	3
Modeling and Simulation of Systems	CAP 4833	3
Introduction to Computer Systems Performance Evaluation	CEN 4400	3

System Programming		
Programming Languages	COP 4020	3
UNIX System Programming	COP 4604	3

Computer Architecture		
Structured Computer Architecture	CDA 4102	3
Introduction to VLSI	CDA 4210	3
CAD-Based Computer Design	CDA 4204	3

The following courses may be taken as computer science electives. The group classification will be designated when offered:

Topics in Computer Science	COT 4930	1-3
Topics in Computer Science	COT 5930	1-3
Directed Independent Study	COT 4900	1-3

Additional Math Elective

One of the following mathematics courses must be taken and must be passed with a grade of "C" or better:

Calculus with Analytic Geometry 3	MAC 2313	4
Numerical Methods	MAD 3400	3
Differential Equations 1	MAP 2302	3 or
Engineering Math 1	MAP 3305	3
Introduction to Queueing Theory	MAP 4260	3
Matrix Theory	MAS 2103	3
Modern Algebra	MAS 4301	3

BS in Computer Engineering Curriculum

The minimum number of credits required for the Bachelor of Science degree with major in Computer Engineering is 124 credits. The tables given below outline the program curriculum.

Specific Degree Requirements	
General Education (1)	
Foundations of Written Communication	6
Foundations of Society and Human Behavior	6
Foundations of Global Citizenship	6
Foundations of Humanities	6
Subtotal	24

Mathematics and Science (Lower Division)		
Calculus with Analytic Geometry 1 (2)	MAC 2311	4
Calculus with Analytic Geometry 2 (2)	MAC 2312	4

Calculus with Analytic Geometry 3 (2)	MAC 2313	4
Engineering Mathematics 1	MAP 3305	3
General Physics for Engineers 1 (2)	PHY 2048	3
General Physics Lab 1 (2)	PHY 2048L	1
Physics for Engineers 2 (2)	PHY 2044	3
General Physics Lab 2 (2)	PHY 2049L	1
Science (5)		4
Subtotal		27

Computer Engineering Core Courses (3)		
Foundations of Computer Science	COP 3014	3
Introduction to Logic Design	CDA 3201C	4
Introduction to Microprocessor Systems	CDA 3331C	3
Introduction to Programming in C	COP 2220	3
Data Structures and Algorithm Analysis	COP 3530	3
Computer Operating Systems	COP 4610	3
Principles of Software Engineering	CEN 4010	3
Engineering Design 1	EGN 4950C	3
Engineering Design 2	EGN 4952C	3
Discrete Mathematics	MAD 2104	3
Stochastic Models for Computer Science	STA 4821	3
Subtotal		34

Computer Engineering Electives (3) (select four of the following)		
Structured Computer Architecture	CDA 4102	3
Introduction to Computer Systems Performance Evaluation	CEN 4400	3
Introduction to Embedded System Design	CDA 4630	3
Introduction to VLSI	CDA 4210	3
Introduction to Data Communications	CNT 4104	3
Computer Network Projects	CNT 4713	3
Mobile App Projects	COP 4655	3

CAD-Based Computer Design	CDA 4204	3
Subtotal		12

Other Engineering (3)		
Fundamentals of Engineering (2)	EGN 1002	3
Circuits 1	EEL 3111	3
Electronics 1	EEE 3300	4
Electronics Laboratory 1	EEL 3118L	2
Subtotal		12

Technical Electives (as approved by advisor) (4), (5)	15	
Total	124	

BS in Electrical Engineering Curriculum

The minimum number of credits required for the Bachelor of Science degree with major in Electrical Engineering is 128 credits. The tables given below outline the program curriculum.

Specific Degree Requirements		
General Education (1)		
Foundations of Written Communication	6	
Foundations of Society and Human Behavior	6	
Foundations of Global Citizenship	6	
Foundations of Creative Expressions	6	
Subtotal		24

Mathematics and Science (2) (Lower Division)		
Fundamentals of Engineering (2)	EGN 1002	3
Calculus with Analytic Geometry 1 (3)	MAC 2311	4
Calculus with Analytic Geometry 2 (3)	MAC 2312	4
Calculus with Analytic Geometry 3 (3)	MAC 2313	4
Introduction to Programming in C	COP 2220	3
C for Engineers	EEL 2161	3
General Physics for Engineers 1 (3)	PHY 2048	3

General Physics Lab 1 (3)	PHY 2048L	1
Physics for Engineers 2 (3)	PHY 2044	3
General Physics Lab 2 (3)	PHY 2049L	1
Science (7)		4
Subtotal		33

Electrical Engineering Core (4)		
Circuits 1	EEL 3111	3
Circuits 2	EEL 3112	2
Introduction to Logic Design	CDA 3201C	4
Electronics 1	EEE 3300	4
Analysis of Linear Systems	EEL 4656	3
Stochastic Models for Computer Science	STA 4821	3
Electronics Laboratory 1	EEL 3118L	2
Electronics 2	EEE 4361	3
Electromagnetic Fields and Waves	EEL 3470	4
Introduction to Microprocessor Systems	CDA 3331C	3
Electronics Laboratory 2	EEL 4119L	3
Engineering Design 1	EGN 4950C	3
Engineering Design 2	EGN 4952C	3
Communication Systems 1	EEL 4512	3
Control Systems 1	EEL 4652	3
Control Systems Lab	EEL 4652L	1 or
Communication Systems Lab	EEL 4512L	1
Introduction to Digital Signal Processing	EEE 4510	3
Subtotal		50

Electrical Engineering Electives (5)		12
Electrical Engineering or Technical Electives (5) (6)		6
Mathematics Elective (5)		3
Subtotal		21
Total		128

C.1.11 Internships, Practicum, Study Abroad, Field Experiences

Working with industry is not new to the CEECS Department, which has a very successful NSF sponsored think-tank like Industry University Cooperative Research Center (I/UCRC) directed by Dr. Borko Furht. The Center for Advanced Knowledge Enablement ([CAKE](#)) has been and continues to be a vehicle where faculty members work on problems of interest to the industry membership. The process keeps the practical work of many participating faculty members relevant to the needs of the industry, and engages both graduate and undergraduate students. In 2017, Dr. Ankur Agrawal established the FAU site of the NSF funded I/UCRC Center for Health Organization Transformation ([CHOT](#)), joining a compendium of six other universities and numerous health care industries. CHOT member institutions conduct research supporting major management, clinical, and information technology innovations in healthcare.

C.1.12 Pedagogy/Pedagogical Innovations

The CEECS department has been involved in a number of pedagogy/pedagogical innovations programs recently. Most notable ones are the CAPTURE program, the HSI program, the eLearning program, and the ILHP program, which are outlined below.

Capture Program

The Computer Accelerated Pipeline To Unlock Regional Excellence ([CAPTURE](#)) program is a collaborative effort between Florida Atlantic University (FAU), Broward College (BC) and Palm Beach State College (PBSC), to identify appropriate courses that will count toward an AA or an AS degree and then transfer to either a Bachelor of Science in Computer Science (BSCS) or a Bachelor of Science in Computer Engineering (BSCE) degree program at FAU. The goal of the collaboration is to enhance the quality of advising, instruction and educational opportunities for students to help them graduate and go on to have successful careers in computer-related fields.

HSI Title V Program

In 2016, FAU, partnered with Palm Beach State College and Broward College, received a large HSI grant from the U.S. Department of Education to address the projected gap between computer science, computer engineering and electrical engineering occupations and workers with enough skills to fill these positions in South Florida. The objective of this grant is to increase the number of degrees awarded to Hispanic and low-income students in these fields, and to facilitate the rate of successful student post-degree computer science, computer engineering and electrical

engineering/STEM (science, technology, engineering, and mathematics) employment or graduate school enrollment. The HSI program information is available at <http://eng.fau.edu/research/hsi/>

Online Computer Science Program

The Bachelor of Science in Computer Science provides students with a quality online education. Computer science incorporates concepts from mathematics, engineering and psychology. Through this program, students will gain knowledge in the following areas:

- Software design and development, data structures and operating systems
- Designing and executing solutions to technical problems
- Effective communication
- Proficiency in math and scientific principles relevant to computer science
- Understanding of the human context in which computing activities take place.

For more details on the newly being developed program, please click the following link: <http://fauelearning.com/fauonline/portfolio-items/computer-science-bs-online/>

Honors Program

The College of Engineering and Computer Science has established the Innovation Leadership Honors Program (ILHP) for outstanding engineering and computer science undergraduate students. Students will be invited to join the program after they have completed their Pre-Professional Engineering Program and have met a set of ILHP eligibility requirements.

The Objectives of the ILHP are to provide top engineering and computer science students with an enhanced background and training in innovation, entrepreneurship, leadership and communication; and to assist top engineering and computer science students develop effective leadership capabilities through exposure to real-life industry relevant experiences that require independent decision making, well established goals and objectives, and valuable risk-assessment skills.

For more details on the ILHP program, please click the following link: <http://www.innovate.fau.edu/>

C.1.13 Institutional Contributions

The department offers CGS 1570 Computer Applications 1 and CGS 1572 Computer Applications 2 to students from other colleges as service courses. In addition, the department

also offers COP 2220 Introduction to C, CDA 3201C Introduction to Logic Design, EEL 3111 Circuits I as service courses to other programs within the college.

C.1.14 Student Profile

The tables given in this section provide data for student profile, including student diversity and gender for all the majors in the CEECS department. Note that the data provided in these tables do not include those students who are still in the pre-professional program. It is clear that minorities, including African Americans and Hispanic students, represent well in the student body in all the BS majors in the department. At around 50%, it is clear that minority students are well represented in the CEECS department. Nationally, minority accounts for about 16% of engineering student body (NSF). Furthermore, our female population in each of the BS programs is around 10%-18%, which is low and commensurate with the national average for the CE (9.2%, IEEE) and EE (12.4%, IEEE) majors and about the same level for CS major (18%, US News).

Table 10. BS Student Profile (I)

		<u>Semester</u>				
		Fall, 2012	Fall, 2013	Fall, 2014	Fall, 2015	Fall, 2016
<u>Major</u>	<u>Ethnicity (2010 and beyond)</u>					
Computer Engineering	Asian	10	7	6	6	12
	Black or African American	24	22	24	26	30
	Hispanic or Latino	52	43	50	48	53
	American Indian or Alaska Native	1	1	1	1	1
	Two or more races	2	4	3	4	9
	Nonresident alien	5	7	7	8	8
	Native Hawaiian or Pacific Islander	1	1	1	1	.
	White	57	65	67	58	56
	Race and ethnicity unknown	.	.	1	3	.
	Total	152	150	160	155	169
Computer Science	<u>Ethnicity (2010 and beyond)</u>					
	Asian	20	22	30	42	55
	Black or African American	43	45	67	69	69
	Hispanic or Latino	59	62	89	111	123
	American Indian or Alaska Native	.	.	.	1	1
	Two or more races	3	7	10	16	15

	Nonresident alien	9	6	8	13	13
	White	120	116	110	141	174
	Race and ethnicity unknown	1	7	4	1	2
	Total	255	265	318	394	452
Electrical Engineering	Ethnicity (2010 and beyond)					
	Asian	16	17	14	16	17
	Black or African American	45	44	41	38	39
	Hispanic or Latino	42	47	43	46	52
	American Indian or Alaska Native	1
	Two or more races	1	3	5	4	3
	Nonresident alien	8	9	6	6	10
	White	66	62	69	68	70
	Race and ethnicity unknown	1	4	3	1	2
	Total	180	186	181	179	193

Table 11. BS Student Profile (II)

		Semester				
		Fall, 2012	Fall, 2013	Fall, 2014	Fall, 2015	Fall, 2016
		#	#	#	#	#
Major	Gender					
Computer Engineering	Female	23	22	14	14	17
	Male	129	128	146	141	152
	Total	152	150	160	155	169
Computer Science	Gender					
	Female	24	27	47	59	58
	Male	231	238	271	335	394
	Total	255	265	318	394	452
Electrical Engineering	Gender					
	Female	10	14	15	22	28
	Male	170	172	166	157	165
	Total	180	186	181	179	193

C.1.15 Advising Procedures

The Department of Engineering Student Advising in the college advises students that have earned thirty or more college credit hours. All students must see a college advisor at least once each semester. During the initial visit, the advisor interviews the student to get valuable

information about the student's life and academic history. The student is informed about the degree requirements and a plan of study is created.

After the initial visit, an advisor evaluates a student's performance and progress in their degree program. The student's plan of study is modified by the advisor if necessary. Students who are identified as at-risk or are having difficulties progressing satisfactory must meet with a college advisor multiple times during the term. During these meetings, strategies are developed that help the student be successful. Each student in the college is closely monitored until all degree requirements have been met, and they are ready to graduate.

Advisors provide career advice and guidance through referrals to professors, the Career Development Center, the Department of Engineering Student Services, and directly to companies. When a student requests information about their career, an advisor is able to give an overview of the field. This information is usually based on jobs trends given by departmental information, the US Government Jobs website, university and government studies, and career and employment literature. Sometimes companies contact advisors directly about internships and job opportunities that are available for students at their companies. Some departments work directly with a group of companies to identify students who qualify for job openings.

C.1.16 Retention and Graduation Rates

Data for retention and graduation rates of all the BS majors in the CEECS department are given in the tables given in this section. Note again that the data provided in these tables do not include those students who are still in the pre-professional program.

The table below illustrates the retention rates (2nd year retention/persistence rates of students with a Grade Point Average (GPA) above 2.0 - FL SUS Metric #5) of the BS majors in the CEECS department. Every year, students from the college pre-professional program move to the BS programs in the CEECS department. Therefore, the number of students in the pre-professional program is reduced steadily. On the other hand, the number of FTIC students in the department increases, therefore its retention rate reduces accordingly.

Table 12. Retention Rate for All BS Majors

Class Level	# of students/% Retained After 1 Year				
	2011	2012	2013	2014	2015
Pre-professional	124/55.0%	126/47.0%	96/33.0%	18/22.0%	6/83.0%
Last Known Department	77/96.0%	117/93.0%	109/87.0%	129/84.0%	176/78.0%

The table given next shows the graduation rates (6th year graduation rates for First-Time-In-College (FTIC) students - FL SUS Metric #4) of all the BS majors in the CEECS department. It is clear that our graduation rate improved significantly over the last couple of years.

Table 13. Graduation Rates for All BS Majors

Cohort	% Graduated Within 6 Years
2007	35.4%
2008	37.6%
2009	48.4%
2010	48.5%

Table 14 given next shows the number of BS degrees awarded by the BS programs (FL SUS Metric #6: Degrees in STEM fields) in the CEECS department.

Table 14. Degrees Awarded for All BS Majors in the CEECS Department

Program & Concentration	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
BSCS Computer Science	65.00	88.00	91.00	89.00	129.00	145
BSCE Computer Engineering	21.00	31.00	45.50	26.00	40.00	31
BSEE Electrical Engineering	27.00	42.00	45.00	49.00	54.00	49
Subtotal	113.00	151.00	181.00	164.00	223.00	225

C.1.17 Licensure Rates (if applicable)

The Department of Computer and Electrical Engineering and Computer Science does not collect or receive licensure data for undergraduate CE, EE and CS majors, since it is usually not required for students of CE, EE and CS majors to obtain a license as a prerequisite for employment.

C.1.18 Placement Rates/Employment Profile

The Department of Computer and Electrical Engineering and Computer Science does not collect or receive placement data for undergraduate CE, EE and CS majors. However, we are aware that many of our graduates have been hired by a variety of companies locally and nationally. In addition, a number of graduates have also continued their graduate studies upon receiving their degrees.

C.1.19 Student Recruitment

The main recruitment effort is through two important programs: the CAPTURE program and the HSI program. The CAPTURE program recruits qualified transfer students from local state colleges. And the HSI program concentrates on students of Hispanic origin. Engineering design projects are annually shown to public through Tech Runway, which serves as another instrument to market our programs.

C.2 Master of Science Programs

C.2.1 Admission Criteria

Incoming MS students for all majors in CEECS must meet the admissions criteria established by the University as described in the University catalog

<http://www.fau.edu/academic/registrar/FAUcatalog/engineering.php#cse>

The following is a summary of the admissions criteria:

Applicants for admission to the master's program are approved by the University upon the recommendation of the department. All applicants must submit with their applications the official transcripts from previous institutions attended and have official GRE scores forwarded to the University. Applications for admission are evaluated on an individual basis. As a minimum, applicants are expected to meet the following requirements.

1. A baccalaureate degree in Computer Science or a related field (Students without a computer science background will be expected to take additional courses);
2. At least a 3.0 (of a 4.0 minimum) GPA in the last 60 credits attempted prior to graduation;
3. A combined score (verbal + quantitative) of at least 295 on the Graduate Record Examination (GRE). GRE scores more than five years old are normally not acceptable. The GRE requirement is waived for any student who has a baccalaureate degree from FAU's Department of Computer & Electrical Engineering and Computer Science with a GPA of at least 3.25 (out of a possible 4.0) in the last 60 credits attempted prior to graduation; and
4. International students from non-English-speaking countries must be proficient in written and spoken English as evidenced by a score of at least 500 (paper-based test) or 213 (computer-based test) or 79 (Internet-based test) on the Test of English as a Foreign Language (TOEFL) or a score of at least 6.0 on the International English Language Testing System (IELTS).

Students whose backgrounds are not in major areas take additional coursework to satisfy deficiencies.

C.2.2 Limited Access Issues

MS programs in the CEECS department are not limited access programs.

C.2.3 Enrollment Information

The data provided here include both MS and PhD programs in the CEECS department. The headcount of the MS and PhD students in these programs are given in Table 15.

Table 15. The Headcount of the MS and PhD Students

	<u>Semester</u>					Fall, 2017
	Fall, 2012	Fall, 2013	Fall, 2014	Fall, 2015	Fall, 2016	
	#	#	#	#	#	
<u>Major</u>						
Bioengineering	14	15	20	16	20	34
Computer Engineering	40	46	38	36	45	42
Computer Science	70	104	83	75	109	104
Electrical Engineering	48	54	56	44	42	50
Info Tech and Mgmt Advanced	8	7	5	6	14	9
Total	189	231	202	177	230	239

Table 16 shows that 51-55% of our graduate students received teaching or research assistantships in 2013-2017. Our goal is to increase the percentage significantly, to 90%, and skew it so that all of our full-time PhD students receive research assistantships for a minimum of 2 years.

Table 16. Number of Graduate Student Received Assistantships

	% Students
FY 2013	55
FY 2014	55
FY 2015	51
FY 2016	54
FY 2017	55

C.2.4 Class Size and Faculty/Student Ratio

The current faculty size of the CEECS Department is 42 full-time faculty members, 3 of which are full-time instructors. The remaining 39 faculty members include the Associate Dean for Academic Affairs of the College of Engineering and the Department Chair.

During the 2015-2016 academic year, there were 916 undergraduate (Computer Engineering, Computer Science, and Electrical Engineering combined) students enrolled in our department (IEA Assessment Dashboard, excluding pre-professional students) and 226 graduate students. This gives a student- faculty ratio of about 28.

Table 17 shows average class size for graduate courses offered in the department. The Department offers an average of 14 courses in Computer Science & Engineering and an average of 7 courses per semester in Electrical & Bio Engineering. A large increase in the average class size of Computer Science & Engineering courses in Fall '16 and '17 is because of a few popular courses (Information Retrieval, Software Engineering, Foundations of Vision, Deep Learning and Cyber Security). Graduate courses are constantly updated to reflect the latest developments in academia and industry. Class cap is always increased to meet student demand.

Table 17. Average Graduate Class Size

Major	Semester				
	Fall, 2013	Fall, 2014	Fall, 2015	Fall, 2016	Fall, 2017
	#	#	#	#	#
Computer Science & Engineering	19	17	16	26	25
Electrical & Bio Engineering	12	11	13	14	16

C.2.5 Curriculum

Master of Science with Major in Computer Science, Computer Engineering

Students need 33 graduate credits (30 with thesis option) with a GPA of 3.0 or better. All courses in the degree program must be completed with a grade of "C" or better. The set of courses that are offered regularly are organized into four groups shown below. Students pursuing Master of Science with Major in Computer Engineering are required to take a minimum of three credits from each of groups 1-A, 2, and 3. Students pursuing Master of Science with Major in Computer Science are required to take a minimum of three credits from each of groups 1-B, 2, and 3.

Students are free to take the remaining 24 credits (18 credits with thesis option) to develop expertise in their areas of interest.

Group 1-A: Computer Architecture and Design	
Advanced Computer Architecture	CDA 6155
Embedded System Design 1	CDA 6316
Multiprocessor Architecture	CDA 6132
Structured VLSI Design	CDA 6214

Group 1-B: Theory	
Analysis of Algorithms	COT 6405
Queueing Theory	MAP 6264
Theory and Philosophy of Computation	COT 6200
Randomized Algorithms	COT 6446

Group 2: Software Development	
Multimedia Programming	CAP 6018
Software Engineering	CEN 5035
Software Maintenance and Evolution	CEN 6027
Software Requirements Engineering	CEN 6075
Software Testing	CEN 6076
Software Architecture and Patterns	CEN 6085
Object-Oriented Software Design	COP 5339

Group 3: Computer Systems	
Computer Performance Modeling	CEN 6405
Computer Data Security	CIS 6370
Theory and Implementation of Database Systems	COP 6731
Mobile Computing	CNT 6517
Data Mining and Machine Learning	CAP 6673
Multimedia Systems	CAP 6010
Evaluation of Parallel and Distributed Systems	CDA 6122
Introduction to Neural Networks	CAP 5615
Wireless Networks	EEL 6591
Advanced Data Mining and Machine Learning	CAP 6778
Video Communication	CNT 6885

Foundations of Vision	CAP 6411
Advanced Computer Networking	CNT 6516
Vehicular Networks	CNT 6528

Master of Science with Major in Electrical Engineering

The department offers thesis and non-thesis options at the master's level. Students may specialize in several areas: telecommunications; digital signal processing; systems and robotics, including control systems and machine vision; electromagnetics and RF, antennas, microwave systems, EMC/EMI and HF RF circuit design; alternative energy systems, including photovoltaic and fuel cell systems; bioengineering; neural networks; and optics and photonics.

Students require 33 credits (30 credits with thesis option) of graduate course work. Students pursuing a non-thesis option must take one 3-credit research-oriented directed independent study course after completion of 18 credits of coursework.

Comparison with MS programs at Stony Brook University (SUNY) and University of Florida (UF)

MS programs at both SUNY and UF require 30 credits while FAU thesis option is 30 credits, non-thesis option is 33 credits. Both SUNY and UF offer more graduate courses than FAU. In Electrical and Computer Engineering alone SUNY offered 19 graduate courses and UF offered 35 graduate courses in Fall 2017. In addition to that SUNY offers 17 and UF offered 28 graduate courses in Computer Science in Fall 2017. Compared to that FAU offered 13 graduate courses in Computer Science and Engineering and 10 in Electrical Engineering. Enrollment data from peers is not readily available to compare using a metric such as courses per enrolled student.

C.2.6 Enrichment Activities

Full time graduate students are eligible to take part in internships during the course of their study. Many students take that opportunity to gain industry experience before graduation. The department has been organizing annual hackathon for the past three years that attracts graduate student participation.

C.2.6 Pedagogy/Pedagogical Innovations

All graduate courses in the department are offered with Lecture Capture Recording that makes all class lectures available to students online. A small number of courses are offered fully online, without a live lecture. About three courses are offered as once-a-week meetings scheduled in the late afternoons (4:00 to 7:00 pm). These offerings are attractive to our student body that attracts graduate students with full time employment.

Every graduate student must maintain a Research Portfolio containing research papers (book chapter, conference or journal contributions accepted or published, patents, directed independent study-based research papers, technical reports) done throughout the student's M.S. degree studies. The M.S. thesis will be added to the Research Portfolio prior to graduation. The Portfolio must be approved by a graduate advisor prior to graduation certification.

C.2.8 Institutional Contributions

BS/MS Program

The department offers a combined Bachelor of Science in Computer Engineering (B.S.C.E.) to Master of Science (M.S.) program. In the computer science area, it offers a combined Bachelor of Science (B.S.) to Master of Science (M.S.) degree program. The bachelor's degrees and the master's degrees must be in the same area. Students in either combined program may count up to 9 credits of approved graduate coursework toward both their bachelor's and master's degrees

Certificate Programs

The department offers two certificate programs: 1) Big Data Analytics and 2) Cyber Security, 3) Bioengineering. Students receive a certification when they complete 12 credits of courses in a specific area (15 credits for bioengineering).

Specializations

Additionally, students can specialize in areas of interest. The following specializations are offered:

- Internet Engineering Graduate Specialty
- Software Engineering Graduate Specialty
- Master of Science with Major in Computer Science with Focus in Internet and Web Technologies
- Master of Science with Major in Computer Science or Computer Engineering with a Business Minor
- Master of Science with Major in Information Technology and Management

C.2.9 Student Profile

Graduate student body of MS and Ph.D. students is very diverse with about 1/3 minorities, and 1/3 international students. Over the last five years, women made up 23% of the graduate enrollment. Enrollment of women is 26% for 2016.

Table 18 and Table 19 show the student diversity profile in the MS and PhD programs.

Table 18. Graduate Student Profile (I)

		Fall, 2012	Fall, 2013	Fall, 2014	Fall, 2015	Fall, 2016
<u>Major</u>	<u>Ethnicity (2010 and beyond)</u>					
Bioengineering	Asian	2	2	1	.	1
	Black or African American	2	2	2	2	3
	Hispanic or Latino	2	3	3	3	5
	Two or more races	.	.	1	1	.
	Nonresident alien	2	4	5	1	1
	White	6	4	8	9	10
	Total	14	15	20	16	20
Computer Engineering	<u>Ethnicity (2010 and beyond)</u>					
	Asian	5	7	3	1	1
	Black or African American	6	6	3	2	2
	Hispanic or Latino	9	14	11	8	10
	Two or more races	1	.	.	2	2
	Nonresident alien	9	9	9	9	12
	White	9	9	12	13	18
	Total	40	46	38	36	45
Computer Science	<u>Ethnicity (2010 and beyond)</u>					
	Asian	4	8	5	3	5
	Black or African American	4	6	7	7	6
	Hispanic or Latino	7	18	13	8	17
	Two or more races	1	.	1	2	3
	Nonresident alien	16	28	20	24	37
	Total	70	104	83	75	109
Electrical Engineering	<u>Ethnicity (2010 and beyond)</u>					
	Asian	3	4	4	1	2
	Black or African American	4	6	5	2	3
	Hispanic or Latino	9	13	14	10	9
	Two or more races	2	2	2	1	1
	Nonresident alien	16	14	15	14	18
	Native Hawaiian or Pacific Islander	.	1	1	.	.
	Total	48	54	56	44	42
Info Tech and Mgmt Advanced	<u>Ethnicity (2010 and beyond)</u>					
	Asian	1	1	2	2	1
	Black or African American	1	.	.	.	1
	Hispanic or Latino	.	1	.	2	5
	Two or more races	.	.	1	.	.
	Nonresident alien	3	3	2	1	6
	White	2	1	.	1	1
	Total	8	7	5	6	14
Total	<u>Ethnicity (2010 and beyond)</u>					
	Asian	16	22	15	7	10
	Black or African American	19	21	17	13	15
	Hispanic or Latino	29	51	41	31	46
	Two or more races	4	2	5	6	6
	Nonresident alien	46	59	51	49	74
	Native Hawaiian or Pacific Islander	.	1	1	.	.
	White	73	73	72	70	79
	Total	189	231	202	177	230

Table 19. Graduate Student Profile (II)

		Fall, 2012	Fall, 2013	Fall, 2014	Fall, 2015	Fall, 2016
		#	#	#	#	#
<u>Major</u>	<u>Gender</u>					
Bioengineering	Female	7	8	9	8	11
	Male	7	7	11	8	9
	Total	14	15	20	16	20
Computer Engineering	<u>Gender</u>					
	Female	4	7	5	7	6
	Male	36	39	33	29	39
	Total	40	46	38	36	45
Computer Science	<u>Gender</u>					
	Female	16	25	22	21	29
	Male	54	79	61	54	80
	Total	70	104	83	75	109
Electrical Engineering	<u>Gender</u>					
	Female	4	4	7	10	9
	Male	44	50	49	34	33
	Total	48	54	56	44	42
Info Tech and Mgmt Advanced	<u>Gender</u>					
	Female	3	3	2	3	5
	Male	5	4	3	3	9
	Total	8	7	5	6	14

C.2.10 Advising Procedures

The department appoints faculty members as graduate advisors. Each graduate program has one graduate advisor for all non-thesis students. Students in thesis option select their graduate advisor in the first semester of their study. The department has a full time Graduate Programs Coordinator to help graduate students.

C.2.11 Retention, Graduation, and Placement Rates

We don't yet have data for the retention rates. The numbers of graduates for each MS program are summarized below. A steep decline in computer science degrees in 2015-2016 can be attributed to a smaller incoming class in Fall 2014. The enrollment has since picked up and so have graduation rates.

Table 20. MS Degree Production

	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Bioengineering	7	7	4	7	5	7
Computer Eng.	9	8	9	9	7	16
Computer Science	28	27	35	31	11	19
Electrical Eng.	8	6	19	10	16	7
Info Tech and Mgmt	4	3	4	2	2	5
Others		3				
All	56	54	71	59	41	54

C.2.12 Licensure Rates (if applicable)

The Department of Computer and Electrical Engineering and Computer Science does not collect or receive licensure data for undergraduate CE, EE and CS majors, since it is usually not required for students of CE, EE and CS majors to obtain a license as a prerequisite for employment.

C.2.13 Placement Rates/Employment Profile

The Department of Computer and Electrical Engineering and Computer Science does not collect or receive placement data for undergraduate CE, EE and CS majors. However, we are aware that many of our graduates have been hired by a variety of companies locally and nationally. In addition, a number of graduates have also continued their graduate studies upon receiving their degrees.

C.2.14 Student Recruitment

The department's graduate student recruitment primarily targets FAU undergraduate students. Graduate programs are advertised during campus activities, orientations, and other student activities (refer to Appendix C for Department Graduate Program Brochure). Graduate programs are also advertised through broad outreach programs by Graduate College. The department has a BS/MS program to encourage undergraduate students pursue graduate degrees. This program allows 9 graduate credits to be counted toward both undergrad and graduate degrees and help speed up graduate studies.

C.3 Doctor of Philosophy Programs

C.3.1 Admission Criteria

Incoming PhD students for all majors in CEECS must meet the admissions criteria established by the University as described in the University catalog:

<http://www.fau.edu/academic/registrar/FAUcatalog/engineering.php#cse>

The following is a summary of the admissions criteria:

Application for admission to doctoral study will be evaluated on an individual basis by the department's graduate programs committee. Usually, the following four criteria must be met:

1. The applicant should have a combined score (verbal + quantitative) of at least 300 on the Graduate Record Examination (GRE) and a GPA of at least 3.3 (out of 4.0 maximum) in previous graduate work. GRE scores more than five years old are normally not acceptable. The GRE requirement is waived for any student who has an M.S. degree without thesis from FAU's Department of Computer & Electrical Engineering and Computer Science with a GPA of at least 3.8 and for any student who has an M.S. degree with thesis from FAU's Department of Computer & Electrical Engineering and Computer Science with a GPA of at least 3.7.
2. The applicant must have a master's degree in Engineering, Computer Science or a related discipline awarded by a recognized institution. Thesis option is preferred. This requirement may be waived under exceptional circumstances.
3. The applicant must provide three reference letters (at least two from academia) that address the student's research potential, motivation, relative academic achievement and personality. Forms are supplied with applications for admission.
4. International students from non-English-speaking countries must be proficient in written and spoken English as evidenced by a score of at least 500 (paper-based test) or 213 (computer-based test) or 79 (Internet-based test) on the Test of English as a Foreign Language (TOEFL) or a score of at least 6.0 on the International English Language Testing System (IELTS).

C.3.2 Limited Access Issues

PhD programs in the CEECS department are not limited access programs.

C.3.3 Enrollment Information

The data for graduate student head counts in the CEECS department are given in Table 15. The total enrollment shows an upward trend, having increased from 189 to 239 over the last 5 years. The numbers are adequate though we would like to see a significant increase in the next few years. We are in the process of implementing a very ambitious funded research program which is expected to increase the percentage of full-time graduate students. The current ratio is 44%.

C.3.4 Class Size and Faculty/Student Ratio

Table 17 shows that the average graduate class size has increased but Fall 2017 numbers are still low at 25 for Computer Science and Engineering and 16 for Electrical and Bio Engineering courses. Enrollment figures in some of the popular software engineering, data analytics and machine learning courses have been consistently higher than the average at around 40-50.

C.3.5 Curriculum

A minimum of 84 graduate credits (including a minimum of 33 dissertation credits) is required beyond a bachelor's degree. No 4000-level courses may be counted in the Ph.D. degree. A master's degree in a related field is considered equivalent to 30 credits. A minimum of 21 credits of coursework is required beyond a master's degree. All courses must be approved by the student's advisor. Students lacking proper background may have to take additional courses to make up for the deficiencies. Ph.D. students can take any graduate courses offered by the CEECS department. When necessary, students are also allowed to take graduate courses from other departments in the University.

In addition to satisfying the course requirement, a doctoral student must pass the Qualifying Examination, complete a dissertation under the supervision of a graduate faculty advisor and a dissertation committee and pass the oral dissertation examination. Also a written dissertation proposal must be accepted by the dissertation committee at least six months prior to the oral dissertation examination. A doctoral candidate is expected to have at least one research paper published or accepted for publication in a fully refereed conference or journal prior to graduation. Every doctoral student must maintain a Research Portfolio containing research papers (book chapter, conference or journal contributions accepted or published, patents, non-refereed publications) done throughout the student's Ph.D. degree studies. Dissertations are added to the Research Portfolio prior to graduation. The Portfolio must be approved by a graduate advisor prior to graduation certification.

Qualifying Exam

The qualifying exam is a written exam intended to assess whether or not a student is ready to conduct research at the doctoral level and is able to present her/his work at international conferences and publish them in journals. The exam must be passed for formal admission into the doctoral program. Students seeking the Ph.D. degree are expected to take the exam during the second semester of their doctoral studies, excluding the summer semester.

C.3.7 Enrichment Activities

This category is the same as that of the Masters Programs and is covered in C.2.6 Enrichment Activities.

C.3.8 Pedagogy/Pedagogical Innovations

Recently, the department introduced new instruments to improve both MS and PhD education. More specifically, all graduate students need to maintain a digital portfolio to document their research activities, including their presentations and publications. In addition, every term, PhD students must report to the dissertation committee his/her research activity during the semester. The committee members evaluate the student's progress as indicated in the status report and provide comments and suggestions. PhD students are also encouraged to present their research results at international conferences. The Department provides partial support for conference travel as does FAU's Graduate Student Association.

C.3.9 Institutional Contributions

N/A

C.3.10 Student Profile

Refer to Masters Programs for details.

C.3.11 Advising Procedures

Following successful completion of the QE, the student must find a qualified faculty member in the department willing to chair the doctoral (dissertation) committee. The dissertation committee chair will then consult with the student to form the complete committee. Working with the

dissertation committee chair, the student must complete the official Admission to Candidacy application along with the approved Plan of Study.

The dissertation committee meets every semester to assess the progress of a student in that semester. The committee produces a written report documenting the progress of the student towards degree completion.

C.3.11 Retention, Graduation, and Placement Rates

The department does not track the placement rate. Table 21 summarizes Ph.D. degree production in the Department. As was indicated in relation to the graduate student demographics, increasing full-time enrollment is expected to increase number of PhD degrees awarded. We iterate, once again, that our recently launched research program and the institutional support for its implementation have already increased sustained research funding (see Section E. Research), which is the key to increased productivity in the graduate program.

Table 21. PhD Degree Production

Program & Concentration	2012- 2013	2013- 2014	2014- 2015	2015- 2016	2016- 2017
PHD Computer Engineering	2	4	7	1	3
PHD Computer Science	2	3	2	4	1
PHD Electrical Engineering	3	3	7	0	3

C.3.12 Student Recruitment

One of the recruitment efforts is to distribute flyers to potential students (refer to Appendix C for the Department Graduate Program Brochure). We have meetings with targeted audiences at local companies to promote our PhD programs. We also work through the industry members of the Departmental Executive Advisory Board. Individual faculty members also do their own recruiting at conferences and on line through internet sites.

D.Faculty

D.1 The Administrative Structure of the Department

D.1.1 Chair and Associate Chairs

Dr. Nurgun Erdol is the Chair of the Department of Computer and Electrical Engineering and Computer Science (CEECS) and is appointed by the Dean of the College of Engineering and Computer Science. She is responsible for budget preparation, the financial operation of the department, preparation of faculty assignments, yearly evaluation of the faculty, supervision of the Department staff, and overall daily operation of the Department. She provides leadership to the Department in establishing the direction of the program, research activities, and industry relations.

The CEECS Department was formed in 2009 after a college wide restructuring merged the former Department of Electrical Engineering (EE) and the Department of Computer Science and Engineering (CSE). Dr. Erdol has been the department Chair since October 1, 2013.

Dr. Erdol, Senior Member of IEEE, Professor of Electrical Engineering, is an expert in Digital Signal Processing, a discipline whose span includes Computer Science and Computer Engineering. She has over 30 years of experience in academia, a consulting history with industry, and research funding from industry and the federal government. She also has a long service record to the profession as an active member of the IEEE. She has given priority to curricular revision to reflect the intellectual overlaps and fuzzy boundaries between the constituent disciplines of the Department and to utilize to the fullest the combined faculty expertise. She emphasizes hiring new faculty to support and steer Departmental research and teaching in strategic areas that are current and future looking. She also is a strong proponent of faculty redevelopment and incorporates it into faculty assignments and encourages faculty to be proactive. For this effort and others, she has strong support from the Administration of the College of Engineering and Computer Science.

Dr. Hanqi Zhuang (December 2013-) and Dr. Hari Kalva (2014-) are the current Associate Chairs of the Department. The Associate Chairs work with the Chair not only to ensure the proper functioning of the Department as an academic unit but also to support activities that enhance its reputation as a respected institution of scholarship. Their tasks include administrative duties such as course scheduling, committee assignments and data collection for assessment of institutional effectiveness. Administrative duties comprise 25% of the Associate Chairs' assignments. Otherwise they are faculty members, with responsibilities for teaching and research. The Chair meets frequently with the Associate Chairs to discuss policies and best practices that will improve the level of preparedness of the students for employment upon

graduation and succeed in the technical world to positions of technical leadership. We also seek the opinions and advice of the members of the Industrial Advisory Board (IAB).

D.1.2 Standing Committees

The Standing Committees and their principal responsibilities are listed below:

ABET Committee: To prepare for and coordinate activities associated with ABET reviews of the Department.

Executive Committee: To advise the Chair on the day-to-day operation of the department, to act for the faculty between regular faculty meetings, to develop policies for the allocation of state funds and other money available to the department, and to advise the Chair on the Departmental budget.

Graduate Programs Committee: To recommend policies for admissions, degree requirements, qualifying exams, etc., to approve proposals for new courses and modifications of existing courses, to approve special topics offerings, to act as an admissions and academic petitions committee.

Laboratory and Equipment Committee: To plan the acquisition and maintenance of equipment required for the various educational programs, to coordinate the acquisition of research equipment, to supervise the operation of the various department teaching laboratories, and to advise the Department's computer systems administrator on policy related to the operation of the Department's computing facilities.

Personnel Committee: To work to safeguard the rights and privileges of the Faculty; to resolve questions of ethical conduct; to represent the Faculty in questions of equitable distribution of departmental resources, including summer teaching appointments; to serve the Department in all matters related to the hiring, appointment, promotion, and granting of tenure to members of the Faculty, including adjunct and visiting faculty; to review all cases of appointment to the Faculty with tenure and all cases of appointment to tenure-earning positions at the rank of Associate Professor or Professor; to review all cases in which members of the faculty are not recommended for reappointment for reasons other than denial of tenure; to advise the Department Chair on matters of personnel policy concerning the Faculty including criteria for faculty performance evaluations and for allocation of merit and discretionary raises; to coordinate the nomination and election by secret ballot of Faculty members to serve on College committees; and to advise the Department Chair on matters of A&P (administrative and professional) and SP (support personal) departmental staffing.

Resource Committee: Jointly with the Chair, to develop and assure adherence to procedures for establishing the budget and the disposition of salary recovery, overhead, and discretionary

monies; to assist the Department Chair in planning and monitoring the fiscal operation of the Department, and to advise the Chair on matters of administrative and budgetary policy and on other allocation of resources matters delegated to it by the Faculty.

Research Committee: To promote high-quality research within the Department and to increase awareness and recognition of that research, both inside and outside the department.

Teaching and Graduate Assistants Committee: To allocate funds for assistantships and tuition waivers, to review applications for assistantships and make recommendations on appointments.

Undergraduate CE Program Committee: To oversee the operation of the undergraduate CE program. The Committee will recommend policies for admission, degree requirements, etc., approve proposals for new courses and modifications of existing courses (in consultation with the other undergraduate program committees, as appropriate), advise the Department Chair on the approval of special topics offerings, and act as an admissions and academic petitions committee.

Undergraduate CS Program Committee: To oversee the operation of the undergraduate CS program. The Committee will recommend policies for admission, degree requirements, etc., approve proposals for new courses and modifications of existing courses (in consultation with the other undergraduate program committees, as appropriate), advise the Department Chair on the approval of special topics offerings, and act as an admissions and academic petitions committee.

Undergraduate EE Program Committee: To oversee the operation of the undergraduate EE program. The Committee will recommend policies for admission, degree requirements, etc., approve proposals for new courses and modifications of existing courses (in consultation with the other undergraduate program committees, as appropriate), advise the Department Chair on the approval of special topics offerings, and act as an admissions and academic petitions committee.

D.2 Faculty Profile

The CEECS Department has 44 full-time faculty members, 5 of whom are full-time instructors. The remaining 39 faculty members include the Dean and Associate Dean for Academic Affairs of the College, the Department Chair and the Director of the Institute for Sensing and Embedded Network Systems Engineering (I-SENSE).

During the 2015-2016 academic year, there were 916 undergraduate (Computer Engineering, Computer Science, and Electrical Engineering combined) students enrolled in our department (IEA Assessment Dashboard, excluding pre-professional students) and 226 graduate students. This gives a student- faculty ratio of about 28. This provides a manageable class size for faculty to interact with students, provide feedback, and meet with students during and outside office hours.

Table 22. Faculty Profile

	Female	Male	Subtotal
White	4	11	15
<i>Hispanic /Latino*</i>	1	2	3
Asian	3	13	16
African American	0	4	4
Total	9	33	42

*The three Hispanic faculty members are also white and accounted for in the White category.

Table 23. Faculty Rank, Specialty and Employment Status

Last name	First name	FT/PT	TT/NT	Extra title	Rank	Specialty	Race	Gender
Aalo	Valentine	FT	TT		Professor	Wireless communications	African American	M
Agarwal	Ankur	FT	TT	I/UCRC CHOT Director	Associate Professor	Health informatics	Asian	M
Alhalabi	Bassem	FT	TT		Associate Professor	Embedded systems	White	M
Asghar	Waseem	FT	TT		Assistant Professor	Point-of-care disease diagnostics	Asian	M
Azarderakhsh	Reza	FT	TT	ISENSE Fellow	Assistant Professor	Cryptographic engineering	White	M
Bagby	Jonathan	FT	TT		Associate Professor	Electromagnetics	White	M
Batalama	Stella	FT	TT	Dean	Professor	Communications, signal processing	White	W
Bou-Harb	Elias	FT	TT		Assistant Professor	Cyber forensics	White	M
Bullard	Lofton	FT	NT		Instructor	Programming	African American	M
Cardei	Ionut	FT	TT		Professor	Cyber physical systems	White	M
Cardei	Mihaela	FT	TT	Grad. Pgm. Director	Professor	Wireless networking	White	W
Cooper	Robert	FT	TT		Professor	Queueing theory	White	M

Last name	First name	FT/PT	TT/NT	Extra title	Rank	Specialty	Race	Gender
De Groff	Dolores	FT	TT		Associate Professor	Electrical Engineering Education	White	W
Erdol	Nurgun	FT	TT	Chair	Professor	Signal Processing	White	W
Fernandez	Eduardo	FT	TT		Professor	Cyber security, software architecture	White/Hispanic	M
Furht	Borijove	FT	TT	I/UCRC CAKE Director	Professor	Multimedia	White	M
Ghoraani	Behnaz	FT	TT	ISENSE Fellow	Assistant Professor	BioSignal Processing	White	W
Hallstrom	Jason	FT	TT	ISENSE Director	Professor	Embedded sensor networks	White	M
Huang	Shihong	FT	TT		Professor	Software engineering	Asian	W
Ilyas	Mohammad	FT	TT		Professor	Wireless networks	Asian	M
Kalva	Hari	FT	TT	Associate Chair	Professor	Video compression	Asian	M
Khoshgoftaar	Taghi	FT	TT		Professor	Big data analytics	White	M
Liu	Feng-Hao	FT	TT		Assistant Professor	Information security, cryptography	Asian	M
Mahgoub	Imad	FT	TT		Professor	Wireless sensor networks	African American	M
Marques	Oge	FT	TT		Professor	Image analysis	White/Hispanic	M
Neelekanta	Perambur	FT	TT		Professor	Microwaves, HF systems	Asian	M
Nojournian	Mehrdad	FT	TT		Professor	Applied cryptography, trust management	White	M
Pados	Dimitris	FT	TT	ISENSE Fellow	Professor	Communication theory, signal processing	White	M
Pandya	Abhijit	PT	TT		Professor	Neural networks	Asian	M
Pavlovic	Mirjana	FT	NT		Instructor	BioEngineering	White	W
Peterson	Vance	FT	NT		Instructor	Electronics Instruction	African American	M
Petrie	Maria	FT	TT		Professor	Engineering education, remote labs	White/Hispanic	W
Rathod	Monika	FT	NT		Instructor	CS instruction	Asian	W
Raviv	Daniel	FT	TT		Professor	Innovation, controls, robotics	White	M
Rhodes	William	FT	TT		Professor	Optical imaging	White	M
Roth	Zvi	FT	TT		Professor	Controls, robotics	White	M
Shankar	Ravi	FT	TT		Professor	STEM education, semantic Web	Asian	M
Sorgente	Tami	FT	NT		Instructor	CS Instruction	White	W
Tang	Yufei	FT	TT	ISENSE Fellow	Assistant Professor	Smart grid security and control	Asian	M
Ungvichian	Vichate	FT	TT		Professor	Electromagnetic interference, PV systems	Asian	M
Wang	Dingding	FT	TT		Assistant Professor	Big data analytics	Asian	W
Yang	KwangSoo	FT	TT		Assistant Professor	Spatial databases and mining	Asian	M
Zhu	Xingquan	FT	TT		Associate Professor	Machine learning, big data analytics	Asian	M
Zhuang	Hanqi	FT	TT	Associate Chair	Professor	Controls, robotics, signal processing	Asian	M
Zilouchian	Ali	FT	TT	Associate Dean	Professor	Controls, stem education	White	M

D.3 Faculty Teaching Load

Average teaching load per tenure track faculty is two courses per term or four for the Fall-Spring academic year. Instructors teach 10-11 credits per term. Four faculty members who have joint appointments with the Institute for Sensing and Embedded Network Systems Engineering (I-SENSE) teach one course per term. The Institute director, who is also a CEECS faculty, teaches one course a year. In addition to classroom lecturing, the Department also factors the additional workload associated with laboratory and design courses into teaching assignments. Faculty who have significant research activity, large number of graduate students or plans to submit large grants receive special consideration and a reduction of their teaching loads. Faculty who do not engage in significant research but are known to be effective and responsible teachers are assigned to core courses or popular electives that have high enrollments. We consider 70 or more as large volume classes. Classroom capacity usually limits enrollment to 90. Some fully online classes may have enrollment numbers around 100.

Teaching assignments are based on faculty research expertise and research areas so that students maximally benefit from faculty members’ research activities and their professional development.

D.4 Faculty Scholarship and Research Productivity

The Research Data summary for the CEECS Department is reported yearly to the University in response to a call for Dashboard indicators. It is tabulated below for each Academic year starting with 2013-14.

Table 24. Research Productivity of the Faculty (I)

	2013-14	2014-15	2015-16
Books & monographs	15	9	9
Peer-reviewed publications	65	202	220
Presentations at professional meetings	142	74	107
Grant Proposals Submitted	29	34	56

D.5 Strategic Planning for Hires

Hiring new faculty members has been one of the most important activities of the department. In 2013, there were 18 full professors, 11 associate professors and no assistant professors. The most faculty hires were made in 2006. When we were given the opportunity to hire, we consulted with our industry partners and strategized to hire into areas that would have the most impact on

education and research. Our goal was to hire to form areas of concentration; to have at least three people in any given area. We also decided to hire opportunistically should circumstance allow. Since 2014, we hired 9 new assistant professors and 3 professors. Five of the new faculty members are joint hires with I-SENSE and one of them is the College Dean. The new faculty members' research areas are data analytics (2), cyber security (4), smart grid (1), bioengineering (2), and sensing and networking. We now have 26 full professors, 5 associate professors and 9 assistant professors. There is still a need to hire more assistant professors.

D.6 Faculty Hiring in Support of the FAU Strategic Plan

The FAU Strategic Plan stipulates the formation of [Pillars](#) that are institutional programs focused on creating knowledge that benefits society: Healthy Aging, Neuroscience, Ocean Science & Engineering, and Sensing & Smart Systems. The Directors of the Pillars report directly to the Vice President of Research. The Pillars of their eponymous theme is expected to be interdisciplinary. While knowledge and tools of Engineering and Computer Science are necessary for all the Pillars, we identify most closely with the Institute for Sensing and Embedded Network Systems Engineering ([I-SENSE](#)). The Pillar Director, Dr. Jason Hallstrom, is tenured in the CEECS Department. The Pillar's faculty members are called I-SENSE faculty fellows and must be on joint appointments with a tenure granting Department. Currently, there are four I-SENSE fellows and they are all on joint appointments with CEECS. They are listed in Table 23 as our faculty and I-SENSE [Fellows](#). Three of them are tenure track Assistant Professors and one is a Full Professor. Their research fields are Biomedical Signal Processing, Power system stability, Cryptographic Engineering and Signal Processing for Communication. Their teaching loads vary but do not exceed two per year.

D.7 Abbreviated Vita of Faculty

Refer to Appendix D.

E. Research

E.1 Research Productivity

Research awards received in fiscal years 2009 through 2016 are given in Table 25.

Table 25. Research Productivity of the Faculty (II)

Fiscal Year	2009	2010	2011	2012	2013	2014	2015	2016
Amount (USD)	791,369	541,114	544,477	1,460,990	526,566	3,041,764	1,685,183	3,004,654
Number of awards	39	11	15	30	11	12	22	31
Number of federal/state awards						8	4	13
Average dollars per award	20,292	49,192	36,298	48,700	47,870	253,480	76,500	96,924
Standard deviation of the awards	23,188	46,437	82,271	39,449	479,012	479,011	108,132	479,012

The distribution of the awards is shown in Figure 2. Each year's award is presented in increasing order against a numbering index. For example, there were 11 awards in FY 2009 and the 11th was for \$1.75M; in FY 2009, there were 39 awards none of which were more than \$100K.

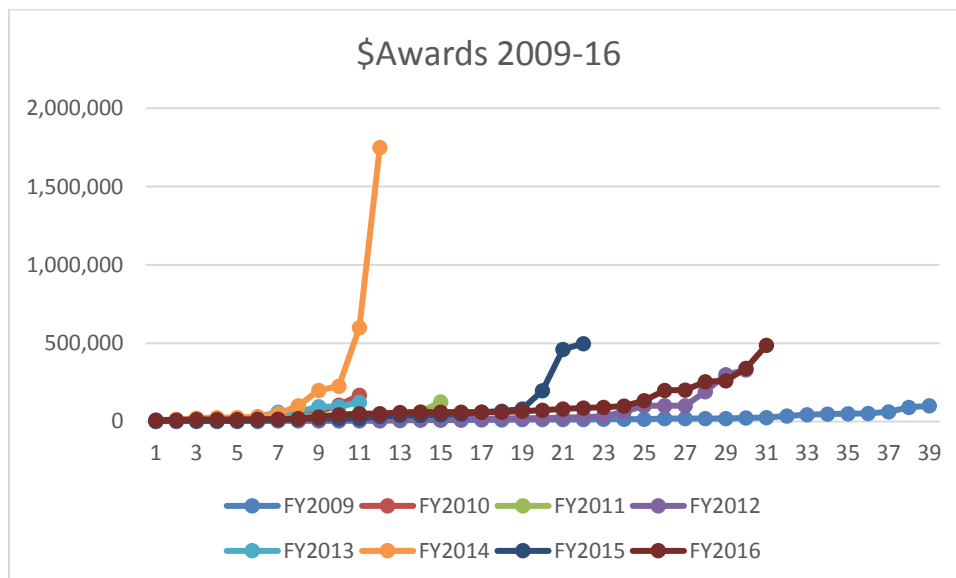


Figure 2. Eight-Year Trend of Sponsored Research Productivity

We note that the FY 2014 data set shown in Table 25 and Figure 2 contains a single award of \$1.75M that was transferred by Dr. Jason Hallstrom when he joined FAU the same year. Removing it from the data as an outlier, we get the data of Table 26 and Figure 2 which show a more meaningful trend of increased total awards, increased number of awards, increased average award and increased competitive federal and state awards. This output is very much in line with our goals.

Table 26. Research Productivity of the Faculty (II), Outlier removed

Fiscal Year	2009	2010	2011	2012	2013	2014	2015	2016
Amount (USD)	791369	541114	544477	1460990	526566	1292870	1685183	3004654
Number of awards	39	11	15	30	11	11	22	31
Number of federal/state awards	0	3	2	7	1	7	4	13
Average dollars per award	20,292	49,192	36,298	48,700	47,870	117,534	76,500	96,924
Standard deviation of the awards	23,188	46,437	82,271	39,449	479,012	168,919	108,132	479,012

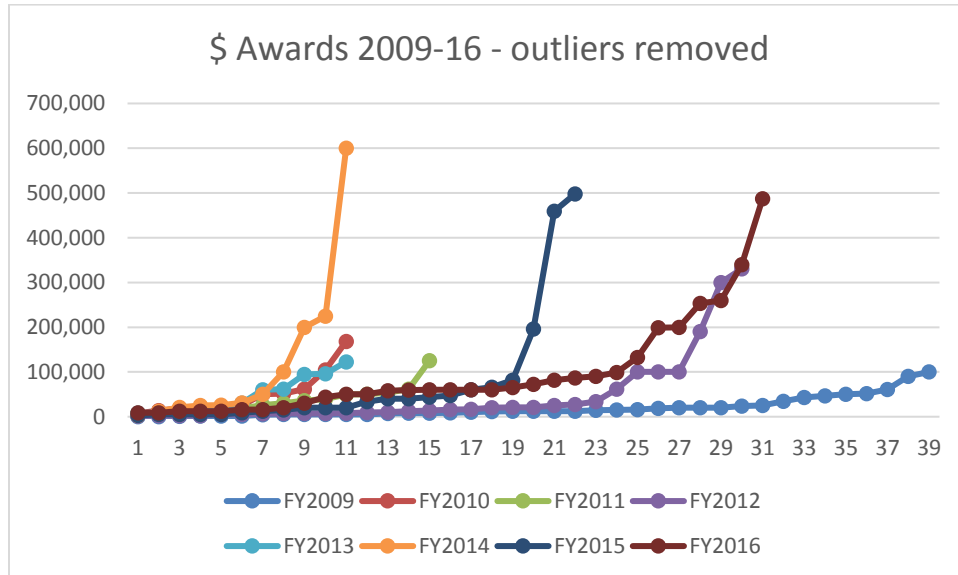


Figure 3. Eight-Year Trend of Sponsored Research Productivity- corrected for an outlier.

Research expenditures from FY 2012 to FY 2016 are shown in Figure 4.

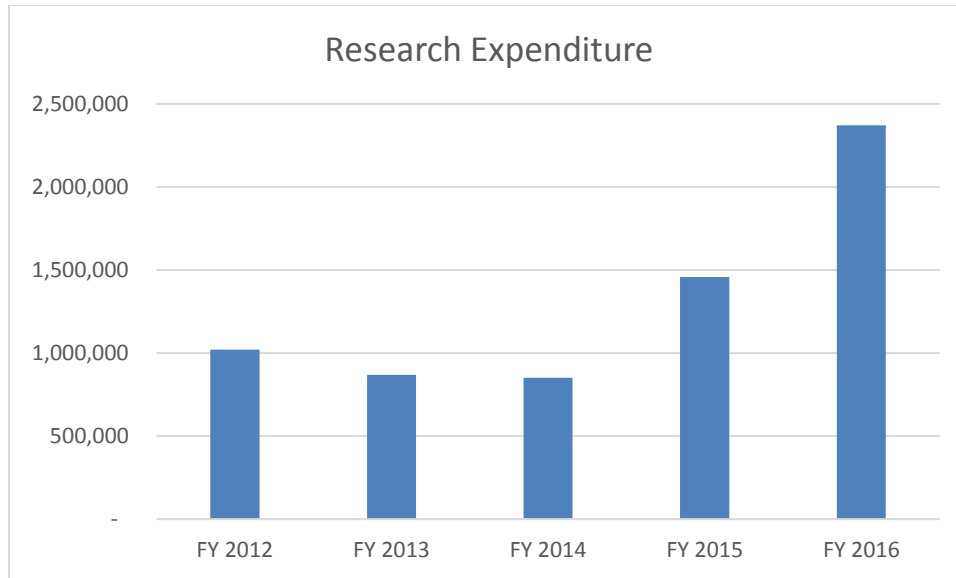


Figure 4. Research expenditure (FY2012 - FY 2016)

E.2 Interdisciplinary Engagement Efforts

Many CEECS faculty are engaged in interdisciplinary research. Co-PI information on funded research reveal the following collaborations.

Table 27. Interdisciplinary Sponsored Research

PI Name	Co-PIs	Sponsor Name	Title
Agarwal, Ankur	Ravi Behara, College of Business, FAU	National Science Foundation - Federal	A Clinical Predictive Model Based Smart Decision Support System for COPD related Re-hospitalization
Agarwal, Ankur	Ravi Behara & Gulcin Gumus, College of Business, FAU	National Science Foundation - Federal	FAU Site Phase-2: I/UCRC for Center for Health Organization Transformation
Asghar, Waseem	Massimo Caputi, College of Medicine, FAU	Florida Department of Health- State	Development of a diagnostic assay for rapid detection and quantification of Zika virus
Asghar, Waseem	Massimo Caputi, College of Medicine, FAU Hadi Shafiee, Harvard Medical School	National Institutes of Health - Federal	Development of disposable and refrigeration-free microchip technology for CD4+ T cell counting at point-of-care settings
Furht, Borko	Ravi Behara, College of Business, FAU Lianfen Qian, Mathematics, FAU	Various Sources - Other	RED: Machine Learning and Optimization Forecast Algorithms
Khoshgoftaar, Taghi	Pierre-Philippe Beaujean, Ocean & Mechanical Engineering, FAU	National Science Foundation - Federal	MRI: Acquisition of Big Data Training & Research Laboratory

Zilouchian, Ali	Nancy Romance, College of Education, FAU	US Department of Education - Federal	An articulated community college-university framework for increasing graduation rates of Hispanic and low- income students in computer science
Azarderakhsh, Reza	Jean Francois BIASSE, Math, USF	USF	Tools for Standardization of Post-Quantum Cryptography
Azarderakhsh, Reza	Mehran Mozaffari Kermani, CSE, USF	RITFFT	Design for Fault Attack Resiliency of Lightweight Cryptographic Architectures for Deeply-Embedded Systems
Azarderakhsh, Reza	Koray Karabina, Math, FAU, Mehran Mozaffari Kermani, CSE, USF	ARO	Emerging side-channel resistant and resource-friendly elliptic curve algorithms and architectures
Azarderakhsh, Reza	Merhan Mozaffari Kermani, CSE, USF	NIST	Efficient Algorithms and Architectures for Post-Quantum Cryptography

E.3 Goals for Research

The goal for research in the department is to maintain an upward trajectory of scholarly reputation. We believe that this is the best way to be of service to our students and to society at large.

The department has five research focus areas that are depicted in Figure 5

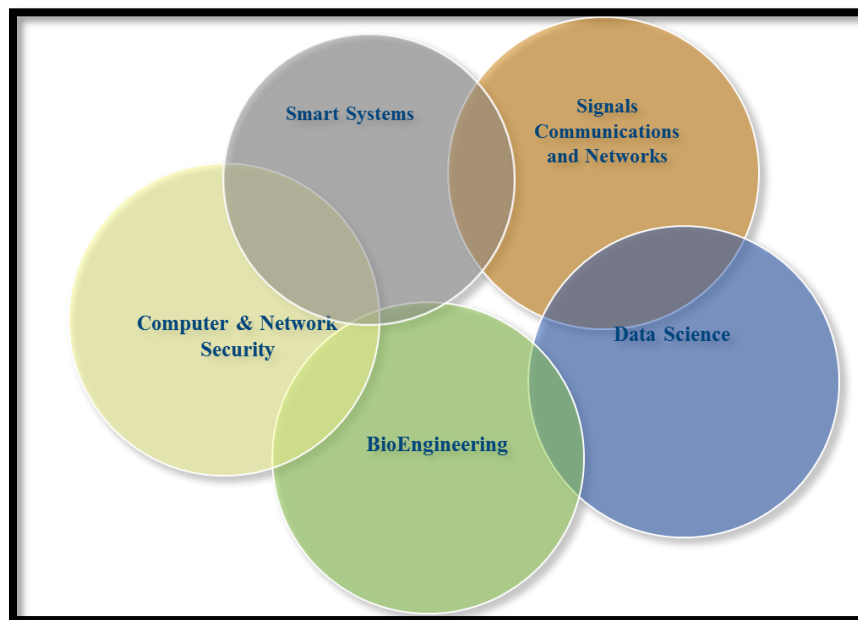


Figure 5. Research Focus Areas

At the time of this report preparation, we are working on a strategic plan that will appoint leaders to each focal group to facilitate coordination to develop a field of recognized expertise. This goal

will require systematic collaboration to obtain sustained funding, to develop a collection of courses that will provide depth in a subject area and build an “ant colony” of graduate students. Any future recruitment will make it a goal to strengthen the areas of focus.

E.4 Assessment

The sponsored research activity trend is shown in the following figure. While increase in funding is evident, we are still short of our goal of \$9M total award computed at \$200K per faculty member.

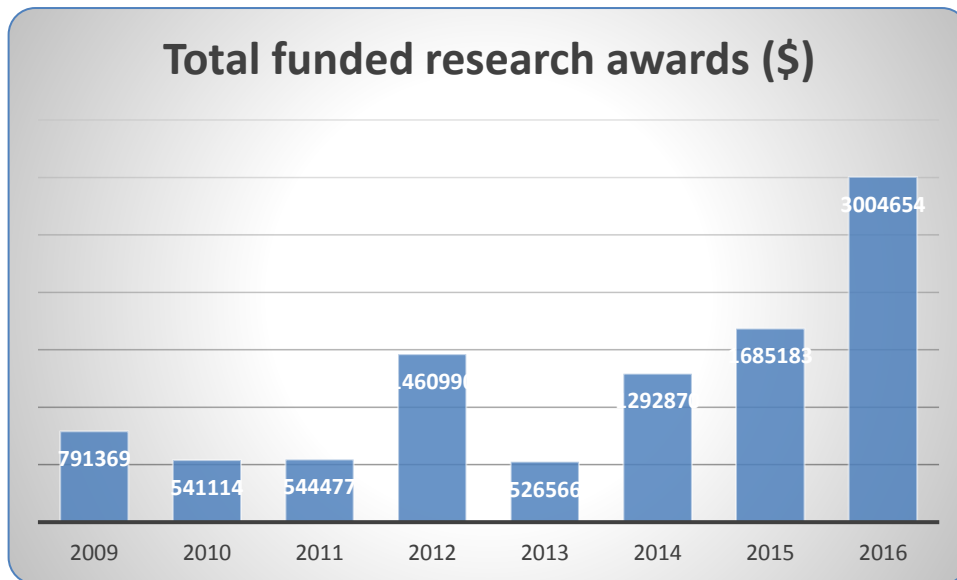


Figure 6. Sponsored Research Activity (2009-2016)

F. Service and Community Engagement

F.1 Goals

The service goals of the Department are to promote engineering and computer science globally and in our local South Florida community, and to let the discipline serve the needs of the community. Our faculty and our students aim to help convey research results to others at levels and in modes that can be most helpful, to raise awareness of engineering tools that can be used to make the community a better place, to help kindle an interest in the discipline and to help people with interest in the discipline advance their knowledge and obtain a degree.

F.2 Assessment

CEECS faculty partake in service to various units of the University, the professional community and the community in which they live through a broad spectrum of activities. According to the Table 28 and Table 29 derived from Departmental Dashboard Indicators, the number of department, college or university committees served by CEECS faculty was 112 in AY 2014-15 and 88 in 2015-16; they were members of 85 professional committees (such as the IEEE, ACM, Tau Beta Pi etc.) in AY 2014. 27 faculty members served as editors or referees in AY 2015-16. Table 29 shows the same numbers normalized by the total number of faculty of that year. In 2014-15, each faculty served on an average of 4 internal committees and 80% of the faculty were editors or reviewers in AY 2015-16.

Table 28. Faculty Service Productivity (I)

	2013-14	2014-15	2015-16
Faculty memberships on department, college or university committees	28	112	88
Faculty memberships on community or professional committees	21	85	83
Faculty serving as editors or referees for professional publications	21	30	27

Table 29. Faculty Service Productivity (II)

	2013-14	2014-15	2015-16
Per faculty memberships on department, college or university committees	1.2	4.0	2.8
Per faculty memberships on community or professional committees	0.9	3.0	2.6

Per faculty serving as editors or referees for professional publications	0.9	1.1	0.8
--	-----	-----	-----

The CEECS Department has many active student organizations: Tau Beta Pi, Institute of Electrical and Electronics Engineers (IEEE), Society of Women Engineers, Alpha Omega Epsilon, Society of Hispanic Engineers, Upsilon Pi Epsilon, The Guild, ACM Women in Computing. The students and their advisors take part in many activities that involve the technical professional community and K-12 students. These activities include hackathons, coding competitions and organized activities distributed over a week during Engineer’s Week. At the end of each semester, students from the Senior Design and Principles of Software Engineering classes showcase their projects to the industrial community in a highly visible event that attracts about 500 visitors. Our faculty serve as judges at the Science and Robotics competitions and mentor K-12 students each year. We give guided tours of our facilities to members of our community, hold informational events for prospective and admitted students, mentor high school student projects.

- The CEECS Lab Manager Charles (Perry) Weinthal is very active in providing support and consult at many tech events that involve FAU students or students from local high schools. Some are listed below:
- 2015-2017 IBM’s Hackathon: Part of the Supervisory and Consultation Team. Purchased parts using donated funds. Provided advice, support and encouragement during the late night parts of the event.
- Assists FAU High and AD Henderson school students with their science projects: 1 received the 3M America’s Young Scientist award in 2016, three received the First Place in the State in 2017 and four students were in second place in 2016.
- FAU faculty and staff serve as judges on science fairs.
- Mr. Weinthal and graduate student Chad Coarsey started a Bionic Glove Project & Owls Lending Hands making low cost prosthetic hands for children and adults. They are currently working on a violin bow adapter for a 7-year old boy.

G. Program Analysis

G.1 Strengths and Opportunities

At the *undergraduate program level*, strengths and opportunities of our program include the following:

- Highly qualified faculty teach all levels of undergraduate electrical engineering and computer science courses.
- Conceptual learning, depth, breadth and the need for life-long learning are stressed in all courses. These attributes are impressed through a feedback system that consists of student assessment and evaluation of student outcomes. For this purpose, we have developed a survey called Student Outcome Assessment (SOA) which is completed for every course taught. The instructors list the Program Outcomes, describe, both quantitatively and perceptively, how well the students achieved each outcome and write how they will amend their teaching to improve achievement.
- We have an Undergraduate Programs Committee for each of our three programs. Their charge is the continual renewal of our curricula to keep course contents current and relevant so that students are well prepared not only for employment but also for upward mobility to leadership positions in technical fields of their major.
- Our industry partners on the Industry Advisory Board are frequently consulted for their suggestions on the curriculum revisions. They give us feedback on how well our graduates, their employees, are prepared and suggest improvements. They volunteer as guest speakers in classes and take part in student activities.
- We have a long tradition of a two-semester senior design course sequence, a part of the Electrical and Computer Engineering core. At the end of the second semester, we organize an exhibit where student showcase and demonstrate their projects. Industry members attend this highly visible event and evaluate the projects, too. Starting in the Spring 2018 term Computer Science students will be required to take the design courses and will be working in teams with the engineering students. This is one of the manifestations of our efforts to integrate the programs and we expect it to be highly successful.
- We encourage undergraduate research. Many of our students take a directed independent study (DIS) course where they often conduct research that leads to a presentation at a university wide undergraduate research conference. DIS is required of the students in the Innovations Leadership Honors Program.

- Our laboratories have been renewed giving students experience with a broad spectrum of equipment.
- We have developed a fully online undergraduate CS program. We have developed many engineering courses to be online as well. This arrangement helps the non-traditional student obtain a degree. We also use these courses to provide students with review material and remedial training.

At the graduate and research levels, our strengths and opportunities include the following:

- Strong individual faculty members have good publishing record in superior journals.
- High quality graduate students have gone on to prestigious employment.
- In the last three years, we have seen a steady rise in research funding, number of proposals submitted and awarded and the number of federally funded grants.
- Interdisciplinary research collaborations have been established between our faculty and faculty of other departments and universities. Many of these collaborations have resulted in sponsored research funding.

G.2 Weaknesses and Threats

At the *undergraduate program level*, weaknesses and threats of our program include the following:

- Increasing class sizes for entry level courses without adequate TA support impedes student success.
- Laboratory space for teaching and research is exhausted.
- Inadequate preparation in math and physics courses continues to be a threat and leads to high DFW rates.

At the *graduate and research* level, weaknesses and threats to the department include the following:

- Some graduate students are not prepared adequately.
- Some part time graduate students take very long to graduate or quit.
- Lack of adequate numbers of faculty in some key research areas is an impediment to developing comprehensive graduate programs in those areas. Insufficiency is seen in the number and spectrum of courses as well as the formation of a body of graduate students in a supportive and collaborative environment.

G.3 Resource Analysis

G.3.1 Funds

Parts of the following description of funding allocation is based on policies and practice of the College prior to a new Dean being appointed in August 2017.

Florida Atlantic University's Operating Budget consists of Educational and General (General Revenue, Student Fees, and Education Enhancement); Student Financial Aid; Grants and Contracts; Auxiliary Enterprises; Athletics Local; Student Government; and, Concession. The University President is required to prepare an annual budget for approval by the Board of Trustees (BOT).

The operating budget governs the University's expenditures during the year. This budget is required to be approved by the Board of Trustees prior to July 1, 2016. Departmental budgets are partly formulaic, based on measures such as total credit hours taught, research expenditures, etc., and essentially determined by the Dean. Each year, the Department plans a budget by taking into account operating expenses, stipends for student assistants for teaching, labs and the Department office, equipment for laboratories and funding of student activities. The budgeted items are funded by a variety of sources and at different times of the year as described below:

- Operating expenses are included in the yearly budget distributed by the Dean in response to a budget request submitted by the Chairs.
- Student assistants: funds for student assistants come from different sources.
- The yearly budget allocation from the Dean includes stipend for Teaching Assistants.
- Each semester, Dean allocates a number of 50% (10 hours per week) Teaching Assistantships to new graduate students with the condition that the other 50% of the assistantship is provided either by individual faculty research funds (10-hour RAs) or by the Department (10-hour TAs) to be paid out of the yearly budget.
- At the beginning of each semester, we receive additional TA stipends from the Center for eLearning. This allocation is based on enrollment in fully online courses we teach and may vary.
- Laboratory equipment and supplies are funded by the Dean, who once a year asks for equipment requests.
- University uses the student paid technology fees to call for equipment proposals. Awards are based on the degree to which the equipment enhances student access across departments and student training.
- Laboratory supplies deemed to be disposable are paid from the Laboratory Fees paid by the CEECS students.

- The Department receives 75% of 10% of overhead funds generated from its research. This money is used to support research activities approved by the Department Chair.
- Salary recovery: The Department receives almost none of the academic year salary. Industry donations are kept in a foundation account and used to pay miscellaneous expenses approved by the Industry Advisory Board.
- New faculty startup funds: New faculty receive startup funds on the commencement of their appointment. The purpose of the funds is to help them launch their research. The Chair is the fund director. Faculty jointly hired by the pillar I-SENSE have more generous startup funds through the pillar.

The primary source of input is assessment of the University by the Board of Governors of the State University System Florida. The Performance Based Funding Model (PBFM), which has been in use since 2014, utilizes metrics to determine budget allocation of each university. The metrics are given in Table 30. Our College, hence the Department, makes significant contributions toward our scores in metrics 1, 2, 6, and 8.a. Metrics 9 and 10, although may change yearly, have been the same for FAU since the inception of the PBFM. They are

- Percent of Bachelor’s Degrees without Excess Hours,
- Bachelor’s Degrees Awarded to Minorities.

Table 30. BOG Performance Based Funding Metrics

Metrics Common to all Institutions	
1. Percent of Bachelor's Graduates Employed (Earning \$25,000+) or Continuing their Education	6. Bachelor's Degrees Awarded in Areas of Strategic Emphasis
2. Median Wages of Bachelor's Graduates Employed Full-time	7. University Access Rate (Percent of Undergraduates with a Pell-grant)
3. Average Cost to the Student (Net Tuition per 120 Credit Hours)	8a. Graduate Degrees Awarded in Areas of Strategic Emphasis 8b. Freshman in Top 10% of Graduating High School Class – for NCF only
4. Six Year Graduation Rate (Full-time and Part-time FTIC)	9. Board of Governors Choice
5. Academic Progress Rate (2nd Year Retention with GPA Above 2.0)	10. Board of Trustees Choice

The College and the Department have taken many measures to contribute to FAUs performance in these categories. Most notable actions are

- a. A Student Success Plan submitted in June 2017. The curricular course dependencies were revised to enable shorter paths to graduation.
- b. The U. S. Department of Education grant award for “An articulated community college-university framework for increasing graduation rates of Hispanic and low-

income students in computer science.” This grant was instrumental in the designation of FAU as a Hispanic Serving Institution.

In 2011, the College sought the consult of a professional to determine a niche for its students. The result of the analysis was the formation of the College-wide Innovation Leadership Honors Program (ILHP) to serve top 5% of the entering sophomore and transfer students with excellent academic achievements. The ILHP objectives are

1. To develop effective leadership capabilities in top engineering students by exposing them to real-life experiences that require independent decision making, well established goals and objectives, and valuable risk-assessment skills.
2. To encourage creativity and innovative-thinking in top engineering students by exposing them to undergraduate research and open-ended practical problems.

In 2013, the BOG awarded the FAU, Broward College (BC) and Palm Beach State College (PBSC) a \$3.5-million state grant <http://www.fau.edu/capture-program/about.php> to create an accelerated pipeline for students in the economically important fields of computer science and computer engineering. The resulting Computer Accelerated Pipeline to Unlock Regional Excellence (CAPTURE) program addressed the need for computer-related workforce development in South Florida, providing superior learning and professional development opportunities for more than 400 anticipated new students.

G.3.2 Space

The CEECS Department shares a five story building, Engineering East (EE), with the pillar I-SENSE, the Dean’s office, the College Technical Services Group and the University Club (a dining facility on the second floor managed by a contracted external company called Chartwells. Conference rooms and lecture halls are open to University use even if they are called “CEECS conference room.” The CEECS offices are on the 4th and 5th floors. The laboratories are as described below:

- Teaching Laboratories: Six laboratories totaling 4000 square feet serve nearly 900 students.
- Graduate student labs and research areas: Nine laboratories totaling 2800 square feet serve as research space for 40 faculty members and 70 full-time students, that is about 40 square feet of space per student.
- Engineering East is a Leeds certified green building that was completed in 2009. The research laboratories / graduate student study areas were configured in an open setting; i.e. multiple students have desk space that is a part of a large table. The places are often crowded and students don’t have any place to store and secure their private belongings.

G.4 Future Direction and Anticipated Changes

In 2009, the College went through a significant restructuring that culminated in the formation of the Department of Computer & Electrical Engineering and Computer Science from the union of the Department of Computer Science and Engineering with the Department of Electrical Engineering. The combined Department is administratively right for forming a fairly large department from two small ones. It also has the infrastructure for inventing a new curriculum that is the result of the fusion of three closely related disciplines with fuzzy and largely overlapping boundaries which, due to rapidly occurring technological advances, are also dynamic. It has the capacity to offer an education with a wide breadth and choice of depth. We have already implemented some changes toward that goal and we anticipate to develop that change in a bold structure in the next few years.

The fusion has already caused some faculty to reinvent themselves and integrate their research with those of others thus generating creative opportunities. For example, plans are underway to offer a track that combines data analytics and signal processing. There are already fairly comprehensive research groups in cyber security and wireless communication whose work cover the total spectrum between the physical layer and the computational. We anticipate and encourage these groups to work in cohesive ways.

Review team's comments on the following issues would be very helpful:

1. The current state of the department's place and its reputation among its peers: What can be done to improve our status as an institution of scholarship?
2. The wisdom of planning to grow as one department of combined disciplines of Electrical Engineering, Computer Engineering and Computer Science.
3. The adequacy of resources, specifically with regards to administrative staffing, and graduate student facilities.
4. Centralized administrative practices, such as budgeting.

G.5 Student Feedback

Student feedback is obtained through exit student surveys and student perception of teaching (SPOT) evaluation. The exit student survey data is given in the following tables and figures and tables. It is clear that while students in general are satisfied with the overall performance of the instruction, especially in the area of design and using tools, they are not so happy in the breath of the curriculum as well as the career service provided by the university.

Table 31. Exit Student Assessment Results (2016-2017)

	Computer			Florida Atlantic University > All Respondents (no filter selected)			Engineering Major/Area of Primary Interest Mean and Range of Lowest to Highest Engineering Major/Area of Primary Interest Mean	Difference Between Engineering Major/Area of Primary Interest and Aggregate Mean
	N	Mean	StdDev	N	Mean	StdDev		
Factor 1. Satisfaction: Quality of Instruction							Min = 5.07 Max = 5.86	Difference = -0.11
	103	5.29	0.89	288	5.40	0.90		
Factor 2. Satisfaction: Aspects of Courses							Min = 5.04 Max = 5.59	Difference = -0.04
	103	5.27	0.92	287	5.31	0.91		
Factor 3. Satisfaction: Breadth of Curriculum							Min = 2.93 Max = 5.09	Difference = -0.27
	99	3.87	1.50	280	4.14	1.59		
Factor 4. Satisfaction: Co-Curricular Activities							Min = 4.40 Max = 5.69	Difference = -0.31
	101	4.78	1.40	281	5.09	1.32		
Factor 5. Satisfaction: Classmates							Min = 5.22 Max = 5.82	Difference = -0.05
	103	5.34	1.19	287	5.39	1.12		
Factor 6. Satisfaction: Career Services							Min = 3.67 Max = 5.11	Difference = 0.14
	98	4.83	1.44	278	4.69	1.46		
Factor 7. Satisfaction: Laboratories							Min = 5.07 Max = 6.02	Difference = 0.11
	103	5.62	0.94	285	5.51	1.05		
Factor 8. Satisfaction: Advisor							Min = 5.23 Max = 6.45	Difference = 0.12
	102	6.11	1.04	286	5.99	1.24		
Factor 9. Satisfaction: Facilities							Min = 4.98 Max = 6.21	Difference = 0.19
	103	5.76	1.01	287	5.57	1.12		
Factor 10. Learning: Engineering: System Design and Problem Solving							Min = 5.37 Max = 6.37	Difference = -0.11
	103	5.88	0.87	286	5.99	0.82		

Factor 11. Learning: Engineering: Impact of Engineering Solutions	103	5.97	0.88	286	5.96	0.91	Min = 5.71 Max = 6.27	Difference = 0.01
Factor 12. Learning: Engineering: Use of Tools	103	6.05	0.85	287	6.08	0.86	Min = 5.71 Max = 6.35	Difference = -0.03
Factor 13. Learning: Engineering: Apply Knowledge and Identify Problems	103	5.91	0.79	287	6.03	0.78	Min = 5.61 Max = 6.36	Difference = -0.12
Factor 14. Learning: Applied Science: System Design and Problem Solving	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 15. Learning: Applied Science: Impact of Engineering Solutions	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 16. Learning: Applied Science: Use of Tools	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 17. Learning: Applied Science: Apply Knowledge and Identify Problems	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 18. Learning: Applied Science: Computer-Based Systems	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 19. Learning: Computing: Apply Knowledge and Identify Problems	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 20. Learning: Computing: Impact of Computing	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 21. Learning: Computing: Computer-Based Systems	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 22. Learning: Engineering Technology: System Design and Problem Solving	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 23. Learning: Engineering Technology: Impact of Engineering Solutions	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 24. Learning: Engineering Technology: Apply Knowledge and Identify Problems	0	-	-	0	-	-	Min = - Max = -	Difference = 0.00
Factor 25. Overall Satisfaction	103	5.73	1.20	287	5.75	1.18	Min = 5.50 Max = 5.92	Difference = -0.02
Factor 26. Overall Learning	103	5.54	1.31	287	5.72	1.20	Min = 5.29 Max = 5.96	Difference = -0.18
Factor 27. Overall Program Effectiveness	103	5.56	1.12	287	5.66	1.07	Min = 5.35 Max = 5.88	Difference = -0.10

Table 32. Exit Student Survey (2014-2017)

Factor 25: Overall Satisfaction of the Programs

Note: After 2015, the survey does not distinguish EE, CE and CS.

Major	2014-2015	2015-2016	2016-2017
Computer	5.08	5.53	5.75
Electrical	5.72	5.53	5.75

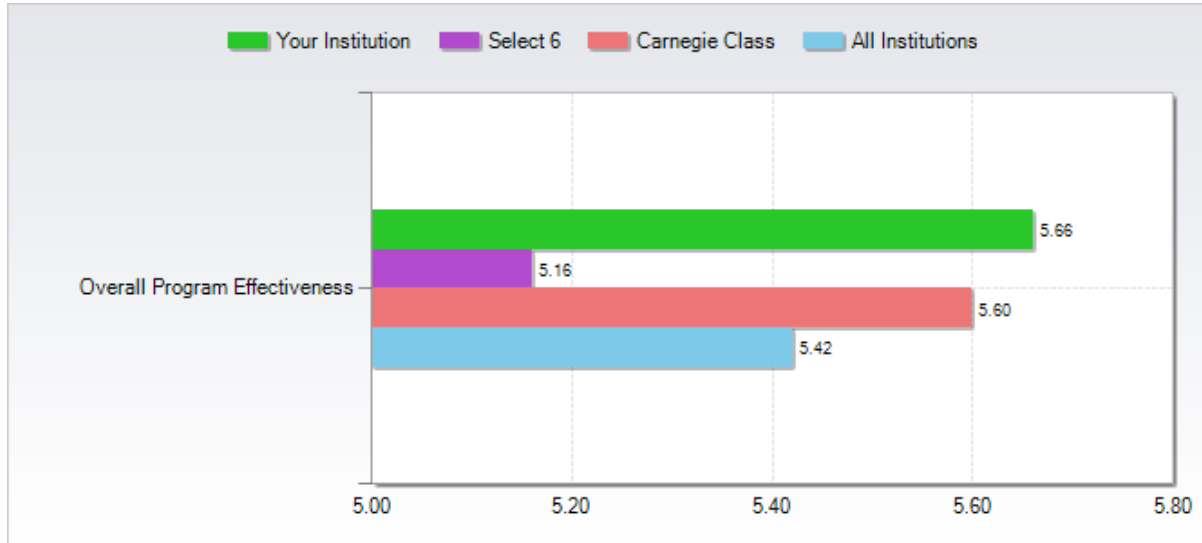


Figure 7. External Benchmark Comparison (2016-2017)

(The horizontal axis denotes the scores; the higher, the better)

Examining Table 31, one can see that our programs receive lower scores in Factors 3, 4 and 6. Factor 3 is about the breadth of the program and Factor 6 concerns career services. The feedback of our students challenges us to expand our programs so our students can have a more comprehensive education while in college.

From Figure 7, one observes that the overall experience of our graduates, based on the exit survey, is much higher than similar institutions (Select 6), and even higher than those from top institutions (Carnegie Class). Figure 8 shows that our students, in general, view our programs more and more positively as years go by.

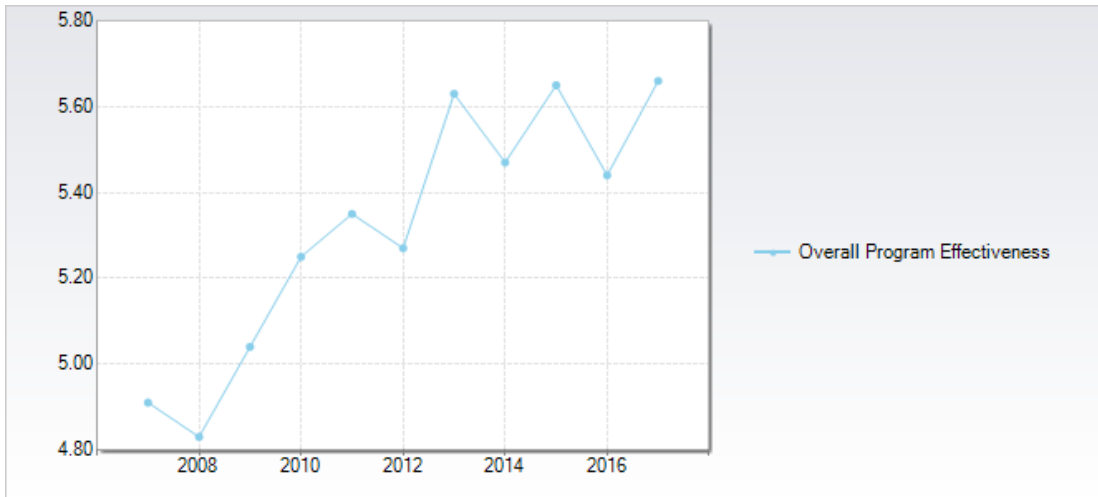


Figure 8. Longitudinal Assessment (FAU COECS)

(The vertical axis denotes the scores; the higher, the better)

H. Appendices

Appendix A. Sample Student Outcome Assessment Form

Student Outcome Assessment (SOA)

COP 2220 – Intro to Programming in C (Fall 2016) T. Sorgente

Part A: Computer Engineering (CE) Program outcome (b) is measured

Total number of students in 2 sections of the class: 187

PROGRAM OUTCOME	DESCRIPTION OF THE TOOL Assignments, projects, exams, etc.	PERCENTAGE OF STUDENTS WHO RECEIVED A SATISFACTORY GRADE ON THIS OUTCOME	INSTRUCTOR'S PERCEPTION ON HOW WELL THIS OUTCOME WAS ACHEIVED
Program Outcome (b) An ability to apply design and development principles in conducting experiments, analyzing results, and construction of hardware or software systems of varying complexity.	<p><u>Programming Assignments (PA):</u></p> <ul style="list-style-type: none"> • Demonstrates the ability to produce correct code. • Demonstrates the ability to produce clear and well-structured code. • Demonstrates the ability to choose and implement data structures. • Demonstrates understanding of the entire software life cycle including design, implementation, testing, maintenance, and documentation. <p><u>My programming lab online tool (MPL):</u></p> <ul style="list-style-type: none"> • Demonstrates the ability to produce correct code. • Demonstrates the ability to produce clear and well-structured code. • Demonstrates the ability to choose and implement data structures. <p><u>Lab:</u></p> <ul style="list-style-type: none"> • Demonstrates the ability to produce correct code. • Demonstrates the ability to produce clear and well-structured code. • Demonstrates the ability to choose and implement data structures. <p><u>Lab quizzes:</u></p> <ul style="list-style-type: none"> • Demonstrates the ability to produce correct code. • Demonstrates the ability to produce clear and well-structured code. • Demonstrates the ability to choose and implement data structures. <p><u>Exam1:</u></p> <ul style="list-style-type: none"> • Demonstrates the ability to produce correct code. • Demonstrates the ability to produce clear and well-structured code. • Demonstrates the ability to choose and implement data structures. <p><u>Final Exam:</u></p> <ul style="list-style-type: none"> • Demonstrates the ability to produce correct code. 	Program Assignments: 80.3% MPL: 78.2% Lab: 80.7% Quizzes: 72.89% Exam1: 76.29% Final: 64% Weighted Average: 74%	4

PROGRAM OUTCOME	DESCRIPTION OF THE TOOL Assignments, projects, exams, etc.	PERCENTAGE OF STUDENTS WHO RECEIVED A SATISFACTORY GRADE ON THIS OUTCOME	INSTRUCTOR'S PERCEPTION ON HOW WELL THIS OUTCOME WAS ACHEIVED
	<ul style="list-style-type: none"> • Demonstrates the ability to produce clear and well-structured code. • Demonstrates the ability to choose and implement data structures. 		

PART B: CONTINUOUS IMPROVEMENT:

Analysis:

In this course we measure student achievements of the following outcome:

(b) An ability to apply design and development principles in conducting experiments, analyzing results, and construction of hardware or software systems of varying complexity.

Students had four large programming assignments, 5 smaller programming assignments with quizzes, 10 weeks of My Programming Lab online homework, and 2 exams related to these outcomes, as presented in the Table above.

Instructor's Recommendations:

Students were given smaller programming assignments to practice each new concept covered in the lecture, these assignments were followed by an online quiz. Students were given 10 weekly online, interactive My Programming Lab assignments to further practice concepts learned the prior week in lecture. In addition, students were given four large, more interesting game themed programming assignments help the student practice the skills covered in the lectures. These larger assignments were broken up into 2 submissions, 1 the algorithm and 2, the code. A midterm was given and a cumulative final exam is given at the end of the semester.

This is an introduction to a challenging subject and not all students remain committed to the required effort needed for success in this course.

Additional TA lab hours were provided this semester for walk in assistance.

Additional TA lab topic sessions were introduced next semester.

Helpful step by step instructions were provided for each of the larger programming assignments in an effort to encourage students to work through the process individually to learn the concepts.

The size of the classes (95 and 92 students) were too large.

The semester began with 187 students and 156 were left in the class to take the final exam, 10 students did not show up for the final exam.

The students who attended class and completed assignments were very successful.

Appendix B. Sample Data for Class Size Computation

Fall 2017 Class Size Data (CEECS, BS Programs)			
Course Number	Course Title	Instructor	Class Size
CAP 4630	Intro Artificial Intelligence	Marques	94
CDA 3201C	Introduction To Logic Design	Petrie	58
CDA 3201C	Introduction To Logic Design	Petrie	78
CDA 3201C	Introduction To Logic Design	Agarwal	60
CDA 3201C	Introduction To Logic Design	Zhu	57
CDA 3331C	Intro Microprocessor Systems	Alhalabi	56
CDA 3331C	Intro Microprocessor Systems	Alhalabi	52
CDA 3331C	Intro Microprocessor Systems	Al-Najada	52
CDA 4210	Introduction to VLSI	Agarwal	75
CDA 4630	Intro to Embedded System Design	Alhalabi	34
CEN 4010	Prin. Software Engineering	Bullard	91
CAP 4770	Intro to Data Mining/Mach Intel	Khoshgoftaar	20
CNT 4703	Computer Network Projects	Bou-Harb	39
COP 2220	Intro to Programming in C	Rathod	84
COP 2220	Intro to Programming in C	Sorgente	72
COP 2220	Intro to Programming in C	Rathod	64
COP 2220	Intro to Programming in C	Sorgente	82
COP 2220	Intro to Programming in C	Rajput	71
COP 3014	Foundations of Computer Science	Bullard	88
COP 3014	Foundations of Computer Science	Bullard	94
COP 3014L	Foundation of Comp. Sci. Lab	Parikh	27
COP 3014L	Foundation of Comp. Sci. Lab	Parikh	25
COP 3014L	Foundation of Comp. Sci. Lab	Heredia	32
COP 3530	Data Struct/Algorithm Analysis	Nojournian	87
COP 3530	Data Struct/Algorithm Analysis	Liu	50
COP 4045	Python Programming	Cardej, I	42
COP 3540	Intro to Database Structures	Rathod	89
COP 3540	Intro to Database Structures	Yang	20
COP 3813	Intro to Internet Computing	Rajput	109
COP 4331	Object-Oriented Design & Prog	Fernandez	32
COP 4610	Computer Operating Systems	Sorgente	72
COP 4610	Computer Operating Systems	Furht	36
COP 4703	Applied Database Systems	Wang	44

COT 4400	Design/Analysis of Algorithms	Cardei, M.	88
COT 4420	Form Lang & Auto Theory	Cardei, M.	55
COT 4935	Senior Seminar	Ungvichian	35
EGN 4950C	Engineering Design 1	Zhuang	50
EGN 4952C	Engineering Design 2	Kalva	30
STA 4821	Stochastic Models for CS	Cooper	55
STA 4821	Stochastic Models for CS	Neelakanta	73
EEE 3300	Electronics 1	Asghar	61
EEE 4361	Electronics 2	Peterson	34
EEE 4510	Intro to Digital Signal Processing	Roth	26
EEL 4930	Design of Digital Systems	Azarderakhsh	18
EEL 4281	Photovoltaic Power Systems	Ungvichian	28
EEL 3111	Circuits 1	Raviv	56
EEL 3112	Circuits 2	Rhodes	36
EEL 3118L	Electronics Laboratory 1	Peterson	52
EEL 3470	Electromagnetic Fields & Waves	Ungvichian	20
EEL 4119L	Electronics Laboratory 2	Peterson	25
EEL 4220	Electrical Machines	De Groff	16
EEL 4512	Communications Systems	Aalo	31
EEL 4512L	Communications Systems Lab	Mukasa	3
EEL 4652	Control Systems 1	Roth	42
EEL 4652L	Control Systems Lab	Levy	20
EEL 4656	Analysis Linear Systems	Rhodes	16
Average Class Size			51

Appendix C. Graduate Program Recruitment Brochure

Graduate Degree Programs

The Department of Computer and Electrical Engineering and Computer Science offers the following graduate degree programs:

Master's Degree Programs

- [Master of Science with Major in Bioengineering with or without Thesis \(MSBioE\)](#)
- [Master of Science with Major in Computer Engineering with or without Thesis \(MSCE\)*](#)
- [Master of Science with Major in Computer Science with or without Thesis \(MSCS\)*](#)
- [Master of Science with Major in Electrical Engineering with or without Thesis \(MSEE\)*](#)

Special Master's Degree Offerings

- [MS in Information Technology and Management \(MSITM\)](#)
- [MSCE/MSCS/MSEE with Minor in Business](#)

Doctoral Degree Programs

- [Doctor of Philosophy with Major in Computer Engineering \(PhD\)](#)
- [Doctor of Philosophy with Major in Computer Science \(PhD\)](#)
- [Doctor of Philosophy with Major in Electrical Engineering \(PhD\)](#)

Graduate Certificate Programs

- [Big Data Analytics w/Computer Science & Business Track Certificate](#)
- [Bioengineering Graduate Certificate \(BGC\)](#)
- [Cyber Security w/Computer Science & Math Certificate](#)

Graduate Course Syllabi

- [Computer Science and Computer Engineering](#)
- [Electrical Engineering](#)

*eLearning Partial Online Program Options

- [Computer Engineering, MS](#)
- [Computer Science, MS](#)
- [Electrical Engineering, MS](#)

Appendix D Abbreviated Faculty CVs

VALENTINE AALO, Ph.D.

Department of Computer and Electrical Engineering and Computer Science
Florida Atlantic University, Boca Raton, FL 33431
aalo@fau.edu

a. PROFESSIONAL PREPARATION

Ph.D. Southern Illinois University, 1991
M.S. Southern Illinois University, 1986
B.S. Southern Illinois University, 1984

b. APPOINTMENTS

Professor and Graduate Adviser, EE Program, FAU, 2015 – Present
Professor, College of Engineering, FAU, 2003 – Present
Associate Professor, Dept. of Electrical Engineering, FAU, 1996-2003
Assistant Professor, Dept. of Electrical Engineering, FAU, 1991-1996

c. PRODUCTS

Recent Journal Publications

-
1. **V. Aalo**, C. Mukasa, and G. Efthymoglou, "Effect of mobility on the outage and BER performances of digital transmissions over Nakagami- m fading channels", *IEEE Trans. Veh. Tech* , vol.65, no. 4, pp. 2715-2721, April 2016.
 2. **V. Aalo**, K. Peppas, G. Efthymoglou, "Performance of CA-CFAR Detectors in Nonhomogeneous positive alpha-stable clutter", *IEEE Transactions on Aerospace and Electronics Systems*, vol.51, no. 3, pp. 2027-2038, July 2015.
 3. **V. Aalo** and C. Mukasa, "Impact of Interference on the Coverage and Connectivity of Ad hoc Networks in a Fading Environment", *Journal of Electrical and Computer Engineering*, vol. 2015, Article ID 51388, 5 pages, 2015. doi: 10.1016/j.aeue.2015.04.003.
 4. K. Peppas, G. Efthymoglou, **V. Aalo**, M. Alwakeel, and S. Alwakeel, "Energy detection of unknown signals in gamma-shadowed Rician fading environments with diversity reception", *IET Commun* , vol. 9, no.2, pp. 196-210, 2015.
 5. **V. Aalo**, K. Peppas, G. Efthymoglou, M. Alwakeel, and S. Alwakeel, "Serial amplify-and-forward relay transmission systems in Nakagami- m fading channel with a Poisson interference field", *IEEE Trans. Veh. Tech* , vol. 63, no.5, pp. 2183-2196, June 2014.
 6. **V. Aalo**, K. Peppas, G. Efthymoglou, M. Alwakeel, and S. Alwakeel, "Evaluation of average bit error rate for wireless networks with alpha-stable interference", *Electronics Letters* , vol. 50, no.1, pp. 47-49, 2 Jan. 2014.

Recent Conference Publications

1. C. Mukasa, **V. A. Aalo** and G. P. Efthymoglou, “Performance Analysis of a Mobile receiver in a Field of Poisson interferers,” 2017 38th IEEE Sarnoff Symp. , Newark, Sept. 2017.
2. C. Mukasa, **V. Aalo**, and G. Efthymoglou, “On the performance of dual-hop network with a mobile relay in a Nakagami fading environment”, 21st International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD 2016), Toronto, Canada, 23-25 October, 2016.
3. C. Mukasa, **V. Aalo**, and G. Efthymoglou, “Exact distributions for aggregate interference in wireless networks with a Poisson field of interferers”, 2016 IEEE 12th International Conference on Wireless and Mobile Computing (WiMob 2016), Manhattan, New York, 17-19 October, 2016.
4. K. Peppas, and G. Efthymoglou, and **V. Aalo**, “Exact and asymptotic analysis of dual-hop AF systems in Nakagami-m fading with Rayleigh interferers”, 2016 European Conference on Networks and Communications (EuCNC), Athens, Greece, 27-30 June, 2016.
5. G. Efthymoglu, C. Mukasa, and **V. Aalo**, “User Association to Small Cells in the presence of Nakagamim Fading and CoChannel Interference”, 23rd International Conference on Telecommunications (ICT 2016), Thessaloniki, Greece, May 16-18, 2016.

d. SYNERGISTIC ACTIVITIES

1. Design and Evaluation of Wireless Networks Protocols \$100,000
PI: **Imad** Mahgoub, Co-PIs: **V. Aalo**, M. Cardei, I. Cardei, and X. Wang
FAU Foundation/Tecore Networks , January 2012 – December 2012
2. Efficient Protocols and Algorithms for Wireless Networks \$100,000
PI: **Imad** Mahgoub, Co-PIs: **V. Aalo**, M. Cardei, I. Cardei, and X. Wang
FAU NSF/IUCRC , February 2012 – January 2013
3. PI: **Imad** Mahgoub, Co-PIs: **V. Aalo**, M. Cardei, I. Cardei, and X. Wang
Equipment Grant: “MSC -Mobile Switching Center, GSN-GPRS Support Node, GSM Base Station (1900 MHz) and OMCR, CDMA Base Station (850 MHz) and BSM Server”, \$965,000 FAU NSF/IUCRC, January 2012 – December 2014

ANKUR AGARWAL, PH.D. (Project CO-PI)

Associate Professor & Assistant Director, Center for Systems Integration,

Department of Computer Science and Engineering, Florida Atlantic University Boca Raton, FL 33431

Tel: (561)-297-3496 Fax: (561)-297-2800

Email: ankur@cse.fau.edu

PROFESSIONAL PREPARATION

- BS Electrical Engineering
Pune University, India, August 2000
- MS Computer Engineering
Florida Atlantic University, Boca Raton, FL, April 2003
- Post Graduate Certificate Diploma in VLSI Design
CMC Institute of Technology, India, April 2003 – August 2003
- Post Graduate Certificate Diploma in Embedded System Design
CMC Institute of Technology, India, April 2004 – August 2004
- Ph.D. Computer Engineering,
Florida Atlantic University, Boca Raton, FL, December 2006

APPOINTMENTS

- Associate Professor, Florida Atlantic University July 2012 - Current
- Assistant Professor, Florida Atlantic University Dec 2006 – July 2012
- Instructor, Florida Atlantic University August 2004 – Dec 2006
- Research Intern, Motorola Sept 2001 – April 2002
- Application Developer, Lampax Electronics, India July 2000 – July 2001
- Research Intern, Lampax Electronics, India May 1998 – Aug 1998

SELECTED PUBLICATIONS

Number of Publications: Journals (18), Book Chapters (12), Conferences (45), Book (1)

(Five Related Publication)

- Borko Furht, Ankur Agarwal, “Handbook of Medical and Healthcare Technologies”, Springer, 2014
- Ravi Behra, Faiz Fatteh, Piyush Jain, Prvatha Laxmi, Ankur Agarwal, “A Prognostic COPD Healthcare Management System”, IEEE International Conference on Systems Engineering, 2013, Orlando, Florida
- Carlos Alveraz, Destin Smith, Ankur Agarwal, “Biomedical Diagnostic System for Device Coding”, IEEE International Conference on Systems Engineering, 2013, Orlando, Florida
- Behara, R.S., A. Agarwal, V. Rao, and C. Baechle (2015). Predicting the Occurrence of Diabetes using Analytics, Introduction to Trends and Research in the Decision Sciences: Best Papers from the 2015 Annual Conference, M. Warkentin (Ed.), Decision Sciences Institute and Pearson/FT Press.
- Ankur Agarwal, Georgiana Hamza-Lup, Taghi Khoshgoftaar, “A System-Level Modeling Methodology for Performance-Driven Component Selection in Multi-Core Architectures”, *IEEE System Journal*, 2011

(Five Significant Publication)

- Timothy J. t.Cyr, Ankur Agarwal, Borko Furht, Brief Overview of Various Healthcare Tools, Methods, Framework and Standards, “Handbook of Medical and Healthcare Technologies”, Springer, 2014
- Vishesh Ved, Vivek Tyagi, Ankur Agarwal, A. S. Pandya, “Personal Health Record System and Integration Techniques with Various Electronic Medical Record Systems”, IEEE High Assurance Systems Engineering, pp. 91-94, 2011
- S. Pandya, A. Arimoto, Ankur Agarwal, Y. Kinouchi, “A Novel Approach for Measuring Electrical Impedance Tomography for Local Tissue with Artificial Intelligence Algorithm”, *International Journal of Biometrics and Bioinformatics*, Vol. 3 Issue 5, pp. 66-81, 2010
- Karuna P. Joshi, Yelena Yesha, Ant A. Ozok, Yaacov Yesha, Ashwini Lahane, Hari Kalva, Ankur Agarwal, and Borko Furht, “User Centric Smart Services on the Cloud”, *The Smart Internet, Lecture Notes in Computer Science, Springer Berlin / Heidelberg*, pp., 234-249, vol. 6400, Oct 2010
- Ankur Agarwal, Nathan Henehan, Vivek Somashakarappa, A. S. Pandya, Hari Kalva, Borko Furht, “Cloud Computing Based Patient Centric Medical Information System”, Handbook of Cloud Computing, Springer, pp. 553-574, 2010

SYNERGISTIC ACTIVITIES

- Assistant Director of Mobile Technology Consortium
- Assistant Director of Center for Systems Integration
- Associate Editor for International Journal of Modeling and Simulation
- Represent Editorial Board for the Following Journals
 - International Journal of Computer Science and Engineering
 - International Journal of Electronics , Circuits and Systems
 - International Journal of Computer Systems Science and Engineering

LIST of COLLABORATORS

- Ankit Jain, Motorola
- A S Pandya, Professor, FAU
- Borko Furht, Professor FAU
- David Pallerin, CEO, ImpulseC Technology
- Eva Lee, Georgia Tech
- Faiz Fatteh, MD, SorenTech
- Georgiana Hamza-Lup, Assistant Professor, FAU
- Hari Kalva, Professor, FAU
- Hanqi Zhuang, FAU
- Jaime Borrás, Former Vice President, Motorola
- Naphtali Rishe, Professor, Florida International University
- Ravi Behara, Associate Professor, FAU
- Ravi Shankar, Professor, FAU
- Tyagi Khoshgoftaar, Professor, FAU
- Wayne Ballentine, Motorola
- Yelena Yesha, Professor, University of Maryland
- Young Ygh-Lho, Silla University, Korea

Bassem Alhalabi, Ph. D

Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University, Boca Raton, FL 33431

alhalabi@fau.edu

(A) PROFESSIONAL PREPARATION

- Continuous professional development through consulting projects, 2005-current
- University of Louisiana at Lafayette, Computer Engineering, Ph.D., 1995
- University of Louisiana at Lafayette, Computer Engineering, M.S., 1993
- Purdue University, W. Lafayette, IN, Electrical Engineering, M.S., 1986
- Ohio University, Athens, Ohio, Electrical Engineering, B.S., 1984

(B) APPOINTMENTS

- Associate Professor (August 2002-Current), Computer Science and Engineering, FAU
- Director (2001-Current), Center for the Advancement of Distance Education Technologies (CADET), FAU
- President and CEO (2005-Current), Research and Development G's Inc., an R&D company based in Boca Raton. Helping local inventors with feasibility study, patents, and prototypes.
- Assistant Professor (August 1996-2002), Computer Science and Engineering, FAU, Florida.

(C) SELECTED PUBLICATIONS (7 OF TOTAL 80)

- C. Carryl, B. Alhalabi, T. Khoshgoftaar and L. Bullard "Verifying the Security Characteristics of a Secure Physical Access Control Protocol," in 21st ISSAT International Journal of Reliability, Quality and Safety Engineering, 2015.
- Bassem Alhalabi, Clyde Carryl, "Universal Physical Access Control System", IEEE BIBE 2014, Nov 10-12 2014, Boca Raton, Fl.
- Bassem Alhalabi, Clyde Carryl, Mirjana Pavlovic, "Activity Analysis and Detection of Repetitive Motion in Autistic Patients", IEEE BIBE 2014, Nov 10-12 2014, Boca Raton, Fl.
Awarded best paper in its category
- Wald, R., Khoshgoftaar, T.M. and Alhalabi, B., "A Novel Baseline-Differencing Approach to Create Generalizable Reliability Models of Ocean Turbine Behavior." Proceedings of the 18th ISSAT International Conference on Reliability and Quality in Design, Boston, Massachusetts, July 26-28, 2012.
- Duhaney, J., Khoshgoftaar, T.M., Sloan, J., Alhalabi, B. and Beaujean, P.P. "A Dynamometer for an Ocean Turbine Prototype: Reliability through Automated Monitoring " IEEE 13th International Conference on High Assurance System Engineering (HASE), Nov 10-12, 2011. PP 244-251.
- Sloan, J., Khoshgoftaar, T.M. and Alhalabi, B., "A Strategy for Data-Driven Testing of an Ocean Turbine Drivetrain." Proceedings of the 17th ISSAT International Conference on Reliability and Quality in Design, Vancouver, B.C., Canada, August 4-6, 2011, pp.364-3
- Ionut Cardei, Ankur Agarwal, Bassem Alhalabi, Timur Tavlitov, Taghi Khoshgoftaar, Pierre-

Philippe Beaujean, "Software and Communications Architecture for Prognosis and Health Monitoring of Ocean Based Power Generators," 15th IEEE Systems Conference, Montreal, Canada, April 2011

(D) SELECTED PATENTS (5 OUT OF TOTAL 10)

- 2014 disclosed to FAU; 2014 filed, pending. Bassem Alhalabi, Clyde Carryl, "Global Controls with Embedded Secured Protocol". U.S. provisional patent Application 2014.
- 2014 filed, pending. Bassem Alhalabi, et al, "Fluid Dispensation Control". U.S. non-provisional patent application 2014.
- 2013 disclosed to FAU, released; 2014 filed, pending. Bassem Alhalabi, et al, "Digital and Electronic Labs Testing Modules". U.S. non-provisional patent application 2014.
- 2009 disclosed to FAU, released; 2012 filed, pending. Bassem Alhalabi, et al, "System for Facilitating Participation of a Plurality of Pilgrims in an Annual Pilgrimage". U.S./International non-provisional patent application N. 13478496, 2012.
- 2009 disclosed to FAU, released; 2013 filed, pending. Bassem Alhalabi, et al, "AMAS, Autism Monitoring and Assistive System". U.S. non-provisional patent application 2013.

(E) SYNERGISTIC ACTIVITIES

- Revamped the CDA3331C (FAU, 2014-16) Introduction to Microcomputers with Course/Lab. Moved from old 68000 platform to state-of-the-art TI MSP430 platform including hands-on session on HW/SW interface . This was a major aspect for the ABET accreditation in 2014.
- Agency: Mobile Help, CAKES university-industry program; \$46,000; CO-Principle Investigator, 2012-2013. Component Evaluation for Physical Phenomenon: Motion and Movement
- Agency: Tabuk University; \$140,000; Consulting and Principle Investigator, 2011-2013. Service Oriented Architecture for Interfacing RFID and GSM Protocol Complete system for Mega Event Management and People Navigation
- Agency: Ocean Engineering, FAU; \$145,919; Principle Investigator, 2010-2011. Ocean Clean Energy, MCM and Prognostics Monitoring
- Agency: CGC; \$50,000 Grant; CO-Principle Investigator, 2010-2011. Android Application Development
- Industrial and Consumer Products Prototypes, RnD G's Inc., 2005-current. Designed, written patents, and built proof of concepts and prototypes for over 50 projects including consumer, energy, commercial, and health care products.

(F) COLLABORATORS, OTHER AFFILIATIONS, SELECTED AWARDS/RECOGNITIONS/MEMBERSHIPS

22 academic and special recognition awards including Distinguished Teacher of the Year, 2012, and honorable listing in "Outstanding People of the 20th Century", 1999, by The International Biographical Center of Cambridge, England.

Member of 15 professional and honor societies including IEEE, ASEE, NEA, ACM, UFF, etc.

Member of 9 academic committees, and 5 community services

Waseem Asghar, Ph.D.**Assistant Professor**

Department of Computer & Electrical Engineering
and Computer Science
Florida Atlantic University, Boca Raton, FL

Ph: 561.297.3728

Email: wasghar@fau.edu
<http://faculty.eng.fau.edu/asghar/>

(a) Professional Preparation

University of Engineering and Technology, Lahore	B.S.	2007	Electrical Eng.
University of Texas at Arlington, TX	Ph.D.	2012	Bioengineering
Harvard Medical School, Harvard University, MA	Postdoc	2012-2014	Bioengineering
Stanford University, CA	Postdoc	2014-2014	Bioengineering

(b) Appointments

09/14 – Present	Assistant Professor, Computer Engineering & Electrical Engineering and Computer Science, Florida Atlantic University, Boca Raton, FL
05/15 – Present	Assistant Professor, Biological Sciences Department (Joint Appointment), Florida Atlantic University, Boca Raton, FL
2014 – 2014	Postdoctoral Research Fellow, Stanford University, Palo Alto, CA
2012 – 2014	Postdoctoral Research Fellow, Harvard Medical School, Brigham and Women's Hospital, and Harvard-MIT Health Sciences and Technology Division (HST), Cambridge, MA
06/12 – 07/12	Faculty Associate Researcher, Shimadzu Institute Nano Technology Research Center, University of Texas at Arlington, TX
2008 – 2012	Research/Teaching Assistant, University of Texas at Arlington, TX

(c) Products

Five products most closed related to proposed project (total peer-reviewed articles = 37)

1. **Asghar, W.**, Velasco, V., Kingslye, J.L., Shoukat, M.S., Shafiee, H., Anchan, R.M., Mutter, G.L., Tuzel, E., and Demirci, U. Selection of Functional Human Sperm with Higher DNA Integrity and Fewer Reactive Oxygen Species. *Advanced HealthCare Materials*, vol 3, issue 10, 1671-1679 (2014)
2. Rappa, K., Rodriguez, HF., Hakkarainen, GC., Anchan, RM., Mutter, GL., **Asghar, W.**, "Sperm processing for advanced reproductive technologies: Where are we today?", *Biotechnology Advances*, vol 34, issue 5 (2016)
3. **Asghar, W.**, Shafiee, H., Velasco, V., Sah, V. R., Guo, S., El Assal, R., Inci, F., Rajagopalan, A., Jahangir, M., Anchan, R. M., Mutter, G. L., Ozkan, M., Ozkan, CS., and Demirci, U., "Toxicology Study of Single-walled Carbon Nanotubes and Reduced Graphene Oxide in Human Sperm," *Nature Scientific Reports*, vol 6, article 30270 (2016)
4. Adenmosun, O., **Asghar, W.**, Kumi-Diaka, J., "Sickle cell sperm selection with Hb-S Mab: A future application for Intracytoplasmic Genotypically Selected Sperm Injection (IGSI)", *Archives of Clinical Microbiology*, vol.8, no.1:34 (2017)
5. Fennell, R., **Asghar, W.**, "Image Sensor Road Map and Solid-State Imaging Devices", *NanoWorld*, vol 1, issue 4, 10-14 (2017)

Five Other Significant Products

1. Demirci, U., **Asghar, W.**, "System and Method for Sperm Sorting", Pub. No.: WO/2015/077333 International Application No.: PCT/US2014/066405; (2015)
2. Shafiee, H., **Asghar, W.**,* Inci, F., Yuksekkaya, M.H., Durmus, N.G., Gurkan, U.A., Kuritzkes, D.R., Demirci, U. "Paper and flexible substrates as materials for biosensing platforms to detect multiple biotargets" *Nature Scientific Reports*, 5, 8719 (* Equal Contribution) (2015)
3. **Asghar, W.**, Yuksekkaya, M., Shafiee, H., Zhang, M., Ozen, M., Inci, F., Kocakulab, M., and Demirci, U. "Engineering Long Shelf Life Multi-layer Biologically Active Surfaces on Microfluidic Devices for Point of Care Applications." *Nature Scientific Reports*, (2016).

4. A. Hafeez*, **W. Asghar***, S. M. Iqbal and A. R. Butt, "GPU-based Real-time Detection and Analysis of Biological Molecules using Solid-State Nanopores," *Journal of Medical & Biological Engineering & Computing*, vol 50, no. 6, pp. 605-615 (* Equal Contribution) (2012)
5. Wan, Y., Liu, Y., Allen, P.B., **Asghar, W.**, Mahmood M.A., Tan J., Duhon, H., Kim, Y.T., Ellington, A.D., Iqbal, S.M. Capture, Isolation and Release of Cancer Cells using Aptamer-Functionalized Glass Bead Array. *Lab on a Chip*, 12(22), 4693-1407 (2012)

(d) Synergistic Activities

Grant Reviewer:

NSF/CBET - FY17UNS7909 "Electrochemical and Bioelectronic Sensors Panel" (2017)

BEAGLE FREEDOM PROJECT (2017)

European Research Council, "ERC Starting Grants", (2017)

NIH - ZRG1 IDM-V(13)B "Small Business- Non-HIV Diagnostics Food Safety Sterilization Disinfection and Bioremediation" (2016)

NIH - ZRG1 IDM-V(12)B "Small Business- Non-HIV Diagnostics Food Safety Sterilization Disinfection and Bioremediation" (2016)

NIH/NIAID R21- Special Emphasis Panel " Rapid Assessment of Zika Virus R21" (2016)

NSF/Chemical, Bioengineering, Environmental, and Transport (CBET) – Nano-Biosensing Program (2016)

Editorial Board Member: SM Journal of Reproductive Health and Infertility, EC Pharmacology and Toxicology Journal, International Journal of Chromatography and Separation Techniques, Annals of Nanoscience and Nanotechnology

Session Chair: Chair for special session "Smart Phone based Health Diagnostics and Monitoring (SP-Health)", in 5th EAI International Conference on Wireless Mobile Communication and Healthcare, London, UK (2015)

Technical Committee Member: 2017 International Conference On Computing and Data Analysis (ICCCA), May 19-23, 2017, Lakeland, FL

Technical Committee Member: The 7th IEEE Annual Computing and Communication Workshop and Conference, 9 - 11 January 2017, Las Vegas, USA

Manuscript Reviewer: Nature Scientific Reports, Human Fertility, Women's Health & Gynecology, Biomaterials, Materials Today Chemistry, Analyst, Chemical Communication, Lab on a Chip, Biointerphases, Biomicrofluidics, Microfluidics and Nanofluidics, Nanostructures, Analytical Methods, RSC Advance, Journal of Bioanalysis & Biomedicine, Journal of Nanoscience and Nanotechnology, Journal of Medical Chemistry

Education: Developed a new interdisciplinary course "Nano-Biotechnology" in Department of Computer & Electrical Engineering and Computer Science at Florida Atlantic University. Course contents are designed carefully by integrating engineering and life sciences concepts, preparing students for future trends in biotechnology.

Member: IEEE EMBS, Biomedical Engineering Society, and Sigma Xi

Media Coverage: Invited by various TV news channels to talk about research including West Palm Beach TV (WPTV), and WPLG news. Invited to talk about research on a live radio program, "Doctor's Radio, NY" and National Public Radio (NPR Miami). The PI's research work has been recognized by many premier magazines including Newsweek, Wired UK, Popular Science, Sciencedaily, and Engadget along with many others.

Selected Honors

2016 **Humanity in Science Award**

2016 **Best Poster Award** at Annual GPSA Research Day.

2015 **FAU Faculty Mentoring Award** for the year 2015.

2013 Epilepsy Therapy Project's **Shark Tank Competition**, Member of the Winning Team

2013 **BRight Future Prize**, Brigham and Women's Hospital, Member of the Winning Team

2012 Nanofab **Best Graduate Student** Award

2011 IEngage Mentoring Fellowship

2009 – 2011 Consortium for Nanomaterials for Aerospace Commerce and Technology (CONTACT) Award

2008-2012 STEM Fellowship, University of Texas

Biographical Sketch

Reza Azarderakhsh

(a) Professional preparation

- **Postdoc:** University of Waterloo, Canada; NSERC Postdoctoral Fellow; 2014.
- **Ph.D.:** Western University, Canada; Electrical and Computer Engineering; 2012.
- **M.Sc.:** Sharif University of Technology, Tehran, Iran; Computer Engineering; 2005.
- **B.Sc.:** Tehran Azad University, Tehran, Iran; Electrical Engineering; 2003.

(b) Appointments

- **2016-present** Assistant Professor CEECS, and I-SENSE Fellow, FAU, FL.
- **2014-2016** Assistant Professor of Computer Engineering, RIT, Rochester, NY.
- **2012-2014** NSERC Postdoc Research Fellow, University of Waterloo, CANADA.

(c) Products

(i) Five publications most closely related to the proposed research

1. A. Jalali, R. Azarderakhsh, M. Mozaffari Kermani, D. Jao, “Supersingular Isogeny Diffie-Hellman Key Exchange on 64-bit ARM”, **IEEE Transactions on Dependable and Secure Computing (TDSC)**, to appear, 2017.
2. B. Koziel, R. Azarderakhsh and D. Jao, “Side-Channel Attacks on Quantum-Resistant Supersingular Isogeny Diffie-Hellman”, in **Proc. Selected Areas in Cryptography (SAC 2017)**, to appear, 2017.
3. Y. Yoo, R. Azarderakhsh, A. Jalali, D. Jao, “A Post-Quantum Digital Signature Scheme based on Isogenies”, in **Proc. Financial Cryptography (FC 2017)**, to appear, 2017.
4. B. Koziel, R. Azarderakhsh, A. Jalali, D. Jao, and M. Mozaffari Kermani, “NEON-SIDH: Efficient implementation of supersingular isogeny Diffie-Hellman key exchange protocol on ARM”, in **Proc. Cryptology and Network Security, (CANS 2016)**, pp. 88-103, 2016.
5. K. Järvinen; A. Miele; R. Azarderakhsh; P. Longa, “FourQ on FPGA: New Speed Records for Elliptic Curve Cryptography over Large Prime Characteristic Fields,” in **Proc. Cryptographic Hardware and Embedded Systems (CHES 2016)**, pp. 517-537, 2016.

(ii) Five other related publications

1. B. Koziel, R. Azarderakhsh, M. Kermani, D. Jao, “Post-Quantum Cryptography on FPGA Based on Isogenies on Elliptic Curves”, **IEEE Transactions on Circuits and Systems (TCAS-I)**, no. 64, vol. 1, pp. 86-99, 2017.
2. B. Koziel, R. Azarderakhsh, and M. Mozaffari Kermani, “Fast Hardware Architectures for Supersingular Isogeny Diffie-Hellman Key Exchange on FPGA”, in **Proc. 17th International Conference on Cryptology (INDOCRYPT 2016)**, pp. 191-206, 2016.
3. R. Azarderakhsh; D. Jao; K. Kalach; B. Koziel; C. Leonardi, “Key Compression for Isogeny-Based Cryptosystems”, in **Proc. of the 3rd ACM ASIA Public-Key Cryptography Workshop (AsiaPKC 2016)**, pp. 1-10, May 2016.

4. R. Azarderakhsh; K. Karabina, “Efficient Algorithms and Architectures for Double Point Multiplication on Elliptic Curves”, in **Proc. of the Third Workshop on Cryptography and Security in Computing Systems (CS2@HiPEAC)**, pp. 25-30, Jan. 2016.
5. R. Azarderakhsh; K. Karabina, “A new double point multiplication algorithm for binary elliptic curves with Endomorphisms”, **IEEE Transactions on Computers (TC)**, vol. 63, no. 10, pp. 2614-2619, 2014.

(d) Synergistic activities

- **Editorial Board:** (a) Associate Editor for the IEEE Transactions on Circuits and Systems I (TCAS-I) cryptographic hardware track , (b) Guest Editor for a SI: IEEE Transactions on Dependable and Secure Computing (TDSC), (c) Guest Editor for a SI: IEEE/ACM Transactions on Emerging Security Trends for Biomedical Computations, Devices, and Infrastructures.
- **Technology Transfer:** Entrepreneur and founder of PQSecure Technologies LLC, Design and implementation of elliptic curve cryptography on BlackBerry Ltd. smartphones for BlackBerry company. Test compaction has been transferred into their internal tool flow.
- **TPC member of Conferences:** SPACE-2017, SSR-2017, IWSEC-2016/2017, FDTC-2017, ACM/SAC-2017, TrustCom-2016, LightSec-2015, SECURITY-2015, ICIKT-2015, ProveSec-2014, PriSec-2013, DCPperf-2012/2013, CloudSec-2011, CSC-2010/2013, SENSORCOMM-2013.
- **Keynote Tutorial/Talk:** (a) ETSI / IQC Quantum Safe Workshop 2017, (b) Microsoft Research Cryptography group 2017, (c) ICT Advanced Innovation Center, Sharif University of Technology, 2016. (d) NSA/DHS Designated Center of Excellence (U at Buffalo), 2014, (e) Laboratory of Cryptography, University of Tsukuba, 2013, (f) Research day at Computer Engineering department at Urmia University, 2015. **Best poster award:** Florida Institute for Cybersecurity (FICS) Research, Quantum-resistant Diffie-Hellman Key Exchange on Nexus 6P Smartphone, 2017.
- **Course Development and Pedagogical Activities:** Developed new graduate level courses on “Cryptographic Computations” and “Cryptographic Engineering” at RIT and FAU respectively. Few universities in the US offer such courses. Also, developed a senior undergraduate level course in “Design of Digital Systems”. Developed a video on quantum computers attack awareness.

JONATHAN BAGBY, Ph.D.

Department of Computer and Electrical Engineering and Computer Science
Florida Atlantic University, Boca Raton, FL 33431
bagby@fau.edu

a. PROFESSIONAL PREPARATION

Ph.D. Michigan State University, 1984
M.S. Ohio State University, 1981
B.S. Michigan State University, 1980

b. APPOINTMENTS

Associate Professor, Dept. of Electrical Engineering, Florida Atlantic University,
1991 – present
Assistant Professor, Dept. of Electrical Engineering, University of Texas Arlington,
1984 – 1990

c. PRODUCTS

Product Closely Related

1. Designing and Optimizing the RF/Antenna System by Analyzing and Collecting Complex Big Data. Sponsor: NSF I/UCRC CAKE, \$10,000 for 2016.
2. Radiation From Small Ferrite Loop Antennas: Phase II
Sponsor: Motorola, Inc., \$11,011 for 1996.
3. High-Performance Computation for Electromagnetics: Phase I
Sponsor: Motorola, Inc., \$5,965 for 1994.
4. Modern RF and Microwave Measurements
Sponsor: National Science Foundation ILI Program, \$174,000 for 1992-93.

Other Significant Products

1. S. Abazari and J. Bagby, “Adaptive Antenna Array Beamforming Using Weighted Non Negative Least Mean Square Base on Mutual Coupling,” IEEE Trans. Antennas Propag., 2017.
2. S. Abazari and J. Bagby, “Mutual Coupling Reduction of Closely Spaced MIMO Antenna Based on Electric Radiator,” Progress in Electromagnetics Research Letters, 2016.
3. S. Aghdam and J. Bagby, “Resonator Type for the Creation of a Potentially Reconfigurable Filtering Band in a UWB Antenna,” Progress In Electromagnetics Research Letters, Vol. 52, pp. 17 – 21, 2015.
4. S. Garcia, J. Bagby, I. Morazzani, “Plane-Wave Scattering of a Periodic Corrugated Cylinder,” IEEE Int. Microwave Symp., 2017.
5. J. Bagby and S. Garcia, “Electromagnetic Scattering from a Loaded Corrugated Cylinder,” Int. PIERS Symp., 2017.

6. S. Abazari and J. Bagby, "Malleble Hyperbolic Cosine Weighting Function Used in Side Lobe Suppression in Antenna Arrays," *Phase Array Syst. & Tech.*, 2016.
7. S. Abazari and J. Bagby, "Reconfigurable UWB Antenna Using a Switchable PIN Diode and Tunable Varactor Diode," *IEEE Trans. Antennas Propag. Lett.*, 2014.

Biographical Sketch
Dr. Elias Bou-Harb

School of Engineering and Computer Science, Florida Atlantic University (FAU), ebouharb@fau.edu,
<http://faculty.eng.fau.edu/ebouharb/>

Biography

Dr. Elias Bou-Harb is a young tenure-track Assistant Professor at the CEECS department at Florida Atlantic University. Previously, he was a postdoctoral research scientist at Carnegie Mellon University (CMU), USA, where he executed imperative research related to empirical threat analysis for IoT and CPS. Dr. Bou-Harb's research, development, training activities and interests focus on the broad area of operational cyber security, including, attacks detection and characterization, Internet measurements, cyber security for critical infrastructure and big data analytics. Dr. Bou-Harb, at 29 years old, has published more than 35 refereed research papers, some of which are in leading cyber security and networking venues such as IEEE Transactions on Dependable and Secure Computing (TDSC), the IEEE Network and Distributed System Security Symposium (NDSS), Elsevier's Computer and Security, IEEE Communications Magazine, and IEEE Communications Surveys & Tutorials. His academic connections and research collaborations include the electrical engineering and computer science departments at CMU, Georgia Institute of Technology, New York University, and Florida's Cyber Security Center at the University of South Florida. Dr. Bou-Harb is the recipient of 3 best paper awards at international venues, including the prestigious ACM's Digital Forensic Research Conference (DFRWS US).

Professional preparation

- *Bachelor of Applied Science*: Computer Science, University of Notre Dame, Lebanon, 2009
- *Masters of Applied Science*: Information Systems Security, Concordia University, Canada, 2011
- *Doctor of Philosophy*: Computer Science, Concordia University, Canada, 2015
- *Postdoctoral Fellow*: Computer Science, Carnegie Mellon University, USA, 2015

Appointments

- *Jan 16-Pres*: Tenure-track Assistant Professor, Department of Computer Science, FAU, USA
- *April 15-Dec 15*: NSERC Postdoctoral Fellow, Department of Computer Science, Carnegie Mellon University, USA
- *June 14-Aug 14*: Visiting Research Scientist, Australia's Information and Communications Technology Research Centre of Excellence, Australia
- *Sept 2009-Pres*: Senior Research Scientist, Cyber Threat Intelligence Unit, National Cyber Forensics and Training Alliance, Canada

Products: Most significant to this proposal

- C. Fachkha, **E. Bou-Harb**, A. Keliris, N. Memon and M. Ahamad. "Internet-scale probing of CPS: Inference, characterization and orchestration analysis." Proceedings of NDSS. Vol. 17. 2017.
- **E. Bou-Harb**, Chadi Assi, and Mourad Debbabi. "CSC-Detector: A System to Infer Large-Scale Probing Campaigns." *IEEE Transactions on Dependable and Secure Computing* (2017).
- **E. Bou-Harb**, M. Debbabi and C. Assi, "Big Data Behavioral Analytics Meet Graph Theory: On Effective Botnet Takedowns." in *IEEE Network*, vol. 31, no. 1, pp. 18-26, 2017.

- **E. Bou-Harb**, Mourad Debbabi, and Chadi Assi. "A novel cyber security capability: Inferring Internet-scale infections by correlating malware and probing activities." *Computer Networks* 94 (2016): 327-343.
- **E. Bou-Harb**, Mourad Debbabi, and Chadi Assi. "On fingerprinting probing activities." *Computers & Security* 43 (2015): 35-48.

Professional experience and capabilities

- *Cyber Security: Research, Operations and Development*
National Cyber-Forensics & Training Alliance (NCFTA); Sept 09 – June 15
 - A Canadian cyber security capability for the analysis of cyberspace
 - Designed, implemented and evaluated efficient big data analytics (predictive analytics, quantitative and statistical analysis) and correlation engines for the acquisition, storing and processing of raw real-time cyber security data
 - Designed and developed techniques for the detection, mitigation and attribution of scanning, denial of service and amplifications attacks
 - Evaluated and benchmarked the performance of big data warehouses.
- *Senior Cyber Security Advisor and Consultant*
INFIDEM (Cyber security supplier for the Canadian Government); Jan 14 – Dec 15
 - Advised team leaders, working on varying projects, on cyber security approaches related to Quebec's critical infrastructure security and tax evasion prevention
 - Designed, evaluated and reviewed infrastructure security architectures
 - Analyzed and synthesized threat models, and responded to incidents in order to prevent the exploitation of vulnerabilities.

Selected honors & awards

- Natural Sciences and Engineering Research Council of Canada (**NSERC**) Postdoctoral Fellowship (**PDF**): \$90, 000. **Top 1%** of all Canadian Computer Science Ph.D. Students.
- **Best Paper Award** at the ACM International Digital Forensics Research Conference (DFRWS), Denver, USA, August 2014. DFRWS is one of the most renowned Digital Forensics venue.
- **Best Paper Award** at the IEEE International Conference on Availability, Reliability and Security (ARES), Regensburg, Germany, September 2013.
- **Best Paper Award** at the IEEE International Symposium on Network Computing and Applications (NCA), Boston, USA, August 2013. NCA is a top-tier venue.

Lofton A. Bullard, Curriculum Vitae

EDUCATION

Doctor of Philosophy **May 2008**
Florida Atlantic University **Boca Raton, FL**
Major: Computer Science, GPA 3.8/4.0
Awards: McKnight Fellowship, Florida Atlantic University Employee Grant In-Aid

HONORS, AWARDS AND CERTIFICATES

FAU Excellence and Innovation in Undergraduate Teaching Award for 2014
FAU Excellence and Innovation in Undergraduate Advising Award for 2012
State of Florida Department of Education Professional Educator's Certificate (Mathematics: Grades 6-12)
McKnight Fellow – Florida Endowment Fund 2002-2003
Florida Atlantic University Employee Grant-In-Aid Award 2001-2002
IMPAC Award 1996 for Academic Excellence

PROFESSIONAL EXPERIENCE

Senior Instructor/Associate Director of the CAPTURE Program Florida Atlantic University	2015 - Present Boca Raton, FL
Senior Instructor/Director of Engineering Student Advising, Florida Atlantic University	2013-2015 Boca Raton, FL
Senior Instructor/Academic Advisor, Florida Atlantic University Florida Atlantic University	2008-2013 Boca Raton, FL
Computer Science Instructor Florida Atlantic University	1999-Present Boca Raton, FL

PUBLICATIONS

“Verifying the Security Characteristics of a Secure Physical Access Control Protocol.”, International Journal of reliability, Quality and Safety Engineering, Vol. 23, No. 2, 2016

“Formal Verification of the Universal Physical Access Control System (UPACS)”, IEEE. doi: 10.1109/RWEEK 2015.7287416

“A Framework of Combining Data Pre-Processing Methods and Boosting for Software Quality Classification.”
Proceedings of the 21st ISSAT International Conference on Reliability and Quality in Design, Philadelphia, PA, August 6-8, 2015.

- "Assessments of Feature Selection with Respect to Data Sampling for Highly Imbalanced Software Measurement Data." Proceedings of the 20th ISSAT International Conference on Reliability and Quality in Design, Seattle, Washington, August 7-9, 2014.
- "Exploring Ensemble Filters for Software Defect Prediction." Proceedings of the 19th ISSAT International Conference on Reliability and Quality in Design, Honolulu, Hawaii, August 5-7, 2013, pp. 216-220.
- "A Comparative Study of Filter-Based and Wrapper-Based Feature Ranking Techniques for Software Quality Modeling." International Journal of Reliability, Quality and Safety Engineering, Vol. 18, No. 4, 2011
- "A Comparative Study of Filter-Based and Wrapper-Based Feature Ranking Techniques for Software Quality Modeling." Proceedings of the 17th ISSAT International Conference on Reliability and Quality in Design, Vancouver, B.C., Canada, August 4-6, 2011 (**Selected as best paper and invited to be presented in special journal issue.**)
- "A Hybrid Approach to Software Fault Prediction." (Presenter) Proceedings of the 16th ISSAT International Conference on Reliability and Quality in Design, Washington, D.C., August 4-7, 2010

RELATED PROFESSIONAL DEVELOPMENT PROGRAMS

1. National Society of Black Engineers Annual National Convention in Kansas City, MO, 4/17
2. Recruiting and Retaining Historically Underrepresented Students in STEM conference in Golden, CO, 9/16
3. National Society of Black Engineers Annual National Convention in Boston, MA, 3/16
4. 2015 NACADA Annual Conference in Las Vegas, NV, 10/15
5. Completed CEN1010: eLearning Designer and Facilitator Certification Course in Boca Raton, FL, 12/11

DISSERTATION COMMITTEES

Darin Jamraj, Ph.D. Candidate, Dissertation Advisor: Bassem Alhalabi

TEACHING AND PROGRAMMING LANGUAGES

Courses Taught at Florida Atlantic University

CEN4010: Principle of Software Engineering
CET4930: Discrete Structures
COP2212: Introduction to Programming in C
COP3530: Data Structures
COT3002: Foundations of Computer Science
COT4400: Design and Analysis of Algorithms
COP3540: Introduction to Database Structures
COT4930: Linux Systems Management
SLS1503: Learning Strategies and Human Development

Mihaela Cardei, PhD

Professor

Computer and Electrical Engineering and Computer Science Department

Florida Atlantic University (FAU)

mcardei@fau.edu

<http://www.cse.fau.edu/~mihaela>

Professional Preparation

University of Minnesota	Computer Science	Ph.D., 2003
University of Minnesota	Computer Science	M.S., 1999
Politehnica University of Bucharest, Romania	Computer Science	M.S., 1996
Politehnica University of Bucharest, Romania	Computer Science	B.S., 1995

Appointments

2014 – present, Professor, Computer & Electrical Eng. and Computer Science, FAU.

2008 – 2014, Associate Professor, Computer & Electrical Eng. and Computer Science, FAU.

2003 – 2008, Assistant Professor, Computer Science and Eng., FAU.

2000, Development Engineer, CoManage Corporation.

1999, Research Intern at Honeywell Laboratories, Minneapolis, MN.

Research Awards

1. NSF CAREER *Optimization Problems in Wireless Sensor Network Design and Applications*, National Science Foundation (NSF), PI, 02/01/06-01/31/12, \$400,000.
2. NSF MRI: *Acquisition of a NUMA-based Supercluster for High Performance Computing*, National Science Foundation (NSF), co-PI, 08/01/05-07/31/10, \$459,065.
3. NSF CISE Instrumentation: *Wireless and Sensor Networking Laboratory*, National Science Foundation (NSF) & Division of Research at FAU, PI, 09/01/04-09/01/07, \$85,851.
4. Secure Telecommunication Networks, *Secure Routing Protocols for Ad Hoc Wireless Networks*, DoD Defense-wide RTDE grant, investigator, 09/01/04-08/31/06, \$37,000.
5. New Project Development Program, *Wireless Sensor Networks Design and Experimentation*, Division of Research at FAU, PI, 01/01/06-12/31/06, \$15,000.

Honors and Awards

- Researcher of the Year (Assistant Professor), Florida Atlantic University, 2006-2007.
- Best paper award, The 35th IEEE International Performance Computing and Communications Conference (IEEE IPCCC), Dec. 2016.
- Best paper award, The 10th IEEE International Conference on Mobile Ad-hoc and Sensor Networks (IEEE MSN), Dec. 2014.
- Best paper award, The 2nd IEEE International Conference on Mobile Ad-hoc and Sensor Systems (IEEE MASS), Nov. 2005.

Dissertation/Thesis advisor

- **Graduated 7 PhD students:** Yueshi Wu, Ali Abu-el Humos, Army Ambrose, Mirela Marta, Amalya Mihnea, Yinying Yang, Shuhui Yang.
- **Graduated 7 MS students:** Army Ambrose, Wael Awada, Pedro Heshike, Anthony Marcus, Mohammad Pervaiz, Anupama Sahu, Iana Zankina.

- Over 90 publications in total
- 6706 citations on Google Scholar

Recent Publications (2014 – Present)

1. C. Aranzazu-Suescun and M. Cardei, Distributed Algorithms for Event Reporting in Mobile-Sink WSNs for Internet of Things, *Tsinghua Science and Technology*, Special Issue on Internet of Things, Vol. 22, Issue 4, pp. 413-426, Aug. 2017.
2. Y. Wu and M. Cardei, Distributed Algorithms for Barrier Coverage via Sensor Rotation in Wireless Sensor Networks, *Journal of Combinatorial Optimization*, DOI: 10.1007/s10878-016-0055-3, 2016.
3. Y. Wu and M. Cardei, Multi-Channel Approaches for Wireless Sensor Networks, *Computer Communications Journal (Elsevier)*, DOI: 10.1016/j.comcom.2016.08.010, 2016.
4. Y. Wu and Mihaela Cardei, Distributed Algorithms for a Robust Topology using Reconfigurable Radios Wireless Sensor Networks, *International Journal of Sensor Networks (IJSNet)*, DOI:10.1504/IJSNET.2016.10001264, 2016.
5. Y. Wu and M. Cardei, A Cognitive Radio Approach for Data Collection in Border Surveillance, *IEEE International Performance Computing and Communications Conference (IPCCC)*, Dec. 2016.
6. C. Aranzazu-Suescun and M. Cardei, Event-based Clustering for Composite Event Detection in Wireless Sensor Networks, *IEEE International Performance Computing and Communications Conference (IPCCC)*, Dec. 2016, *Best Paper Award*.
7. C. Aranzazu-Suescun and M. Cardei, Unmanned Aerial Vehicle Networking Protocols, *LACCEI International Multi-Conference for Engineering, Education, and Technology*, Jul. 2016.
8. A. Mihnea and M. Cardei, Methods to Improve Capacity in Grid Networks, *The 29th International Conference on Computer Applications in Industry and Engineering (CAINE)*, Sept. 2016.
9. Y. Wu, D. Raviv, and M. Cardei, Campus Navigation System with Seamless Real-Time Information, *International Conference on Computers and Their Applications (CATA)*, Apr. 2016.
10. A. Mihnea and M. Cardei, Analysis of Interference for a Multi-Radio Channel Assignment Algorithm, *International Conference on Computers and Their Applications (CATA)*, Apr. 2016.
11. Y. Wu and M. Cardei, Distributed Algorithm for Mending Barrier Gaps via Sensor Rotation in Wireless Sensor Networks, *The 9th Annual International Conference on Combinatorial Optimization and Applications (COCOA 2015)*, Dec. 2015.
12. A. Mihnea and M. Cardei, Efficient Wireless Communication in Grid Networks, *International Journal of Interdisciplinary Telecommunications and Networking (IJITN)*, Vol. 7(3), pp. 57-79, 2015.
13. A. Mihnea and M. Cardei, Robustness to Multiple Primary Users and Balanced Channel Assignment in Cognitive Radio Networks, *International Journal of Computer and Communication System Engineering (IJCCSE)*, Vol 2(3), pp. 553-560, 2015.
14. A. Mihnea and M. Cardei, Multi-Channel Wireless Sensor Networks, *Recent Development in Wireless Sensor and Ad-hoc Networks*, S. Patnaik, X. Li, and Y.-M. Yang (eds.), Springer, 2015, ISBN: 978-81-322-2129-6.

ROBERT B. COOPER, PhD

Professor
Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University
Boca Raton, FL 33431-0991

(561)297-3673
cooperr@fau.edu
www.cse.fau.edu/~bob/

EDUCATION

PhD (Electrical Engineering), 1968; MS (Systems Engineering and Operations Research), 1962; University of Pennsylvania.
BS (Science), 1961; Stevens Institute of Technology.

EMPLOYMENT

Florida Atlantic University, 1978-present (tenure awarded 1983).
Professor, Dept. of Computer and Information Systems, 1978-1987.
Professor, Dept. of Computer & Electrical Engineering and Computer Science, 1987-present; Associate Chair, 2003-2009.
Sabbatical leave, Fall 1988, visitor: NTT Communication Switching Labs, Tokyo.

New Mexico Institute of Mining and Technology, 1976-1978.
Associate Professor, Dept. of Mathematics.

University of Michigan, January-June 1975.
Visiting Associate Professor, Dept. of Industrial and Operations Engineering.

Georgia Institute of Technology, 1969-1976 (tenure awarded 1972).
Associate Professor, School of Industrial and Systems Engineering, 1969-1973.
Associate Professor, School of Information and Computer Science, 1972-1976.

AT&T Bell Laboratories, 1961-1969.

PROFESSIONAL ACTIVITIES (selected)

OPERATIONS RESEARCH, Area Editor (Telecommunications), 1998-2002; Associate Editor, 1992-1998.

NAVAL RESEARCH LOGISTICS, Associate Editor, 1984-2007

INFORMS JOURNAL ON COMPUTING, Associate Editor, 1988-2011.

OPSEARCH (Journal of the Operational Research Society of India), Associate Editor, 1979-1992.

INFORMS Nicholson Prize Committee, Member 1994.

INFORMS Lanchester Prize Committee, Member 1992.

INFORMS Applied Probability Society: Chair 1984-85, Chair-Elect 1983-84, Secretary-Treasurer 1976-77 and 1983-84, Council 1979-81. Best Publication Prize Committee, Chair 1996 and Member 1994. Erlang Prize Committee, Member 1996.

INFORMS Technical Section on Telecommunications: Chair 1992-93, Chair-Elect 1991-92.

PROFESSIONAL MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE). Fellow (elected 1996, "For fundamental contributions to queueing theory and its applications in teletraffic and computer engineering").

Institute for Operations Research and the Management Sciences (INFORMS)
Society for Industrial and Applied Mathematics (SIAM)

American Association for the Advancement of Science (AAAS)

Sigma Xi (elected 1970)

Tau Beta Pi (elected 1960)

PUBLICATIONS (selected)

Cooper, R.B., S.-C. Niu, and M.M. Srinivasan. Setups in Polling Models: Does it Make Sense to Set Up if No Work is Waiting? *JOURNAL OF APPLIED PROBABILITY* 36 (1999), 585-592.

Cooper, R.B., S.-C. Niu, and M.M. Srinivasan. Some Reflections on the Renewal-Theory Paradox in Queueing Theory. *JOURNAL OF APPLIED MATHEMATICS AND STOCHASTIC ANALYSIS* 11 (1998), 355-368.

Cooper, R.B., S.-C. Niu, and M.M. Srinivasan. When Does Forced Idle Time Improve Performance in Polling Models? *MANAGEMENT SCIENCE* 44 (1998), 1079-1086.

Cooper, R.B., S.-C. Niu, and M.M. Srinivasan. A Decomposition Theorem for Polling Models: The Switchover Times are Effectively Additive. *OPERATIONS RESEARCH* 44 (1996), 629-633.

Niu, S.-C. and R.B. Cooper. Transform-Free Analysis of M/G/1/K and Related Queues. *MATHEMATICS OF OPERATIONS RESEARCH* 18 (1993), 486-510.

Fuhrmann, S.W. and R.B. Cooper. Stochastic Decompositions in the M/G/1 Queue with Generalized Vacations. *OPERATIONS RESEARCH* 33 (1985), 1117-1129.

Cooper, R.B. Queues Served in Cyclic Order: Waiting Times. *THE BELL SYSTEM TECHNICAL JOURNAL* 49 (1970), 399-413.

Cooper, R.B. *INTRODUCTION TO QUEUEING THEORY*. Macmillan, 1972. Second Edition, North-Holland (Elsevier), 1981. Solutions Manual by Borge Tilt. Available free from homepage: www.cse.fau.edu/~bob

VITAE SUMMARY
Dolores F. De Groff, Ph.D.

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E-mail: degroff@fau.edu
Cell: (561) 305 2553

Associate Professor
Department of Computer & Electrical
Engineering and Computer Science
Florida Atlantic University
Boca Raton, FL 33431

A. EDUCATIONAL BACKGROUND

Ph.D.	Electrical Engineering, Florida Atlantic University, 1993
M.S.E.	Electrical Engineering, Florida Atlantic University, 1990
B.S.	Electrical Engineering, Florida Atlantic University, Honors , 1989

B. EMPLOYMENT HISTORY

August 2014–Present	Associate Professor (Tenured), Department of Computer & Electrical Engineering and Computer Science, Florida Atlantic University.
August 2009–August 2014	Associate Professor (Tenured), Department of Civil, Environmental, and Geomatics Engineering, Florida Atlantic University.
June 1998–August 2009	Associate Professor (Tenured), Department of Electrical Engineering, Florida Atlantic University.
August 1994–June 1998	Assistant Professor (Tenure-track), Department of Electrical Engineering, Florida Atlantic University.
August 1993–August 1994	Visiting Assistant Professor, Department of Electrical Engineering, Florida Atlantic University.

C. AREAS OF CURRENT RESEARCH ACTIVITY

- Smart Grid, Green Environment, Alternative Energy Production
- Neural Networks

D. PUBLICATIONS

- **Journal papers (Total):** 29
- **Conference papers (Total):** 13

Selected Recent Publications:

D. De Groff: "Classroom Learning of the Topics in Electric Power Systems Emphasized with the Use of Matlab™, PowerWorld Simulator™, and SimPowerSystems™," Computers in Education Journal (Vol. 7, No. 2, April-June 2016 Issue).

D. De Groff, M. Dabbas and P.S. Neelakanta: "Neuro-Fuzzy Approach Toward Technoeconomic Forecasting," Journal of Electrical Engineering and Electronic Technology (Vol. 4, No. 1, 2015).

D. De Groff: "A Simplified Analysis of an Electrical Network with Resistive and/or Reactive Elements," International Journal of Computers & Technology (Vol. 12, No. 6, Feb. 11, 2014 issue).

M. Dabbas, P.S. Neelakanta, and **D. De Groff:** "Technoeconomic Projections With Artificial Neural Networks Using an Ensemble of Sparsely-sampled Bootstrapped Data," British Journal of Economics, Management & Trade (4(2):228-263,2014).

D. De Groff and M. Arockiasamy: "Solving Graphic-Statics Problems Using AutoCAD™," Computers in Education Journal (Vol.4, No. 2, April – June 2013 Issue).

P.S. Neelakanta, M. Dabbas, and **D. De Groff**: "Constructive ANN with Dynamically Set Sigmoid: A Simulation Tool for Technoeconomic Forecasting," International Journal of Latest Trends in Computing (E-ISSN:2045-5364) (Vol. 3, No. 2, June 2012).

P.S. Neelakanta, R.F. Yassin, M. Dabbas and **D. De Groff**: "Growth-Models of Market Structures and Forecast Predictions via Artificial Neural Networks," International Journal of Computer Theory and Engineering, Sept. 2011.

D. De Groff: "Computational Decision-Making via Game-theoretic Approach and ANN-Based Methods: An Example of Power Utility Conservation Under Non-green/Green Environments," International Journal of Latest Trends in Computing (Vol. 2, Issue 1, March 2011) Published Online (<http://ijlct.excelingtech.co.uk/vol2issue1/10-vol2issue1.pdf>).

D. De Groff: "Green Environment: Decision-Making and Power Utility Optimization Towards Smart-Grid Options," Int. J. Smart-Grid and Renewable Energy, 2010, (Vol. 1, No. 1 May 2010). Published Online (<http://www.scirp.org/journal/sgre/>).

E. TEACHING AREAS/SPECIALIZATIONS

(1) Twenty-four years teaching experience in the areas of Alternative Energy, Power Systems, Electrical Machines, and STEM-related initiatives. (2) Involved in a team effort that was successful in obtaining a Department of Energy Grant to teach courses in the energy area. (3) Recipient of several teaching awards including the University Award for Excellence in Undergraduate Teaching. (4) **Current teaching load involves teaching approximately five-hundred (500) students per academic year**

F. SPONSORED ACTIVITIES

Southeastern Center for Electrical Engineering Education

Presidential Research Development Award (FAU)

Participation on Florida Department of Education (FLDOE) Race to the Top (PI: Dr. Ali Zilouchian) Grant (for FAU High)

Participation with Navitas courses (graduate and undergraduate)

Participation with Department of Energy Grant (PI: Dr. Ali Zilouchian)

G. AWARDS: 1996: Florida Engineering Education Delivery System (FEEDS) Exceptional Professor, College of Engineering, FAU
1997: University Award for Excellence in Undergraduate Teaching, FAU
1997: Most Organized Professor, Department of Electrical Engineering

H. PROFESSIONAL AFFILIATIONS Sigma Xi, Tau Beta Pi, Society of Women Engineers

NURGUN ERDOL, Ph.D.

Department of Computer and Electrical Engineering and Computer Science
Florida Atlantic University, Boca Raton, FL 33431
erdol@fau.edu

a. PROFESSIONAL PREPARATION

Ph.D. University of Akron, 1982
M.S. Bogazici University, 1976
B.S. Bogazici University, 1974

b. APPOINTMENTS

2013, October 1 – present, Professor and Chair, Computer & Electrical Engineering and Computer Science, Florida Atlantic University
2010-present, Professor, Computer & Electrical Engineering and Computer Science, Florida Atlantic University
2002-2010, Professor, Department of Electrical Engineering, Florida Atlantic University
Summer 2002, NASA Faculty Fellow at Langley Research Center
1994-1995, Visiting Associate Professor, Electrical, Computer and Systems Engineering Department, Rensselaer Polytechnic Institute
1993-2002 Associate Professor, Department of Electrical Engineering, Florida Atlantic University
1980-1993, Assistant Professor Department of Electrical Engineering, Florida Atlantic University

c. PRODUCTS

Product Closely Related

1. Castellanos, R., N. Erdol, and H. Zhuang, “Multitaper Smoothed Minimum Statistics Noise Power Estimation,” *Interdisciplinary Topics in Applied Mathematics, Modeling and Computational Science*, Springer Proceedings in Mathematics & Statistics 117, 133-139, 2015.
2. Esfahanian, M., H. Zhuang, and N. Erdol, “Sparse Representation for Classification of Dolphin Whistles by Type,” *J. Acoustical Society of America*. Vol. 136 (1), 1-7, July 2014.
3. Esfahanian, M., H. Zhuang, and N. Erdol, “On contour-based classification of dolphin whistles by type,” *Applied Acoustics. Journal of Applied Acoustics*, Vol. 76, pp. 274-279, Feb 2014.
4. Esfahanian, M., H. Zhuang, and N. Erdol, “Using local binary patterns as features for classification of dolphin calls,” *J. Acoustical Society of America*. Vol. 134 (1), 105-111, July 2013.

5. W. Charoenruengkit, and N. Erdol, The Effect of Spectral Estimation on Speech Enhancement Performance, IEEE Transactions on Audio, Speech and Language Processing, vol.19, Issue 5, 1170-1179, 2011.

Other Significant Products

1. M. Esfahanian, Zhuang H., Erdol N., and E. Gerstein, "Comparison of Two Methods for Detection of North Atlantic Right Whale Upcalls," Proceedings of the 23rd European Signal Processing Conference, 559-563, 2015.
2. M. Esfahanian, H. Zhuang, and N. Erdol, "Application of Gabor wavelets and Sparse-Representation for classification of dolphin whistles," Proc. ICASSP 2014, Florence, Italy, May 2014,
3. M. Esfahanian, H. Zhuang, and N. Erdol, "Sparse Representation Classification of Dolphin Whistles Using Local Binary Patterns," 166th Meeting of the Acoustical Society of America, San Francisco, USA, December 2013.
4. M. Esfahanian, H. Zhuang, and N. Erdol, "Classification of Dolphin Whistles Types Using an Eigen-Whistle Algorithm," 5th International Workshop on Detection, Classification, Localization, and Density Estimation (DCLDE) of Marine Mammals, Oregon, USA, August 2011.
5. S. Bulek, N. Erdol, "Exploring Sensitivity of Joint Diagonalization in Convolutional Blind Source Separation," Transactions of the Asilomar Conference on Signals, Systems and Computers, 2010.

d. SYNERGISTIC ACTIVITIES

1. Zilouchian, A. (PI), N. Romance, N. Erdol and H. Zhuang, "HSI- STEM & Articulation Program: An Articulated State College-University Framework for Increasing Graduation Rates of Hispanic and Low-income Students in Computer Science," Department of Education. Total award: \$4,456,707, 10/01/2016-09/30/2021.
2. Rhodes, W. T., N. Erdol, Collaborative Development and Application of Distributable, Internet Accessible, Interactive Medical Imaging Teaching Software and Dynamic Tracking System", NSF Total award: \$104,000. 2010-2011.
3. Erdol, N., "Signal Processing for Detection and Characterization of Wake Vortices," NASA, Total award: \$268,106. 2005-2006.
4. Erdol, N., "Signal Processing for Detection and Characterization of Wake Vortices," NASA, Total award: 150,950. 2004-2005.
5. Erdol, N., "Signal Processing for Detection and Characterization of Wake Vortices," NASA, Total award: \$274,000. 2003-2004.

Short Biography: Eduardo B. Fernandez (Eduardo Fernandez Buglioni)

See <http://faculty.eng.fau.edu/fernande> for a complete biography and list of publications.

Professor, Department of Computer and Electrical Engineering and Computer Science

Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431

Tel. 561-297-3466, Fax 561-297-2800, email: fernande@fau.edu

Education

- Ingeniero Electricista (Electrical Engineer), Univ. F. Santa Maria, Valparaiso, Chile, 1960.
- M.S. in Electrical Engineering, Purdue University, Lafayette, Indiana, 1963.
- Ph.D. in Computer Science, University of California, Los Angeles, California, 1972.

Appointments:

[January 1984-present] Dept. of Computer and Electrical Eng. and Comp. Science, Florida Atlantic University. Tenured May 1986. Associate Chairman 1987- 1989.

[August 1981-December 1983] Professor of Elect. and Computer Eng., University of Miami, FL.

[January-June 1981] Adjunct Professor, Department of Computer Science, Yale University.

[1980-81] IBM Corp., Advisory Industry Specialist, New Haven, CT.

[1973-1979] IBM Corporation, Los Angeles Scientific Center Staff Member.

[1973-75] University of California Los Angeles, Department of Computer Science, Adjunct Professor.

[1970-1972] University of California, Los Angeles, Department of Computer Science. Postgrad.Res. Engineer.

[1966-1973] Universidad de Chile, Department of Electrical Engineering, Associate Professor of Electrical Engineering and Computer Science. Head of the Digital Systems and Control Laboratory 1970-1973.

Selected Publications:

E.B.Fernandez, *Security patterns in practice: Building secure architectures using software patterns*, Wiley Series on Software Design Patterns, 2013.

Eduardo B. Fernandez, Elias Bou-Harb, and Virginia Romero, "A security pattern for honeypots", 6th Asian Conf. on Pattern Languages of Programs" (AsianPLoP 2017), Tokyo, Japan, March 11-12, 2017.

E.B. Fernandez, N. Yoshioka, H. Washizaki and M.H.Syed, "Modeling and security in cloud ecosystems", *Future Internet* **2016**, 8(2), 13; (Special Issue Security in Cloud Computing and Big Data), doi:[10.3390/fi8020013](https://doi.org/10.3390/fi8020013)

E.B.Fernandez, Raul Monge, and Keiko Hashizume, "Building a security reference architecture for cloud systems", *Requirements Engineering*. Doi: 10.1007/s00766-014-0218-7, June 2016, Volume 21, Issue 2, pp 225-249.

Anton Uzunov, E. B Fernandez, Katrina Falkner, "Security solution frames and security patterns for authorization in distributed, collaborative systems", *Computers & Security*, 55, 2015, pp. 193-234, doi: 10.1016/j.cose.2015.08.003

E.B.Fernandez and M.M. Larrondo-Petrie, "Designing secure SCADA systems using security patterns", *Procs. of the 43rd Hawaii Conf. on Systems Science*, Honolulu, Jan.2010, 1-8.

<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5428672>

M. VanHilst, E.B.Fernandez, and F. Braz, "A multidimensional classification for users of security patterns", *Journal of Research and Practice in Information Technology*, vol. 41, No 2, May 2009, 87-97.

E.B.Fernandez, J. Ballesteros, A. C. Desouza-Doucet, and M.M. Larrondo-Petrie, "Security Patterns for Physical Access Control Systems", in S. Barker and G.J. Ahn (Eds.), *Data and Applications Security XXI*, LNCS 4602, 259-274, Springer 2007.

E. B. Fernandez, R. B. France, and D. Wei, "A formal specification of an authorization model for object-oriented databases", in *Database Security IX: Status and Prospectus*, D. Spooner, S. Demurjian, and J. Dobson (Eds.), Chapman & Hall, 1996, 95-110.

N. Delessy and E. B. Fernandez, "A pattern-driven security process for SOA applications", *Procs. of the 3rd Int. Conf. on Avail., Reliab. and Security (ARES 2008)*, Barcelona, Spain, March 4-7, 2008, 416-421.
E. B. Fernandez, E. Gudes, and H. Song, "A model for evaluation and administration of security in object-oriented databases", *IEEE Trans. on Knowledge and Database Eng.*, vol. 6, no. 2, April 1994, 275--292.

Synergistic Activities.

Chairman of 12 completed Ph.D. dissertations, 37 completed M.S. theses, 1 M.S. thesis and 4 Ph.D. dissertations in preparation. Committee member of 33 completed M.S. theses and 10 Ph.D. dissertations.

Referee or Committee member for external Ph.D. dissertations: University of Calcutta, India (1993); Indian Institute of Technology, New Delhi, India (1994); University of Nice, France(1998); Georgia Institute of Technology (1998); Catholic University, Santiago, Chile (1999), Univ. of Brasilia, Brazil (2009). University of Adelaide (Australia, 2011)

Referee Habilitation Profs. Guenther Pernul, U. of Regensburg, Germany, and Brahim Hamid, U. of Toulouse, France (2016).

New Graduate Courses Created: Fault-tolerant computer systems; Concurrent processing; Object-oriented software design; Data Security; Advanced object-oriented software design; Formal specification methods; Real-Time Software; Distributed Object-oriented Systems; Distributed Systems Security; Cloud Computing.

NSF panelist (many times). Reviewer of proposals/researchers for research commissions of Israel, South Africa, Austria, Holland, Hong Kong, Japan, Germany, Chile, Argentina, India, and France.

Honorific and Profess. Memberships:

Member of IFIP Working Group on Database Security (1988 to present).
Senior Member of IEEE, Member of ACM

Awards:

Shepherding award, EuroPLoP 2002, Shepherding award, PLoP 2002.

Keynote speaker: DEXA 1999, LatinAmerican Patterns Conf. 2005 and 2016, SSI 2006, SPAQu, 2007, WOSIS, 2008.

Program Committee Memberships:

Int. Conf. on Trust and Privacy in Digital Business (TrustBus), 2002-2011-2017

Int. Conference and Workshop on Database and Expert Systems Applications, DEXA, 2002 to 2010.

Int. Conf. on Electronic Commerce and Web Technologies, EC-Web 2002 to 2009.

Organizer of Workshop on Security patterns at DEXA and ARES 2007-2011

Organizer of Latin American Symposium on Software Architecture, Panama City, July 2012

Pattern Languages of Programs Conference (2010-2017)

Editorial board:

Communications and Computer Security

Acta Press, http://www.actapress.com/Content_Of_Journal.aspx?JournalID=164#editors-3

Journal of Applied and Theoretical Electronic Commerce Research (JTAER)

<http://www.jtaer.com/>

Information, MDPI, www.mdpi.com/journal/information

Borko Furht

(a) Professional Preparation

Institution(s)	Location	Major	Degree & Year
University of Belgrade	Belgrade, Yugoslavia	Electrical & Computer Engineering	PhD, 1978
University of Belgrade	Belgrade, Yugoslavia	Electrical Engineering	MSc, 1973
University of Belgrade	Belgrade, Yugoslavia	Electrical Engineering	BSEE (Dipl. Eng.) 1970

(b) Appointments

- 1992-present** Professor of Computer Science and Engineering
2009-2013 Chairperson, Department of Computer & Electrical Engineering and Computer Science
2002-2009 Chairman, Department of Computer Science and Engineering
2006-2008 Senior Asst. VP for Engineering & Technology at FAU
1988-1992 Senior Director of Advanced Development & Vice-President of Research, Modular Computer Systems, Computer Division of Daimler Benz, Fort Lauderdale, FL.
1982-1988 Associate Professor of Electrical and Computer Engineering, University of Miami, Coral Gables, Florida

(c) Publications (total about 320 publications)

(i) Five Publications Most Closely Related to the Proposed Project

1. B. Furht and F. Villanustre, "Big Data Technologies and Applications *Springer Science and Business Media*, New York, 2016.
2. V. Adzic, H. Kalva, and B. Furht, "Optimizing Video Encoding for Adaptive Streaming over HTTP," *IEEE Transactions on Consumer Electronics*, Vol. 58, No. 2, May 2012, pp. 397-403.
3. B. Furht and A. Escalante, "Handbook of Data Intensive Computing," *Springer Science and Business Media*, New York, 2011.
4. J. Shaw, F. Villanustre, B. Furht, A. Agarwal, and A. Jain, "Modeling Ebola Spread using HPCC/KEL System," Chapter in the book B. Furht and F. Villanustre, "Big Data Technologies and Applications *Springer Science and Business Media*, New York, 2016.
5. A. Colic, O. Marques, and B. Furht, "Driver Drowsiness Detection: Systems and Solutions, Springer Briefs, 2014.

(ii) Five Other Significant Publications

6. A. Colic, O. Marques, and B. Furht, "Design and Implementation of a Driver Drowsiness Detection System: A Practical Approach," *Proceedings of the International Conference on Signal Processing and Multimedia Applications (SIGMAP 2014)*, Vienna, Austria, 2014.
7. B. Furht, O. Marques, and A. Colic, "Driver Drowsiness Detection System Using Image Processing, FAU Patent Disclosure (July 2014), and Provisional US patent 62/027,573, August 2014.
8. B. Furht and A. Agarwal, "Handbook of Medical and Healthcare Technologies," *Springer Science and Business Media*, New York, 2013.
9. V. Adzic, H. Kalva, and B. Furht, "Content Adaptation for Mobile Devices: A Survey," *Special Issue on Survey Papers in Multimedia by World Experts, International Journal of Multimedia Tools and Applications*, Springer, No. 1, January 2011, pp. 379-396.

10. F. Villanustre and B. Furht, "Social Network Analytics: Hidden and Complex Fraud Schemes," Chapter in the book B. Furht and F. Villanustre, "Big Data Technologies and Applications *Springer Science and Business Media*, New York, 2016.

(d) Synergistic Activities

Leadership

- As Chair of the Department increased sponsored research from \$800,000 in 2002 to \$2.5 million in 2013.
- Serving as Special Advisor for Technology and Innovations for the United Nations Global Millennium Development Foundation (2013 – present)
- Editor-in-Chief of Springer's Journal of Multimedia Tools and Applications (1994-present) and Journal of Big Data (2013-present)

Research (total over \$15 million of sponsored research); Selected recent projects

- "NSF: Industry/University Cooperative Research Center for Advanced Knowledge Enablement," Phase II, PI, \$225,000, (2015-2020).
- "CC*DNI Networking Infrastructure: Enabling Multi-Campus, Data-Driven Science and Engineering through a 10Gb FAU DMZ", \$498,000, Co-PI, (2016-2017).
- NSF Fundamental Research Program "I/UCRC: Collaborative Research: Data Correlation and Fusion for Medical Monitoring," total \$400,000 including \$200,000 industry cost share from Soren Technologies, jointly with Florida International University, Co-PI, (2012-13).
- "A Multi-Center Distributed Cloud Computing Collaborative Feasibility Study to Provide Massive 3-D Visualization Services for Climate Data on Demand," NSF CORBI grant, jointly with University of Maryland and Florida International University, Co-PI, \$100,000, (2010-11).
- "NSF: Industry/University Cooperative Research Center for Advanced Knowledge Enablement," Phase I, PI, \$414,000 including supplements, (2009-2016).
- "Global Living Laboratory for Cyber Infrastructure Application Enablement", NSF PIRE Grant (jointly with FIU), Co-PI, \$2.3 million, (2007-2012).
- "Design of Blackberry and iOS Application for Push to Talk Technology," Co-PI, \$30,000, Motorola Mobility powered by Google, (2013).
- Collaborative Research: Data Correlation and Fusion for Medical Monitoring," Co-PI, \$200,000, Soren Technology, (2012-2013).
- "Exploration and Integration Voice over IP Technologies with Social Media Platform," Co-PI, \$142,000, NSF Center project for Motorola Mobility and other industry members, (2013).

Partnership

- Through NSF-sponsored I/UCRC CAKE established collaboration with 33 industry partners, which are members of the I/UCRC CAKE at FAU.
- Joint funded research projects with Florida International University and University of Maryland Baltimore County.

Service

- Conference and program chair of several international IEEE and ACM conferences
- Editor-in-Chief of Springer's Journal of Multimedia Tools and Applications (1994-present) and Journal of Big Data (2013-present)
- Served on Board of Directors of several high-tech companies
- Principal consultant for high-tech companies including IBM, Cisco, General Electric, Samsung, Xerox, Hewlett Packard, NASA, Honeywell, Adobe, and others.

Education

- Led the creation of several new programs at FAU: (a) Professional Weekend Master Program in Computer Science, (b) Bachelor in Information Technology, (c) Master of Information Technology and Management, and (d) Master in Multimedia Technology and Entertainment.

Biographical Sketch

Behnaz Ghoraani

Institute for Sensing and Embedded Network Systems Engineering
324 Engineering East
Florida Atlantic University
Boca Raton, FL 33431-0991

Email: bghoraani@fau.edu
Office Phone: 561.297.3035
Fax: 561.297.3792
Website: <http://biomedsignal.com/>

(a) Professional Preparation

Sharif University of Technology	Tehran, Iran	Electronics and Electrical Engineering	B.Sc., 1998
Amir Kabir University of Technology	Tehran, Iran	Electronics and Electrical Engineering.	M.Sc., 2000
Ryerson University	Toronto, Canada	Electrical and Computer Engineering	Ph.D., 2010
University of Toronto	Toronto, Canada	Cardiac Electrophysiology at Faculty of Medicine	2010-2012

(b) Appointments

Faculty Fellow, FAU Institute for Sensing and Embedded Network Systems Engineering	2016–present
Assistant Professor, FAU Computer & Electrical Engineering and Computer Science	2016–present
Assistant Professor, Rochester Institute of Technology, Biomedical Engineering	2012–2016
Seasonal Lecturer, Ryerson University, Electrical and Computer Engineering	2010–2012
Research Assistant, Ryerson University, Electrical and Computer Engineering	2005–2006
Test Engineer, Celestica, Alcatel Department, Toronto, Canada	2004–2005
Design Engineering, Kanavaran, Tehran, Iran	2000–2004

(c) Products

Students are underlined.

(i) (5 closely related)

- **B. Ghoraani**, “Class-specific Discriminant Time-frequency Analysis Using Novel Jointly-learned Non-negative Matrix Factorization”, EURASIP Journal on Advances in Signal Processing, DOI: 10.1186/s13634-016-0393-4. Sept 2016.
- V. Ramji, M. Hssayeni, M. Burack, **B. Ghoraani**, “Parkinson’s Disease Medication State Management Using Data Fusion of Wearable Sensors”, in the proceedings of the International Conference of the IEEE Biomedical and Health Informatics, Pages: 193 - 196, Orlando, Feb 2017.
- M. Hssayeni*, M. Burack, **B. Ghoraani**, “Automatic Assessment of Medication States of Patients with Parkinson’s Disease Using Wearable Sensors”, in the proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Pages: 6082-6085, Orlando, August 2016. * *Graduate Student received NSF young professional award*
- **B. Ghoraani**, S. Krishnan, R. J. Selvaraj and V. S. Chauhan, “T Wave Alternans Evaluation Using Adaptive Time-Frequency Signal Analysis and Non-negative Matrix Factorization”, Medical Engineering and Physics, 33(6), Pages:700-711, 2011. J15)

- **B. Ghoraani**, and S. Krishnan, “Time-Frequency Matrix Feature Extraction and Classification of Environmental Audio Signals”, the IEEE Transactions on Audio, Speech and Language Processing, 19 (7), Pages: 2197 – 2209, 2011.
- (ii) (5 other significant products)
- U.S. Patent Application: **B. Ghoraani** and **P. Ganesan**, “Systems and Methods for Localizing Signal Sources using Multi-Pole Sensors”, Serial No. 15/595,110, Filed: May 15, 2017
 - **P. Ganesan**, **M. Sterling**, **S. Ladavich** and **B. Ghoraani**, ”Computer-Aided Clinical Decision Support Systems for Atrial Fibrillation”, Computer-aided Technologies - Applications in Engineering and Medicine, ISBN 978-953-51-2788-8, Book edited by Razvan Udriou, December 2016.
 - **S. Traitruengsakul**, L. E. Seltzer, A. R. Paciorkowski, and **B. Ghoraani**, “Developing A Novel Epileptic Discharge Localization Algorithm for Electroencephalogram Infantile Spasms During Hypsarrhythmia”, *Medical & Biology Engineering and Computing Journal*, Pages: 1-10, February 2017.
 - **D. Sinkiewicz**, L. Friesen, **B. Ghoraani**, “A novel method for extraction of neural response from single channel cochlear implant auditory evoked potentials”. *Medical Engineering & Physics*. 40 (2017) Pages: 47–55.
 - **S. Ladavich** and **B. Ghoraani**, “Rate-Independent Detection of Atrial Fibrillation by Statistical Modeling of Atrial Activity”, *Biomedical Signal Processing and Control Journal*, Pages: 274–281, 2015.

(d) Synergistic Activities

- *Selected Honors & Recognitions* – Senior member of the IEEE Signal Processing since (2012), Recipient of the G. Gordon M. Sterling Engineering Intern Award by the Professional Engineers Ontario (Canada 2012: http://www.peo.on.ca/index.php/ci_id/25626/la_id/1.htm), Recipient of the extraordinary service award to the IEEE Women in Engineering Society by the IEEE Toronto Section (2011), Outstanding New Leader Award In appreciation to excellent service by the IEEE Toronto Section (2009).
- *Paper awards* – Student Paper Competition Finalists at *IEEE EMBC 2016* in Orlando, FL for developing an algorithm for target detection of atrial fibrillation sources, Graduate student received the *Gordon K. Moe Young Investigator Award* in November 2015. Graduate student received *NSF travel award* at the IEEE EMBC 2016 in Orlando, FL for developing an algorithm for Parkinson medication state detection using wearable sensors and contribution to Smart and Connected Health.
- *Conference Committee* – Chair of Women in Engineering and Biomedical Signal Processing at the IEEE Life Sciences Conference on “Personalized Healthcare & Wearables” (Sydney, December 2017), Special Track Organizer on Biomedical Imaging and Signal Processing Tools for Cardiac Arrhythmias at the IEEE Computer-based Medical Systems Conference (Thessaloniki, Greece June 2017), Western New York Image and Signal Processing Workshop (2013-2015), Queen’s Biennial Symposium on Communications (2014), IEEE Canadian Conference on Electrical and Computer Engineering (2011), IEEE Int. Conference Science & Technology for Humanity (2011), IEEE Canadian Women in Engineering National Conference (2011).
- *Outreach Activities* – Mentor of the Pittsford School Internship Program at Mendon/Sutherland High Schools (2015-2016), Beyond 9.8 Middle School Outreach Activity (2012-2016), WE@RIT workshop Activity (2013-present), BMES Student Chapter Faculty Advisor (2012-2016), IEEE Rochester Signal Processing Chapter Treasurer (2012-2016).
- During the past 5 years, Dr. Ghoraani has served as PI on one NIH project and six internal projects, and as co-PI of one NSF REU grant.

Biographical Sketch: Jason O. Hallstrom

Institute for Sensing and Embedded Network Systems Engineering office phone: 561.297.4748
324 Engineering East fax: 561.297.2800
Florida Atlantic University email: jhallstrom@fau.edu
Boca Raton, FL 33431-0991

(a) Professional Preparation

OHIO STATE UNIVERSITY Ph.D. in Computer and Information Science, 2004
OHIO STATE UNIVERSITY M.S. in Computer and Information Science, 2004
MIAMI UNIVERSITY M.A. in Economics, 1998
MIAMI UNIVERSITY B.A. in Systems Analysis, 1998

(b) Appointments

FAU Director, Institute for Sensing and Embedded Network Systems Engineering, 2015–present.
FAU Professor, Computer & Electrical Engineering and Computer Science, 2015–present.
CLEMSON Associate (IDEaS) Professor, School of Computing, 2010–2014.
CLEMSON Deputy Director, Institute of Computational Ecology, 2013–2014.
CLEMSON Associate Director, Institute of Applied Ecology, 2010–2013.
CLEMSON Assistant Professor, School of Computing, 2004–2010.
METAVANTE CORPORATION Independent Software Developer/Engineer, 1995–2006.

(c) Products

(i) (5 closely related)

- Hughes, S., Zhai, J., Hallstrom, J.O., “WASTE REDUCE: Waste Auditing Technology to Enhance Reduction of Edible Discards in University Cafeterias and Eateries”, (*In Revision*), 12pp., (2017).
- Mazumder, B., Hallstrom, J.O., “A Fast, Lightweight, and Reliable File System for Wireless Sensor Networks”, *Proceedings of the 2016 International Conference on Embedded Software*, 23:1-10, (2016).
- Ali, F.N., Feaster, Y., Zhai, J., Hallstrom, J.O., “The Smart Surface Network: A Bus-based Approach to Dense Sensing”, *Computer Networks*, 167 – 183, (2015).
- Zhai, J., He, Y., Switzer, F.S., Hallstrom, J.O., “A Software Approach to Protecting Embedded System Memory from Single Event Upsets”, *Proceedings of the 12th European Conference on Wireless Sensor Networks*, Porto, Portugal, 274 – 282, (2015).
- Qiu, C., Shen, H., Soltani, S., Sapra, K., Jiang, H., Hallstrom, J.O., “CEDAR: A Low-latency and Distributed Strategy for Packet Recovery in Wireless Networks”, *IEEE/ACM Transactions on Networking*, PP(99), 1 – 14, (2014).

(ii) (5 other significant products)

- Liu, J., Shen, H., Yu, L., Narman, H.-S., Zhai, J., Hallstrom, J.O., He, Y., “Characterizing Data Deliverability of Greedy Routing in Wireless Sensor Networks”, *IEEE Transactions on Mobile Computing*, 18pp., (*to appear*), (2017).
- Jiang, H., Zhai, J., Wahba, S.K., Mazumder, B., Hallstrom, J.O., “Fast Distributed Simulation of Sensor Networks using Optimistic Synchronization”, *IEEE Transactions on Parallel and Distributed Systems*, PP(99), 1 – 14, (2014).
- Jiang, H., Zhai, J., Hallstrom, J.O., “FlashTrack: A Fast, In-network Tracking System for Sensor Networks”, *Proceedings of the 10th IEEE International Conference on Distributed Computing in Sensor Systems*, Marina Del Rey, CA, 51 – 58, (2014).
- Jiang, H., Hallstrom, J.O., “Fast, Accurate Event Classification on Resource-Lean Embedded Sensors”, *ACM Transactions on Autonomous and Adaptive Systems*, 8(2), #11, (2013).

- Mazumder, B., Hallstrom, J.O., “An Efficient Code Update Solution for Wireless Sensor Network Re-programming”, *Proceedings of the 13th International Conference on Embedded Software*, Montreal, Canada, (1 — 10), (September 2013)

(d) Five Relevant Synergistic Activities

- Best Paper Award, Levy, M., Hallstrom, J.O., “A New Approach to Data Center Infrastructure Monitoring and Management”, The 7th IEEE Annual Computing and Communication Workshop and Conference, (2017).
- Best Short Paper Award, He, Y., Du, Y., Hughes, S., Zhai, J., Hallstrom, J.O., “DESAL^β: A Framework for Implementing Self-stabilizing Embedded Network Applications”, The 6th EAI International Conference on Sensor Systems and Software, (2015).
- Best Paper Award, Feaster, Y., Zhai, J., Hallstrom, J., “Serious Toys: Introducing Sensors and Sensor Networks in Pre-Collegiate Classrooms”, The 16th Annual ACM Conference on Information Technology Education, (2015).
- Witness, The House Committee on Homeland Security’s Subcommittee on Oversight and Management Efficiency, Field Hearing: “Emergency Preparedness: Are We Ready for a 21st Century Hugo?”, (sensor technology witness), (2014).
- Best Paper Award, Eidson, G.W., Esswein, S.T., Gemmill, J.B., Hallstrom, J.O., Howard, T.R., Post, C.J., Sawyer, C.T., Wang, K.-C., White, D.L., “The South Carolina Digital Watershed: End-to-End Support for Realtime Management of Water Resources”, The 4th International Symposium on Innovations and Real-time Applications of Distributed Sensor Networks, (2009).

Shihong Huang (<http://scholar.google.com/citations?user=c2XTHWgAAAAJ&hl=en>)

a. Professional Preparation.

Southwest Jiaotong University	Baccalaureate	1987	Mechanical Engineering
University of California, Riverside	M.Sc.	2001	Computer Science
University of California, Riverside	Ph.D.	2004	Computer Science

b. Appointments and awards.

2016 – now	Professor, Dept. of Computer & Electrical Engineering and Computer Science, Florida Atlantic University (FAU), Boca Raton, FL
2010-2016	Associate Professor, Dept. of Computer & Electrical Engineering and Computer Science, Florida Atlantic University (FAU), Boca Raton, FL
2004-2010	Assistant Professor, Dept. of Computer & Electrical Engineering and Computer Science, Florida Atlantic University, Boca Raton, FL
2012 (Mar-Jul)	Visiting Professor, Mälardalen University, Real-Time Research Center (MRTC), Västerås, Sweden (on sabbatical)
2012 (Jan-Jul)	Visiting Researcher, Information and Communication Technology (ICT), SINTEF, Oslo Norway (on sabbatical)
2001-2004	Graduate Research Associate and Graduate Teaching Assistant, University of California, Riverside
2008, 2015	Award for Excellence in Undergraduate Teaching, Florida Atlantic University
2007	Recognition of Service Award ACM Service Award given in Appreciation for Contribution to ACM: General Chair of ACM 24 th Annual International Conference on Design of Communication (SIGDOC 2006)
2006	New Advisor of the Year Award given for being Faculty Advisor to the Society of Women Engineers (SWE). (The 2005 - 2006 Club Leadership Award)
2005	IBM Faculty Award, a worldwide competitive program to foster collaboration between researchers at leading universities worldwide and those in IBM research, development and services organizations
2001-2004	Chancellor's Distinguish Fellowship Award University of California, Riverside
2003	Participation Grant Dagstuhl Computer Science Center Foundation, Germany
2001	Student Travel Grant Award ACM SIGSOFT (CAPS Funding)

c. Products. (Products most closely related☺)

1. Eric Lloyd, Shihong Huang, Emmanuelle Tognoli. Improving Human-in-the-Loop Adaptive Systems Using Brain-Computer-Interaction. (Full Paper). In Proceedings of the *12th International Symposium on Software Engineering for Adaptive and Self-Managing Systems* (SEAMS 2017). May 22—23, 2017. Pages: 163—174. Buenos Aires, Argentina. Full paper acceptance rate: 21%. (61 submissions, 13 has been accepted as full papers, 1 as a short paper, and 7 as artefact papers)
2. James J. Mulcahy and Shihong Huang. Reengineering Autonomic Components in Legacy Software Systems: A Case Study. INCOSE Track (The International Council on Systems Engineering). To appear in the Proceeding of the *11th Annual IEEE International Systems Conference* (IEEE SysCon 2017). April 24-27, 2017. Montreal, Canada.
3. Huang, S., Miranda, P. (2015). Incorporating Human Intention into Self-Adaptive Systems. *Proceedings of IEEE/ACM 37th International Conference on Software Engineering* (ICSE2015). New Ideas and Emerging Results [special track for new ideas]
4. Mulcahy, J., Huang, S. (2014). Autonomic Software Systems—Developing for Self-Managing Legacy Systems, in: *Proceedings of IEEE the 30th International Conference on Software Maintenance and Evolution*
5. Huang, S., Tognoli, E. (2014). Brainware: synergizing software systems and neural inputs, in: *Proceedings of IEEE/ACM 36th International Conference on Software Engineering* (ICSE2014). New Ideas and Emerging Results, pp. 444-447. [special track for new ideas]

Other significant products

1. Minan, M., Huang, S., Pavlovic, M. (2014). Ying—an app to enhance the social behavior and verbal communication skills of children with autism spectrum disorder. <https://www.youtube.com/watch?v=nUMjyl-mwAo>
2. Parker, M., Pandya, A., Hsu, S., Huang, S. (U.S. Patent Notice of Acceptance, August 2014). Apparatus and Method for Managing Interaction-based Services. Provisional Patent, filed March 2009, Florida Atlantic University, Docket Number: 6818-173. Patent issued by the U.S Patent & Trademark Office, Patent Number No. US8,799,017 B2, Date of Patent Awarded: August 5, 2014.
3. Huang, S., Pavlovic, M., Petersen, J., Tognoli, E. (2012). Computer Interaction System to Identify Learning Patterns and Improve Performance in Children with Autism Spectrum Disorders. Poster at Enterprise Development Corporation (EDC) 11th Annual Life Science Conference – BioTech 2012
4. (2014) One of the core contributors to the OMG (Object Management Group) International software development standard *Essence—Kernel and Language for Software Engineering Methods*. The Standard is approved in April 2014. Online at: <http://www.omg.org/spec/Essence/>
5. Petkovic, D., Sosnick-Pérez, M., Huang, S., Todtenhoefer, R., Okada, K., Arora, S., Sreenivasen, Lorenzo Flores, R., Dubey, S. (2014). SETAP: Software Engineering Teamwork Assessment and Prediction Using Machine Learning. IEEE Frontiers in Education (FIE 2014).

d. Synergistic activities.

1. Leadership in professional community: Executive committee member Software Engineering Method and Theory (SEMAT) Initiative (www.semat.org), a new software engineering initiative led by Ivar Jacobson, Bertrand Meyer and Richard Soley, resulting a new OMG software development standard Essence (2011-now). Editorial board of Journal of Software Engineering (2011-now). Election Nomination Committee Chair of ACM SIGDOC 2009. Steering Committee member, IEEE International Symposium on Web Site Evolution (WSE) (2007—2009). Board member, ACM Special Interest Group on Design of Communication (ACM SIGDOC) (2006-2007). IEEE Palm Beach Session Executive Committee; Co-chair of the Computer Society and Signal Processing Society (2007-now). General Chair of the 24th ACM International Conference on Design of Communication
2. Innovation in teaching and training: Established a new global software engineering course, team up with San Francisco State University and University of Applied Sciences, Fulda Germany. This course provides students with real-world distributed global software development experience. Supported by NSF “Collaborative Research: Transforming the Understanding, Assessment and Prediction of Teamwork Effectiveness in Software Engineering Education using Machine Learning”. NSF Award Number: 1140191 (2012-2015).
3. Mentoring students organization: Faculty advisor to FAU chapter the Society of Women Engineers (SWE) and Alpha Omega Epsilon (AOE), a social and professional sorority for women in engineering and technical sciences.
4. Community volunteers: Volunteer board member of Artists with Autism, a none profit organization for aspiring artists on the autism spectrum (2014-now)
5. Public dissemination of science and engineering: Invited speaker to Meeting of the Minds Science & Engineering at FAU Council for Scholarship and Inquiry sponsored, FAU (2014). Keynote speaker at Latin American Software Engineering Symposium (LASES 2014). Keynote speaker at the Latin American Conference on Software Engineering and Knowledge Engineering (2012). Organizing tutorials, workshops and panel discussions (ICSE 2014, GTSE2013, ICMLA2012, SIGCSE2009, CASCON2006, 2005, SIGDOC2005, 2004, IWPC 2003, Dagstuhl Seminar 2003).

e. Collaborators & other affiliations.

1. **Collaborators (4)**: Berre, Arne. SINTEF, Oslo Norway | Petkovic, Dragutin. San Francisco State University | Todtenhoefer, Rainer. University of Applied Science, Germany | Tognoli, Emmanuelle. Florida Atlantic University |
2. **Graduate advisor (2)**: Tilley Scott, Florida Institute of Technology; Thomas Payne, University of California Riverside
3. **Thesis advisor (total 14 Graduated)**: Amador, Francisco | Tripathi, Shubhang | Chakrabarty, Nabarun | Garcia, Adriana | Gohel, Vaishali | Lo, Christopher | Mangs, Jan | Minan, Maria | Mulcahy, James | Pasmore, Simone | Petersen, Jake |Chinchanikar, Sucharita | Lloyd, Eric | Noori Aziz

Ionut Cardei

1

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(a) Professional Preparation

“Politehnica” University of Bucharest, Romania	Computer Science	B.S.1995	
University of Minnesota	Minneapolis, MN (USA)	Computer Science	M.S. 1999
University of Minnesota	Minneapolis, MN (USA)	Computer Science	Ph.D. 2003

(b) Appointments

- Department of Computer & Electrical Engineering and Computer Science, Florida Atlantic University, Boca Raton, Florida, August 2004 – present, Professor
- Honeywell Labs, Minneapolis, MN, August 2001 – July 2004, June 1998 – January 2000, Senior Research Scientist / Research Scientist
- CoManage Corporation, Pittsburgh, PA, January 2000- June 2001, Software Development Engineer.

(c) Publications

Cardei, Ionut, Borko Furht, and Luis Bradley. "Design and Technologies for Implementing a Smart Educational Building: Case Study." *Facta Universitatis, Series: Electronics and Energetics* 29, no. 3 (2015): 325-338.

Fraser R. Dalgleish, Joseph J. Shirron, David Rashkin, Tom E. Giddings, Anni K. Vuorenkoski, Ionut Cardei, Bing Ouyang, Frank M. Caimi and Mihaela Cardei, “A Physical Layer Simulator for Undersea Free Space Laser Communications,” *SPIE Optical Engineering Journal* 53 (5), 051410 (April 25, 2014); doi: 10.1117/1.OE.53.5.051410

Marcus, Anthony, Ionut Cardei, Borko Furht, Osman Salem, and Ahmed Mehaoua. “A Mobile Device Prototype Application for the Detection and Prediction of Node Faults in Wireless Sensor Networks”, *International Journal of Soft Computing and Software Engineering (JSCSE)*, ISSN: 2251-7545 & DOI: 10.7321/jscse, Vol. 3, No. 3, pp. 745-752, 2013.

Ambrose, Arny, Mihaela Cardei, and Ionut Cardei, “HEMS, a Hurricane Evacuation Management System,” *Ad Hoc & Sensor Wireless Networks*, Old City Publishing, (1-2) pp. 143-167, 2013

Yuan, Quan, Ionut Cardei, and Jie Wu "An Efficient Prediction-based Routing in Disruption-Tolerant Networks," IEEE Transactions on Parallel and Distributed Systems, Vol. 23, No. 1, 2012, 19-31.

Marcus, Anthony, Mihaela Cardei, Ionut Cardei, Eduardo Fernandez, Fulvio Frati, and Ernesto Damiani, "A Pattern for Web-based WSN Monitoring," Journal of Communications, special issue on New Advances in Wireless Sensor Networks, Vol. 6, No. 5, pp. 393-399, Aug. 2011.

Yuan, Quan, Ionut Cardei, Jing Chen, and Jie Wu, "Multi-copy Routing with Trajectory Prediction in Social Delay-Tolerant Networks", the 2015 IEEE Global Communications Conference Wireless Networks (GLOBECOM 2015), San Diego, CA, USA, December 6-10, 2015

Rubis, Russ, Ionut Cardei, "The Business Data Object Versioning and Change History Patterns," the International Conference on Pattern Languages of Programs (PLOP 2015), Pittsburgh, Pennsylvania, USA, 10/23 -10/26 2015

Rubis, Russ, Ionut Cardei, "The Extended Money Object Pattern", the International Conference on Pattern Languages of Programs (PLOP 2015), Pittsburgh, Pennsylvania, USA, 10/23 -10/26 2015

Cardei, Ionut, Yueshi Wu, and James Junco. "Backup Wi-Fi Ad-Hoc Network for Emergency Response in Scenarios with Sporadic Connectivity and Primary Users." the 10th IEEE International Conference on Mobile Ad-hoc and Sensor Networks (MSN), 2014, pp. 66-73.

Rubis, Russ, Ionut Cardei, "Business Object State Transition Controller." the International Conference on Pattern Languages of Programs (PLOP 2014), October 2014, Monticello, IL

Rubis, Russ, Ionut Cardei, "Pattern for fine-grain access-controlled business objects." the International Conference on Pattern Languages of Programs (PLOP 2014), October 2014, Monticello, IL

Furht, B., V. Aalo, V. Aalo, A. Agarwal, I. Cardei, M. Cardei, N. Erdol, S. Huang, H. Kalva, T. Khoshgoftaar, I. Mahgoub, O. Marques, M. Petrie, D. Raviv, V. Ungvichian, H. Zhu, "Creating Entrepreneurial University," International Conference of Education, Research and Innovation (ICERI 2013), Nov. 2013.

(d) Synergistic Activities

- U.S. Patent # 7,460,549 awarded on December 2, 2008: Ionut Cardei, Allalaghatta Pavan, Srivatsan Varadarajan, Lee Graba, "Resource Management for Ad Hoc Wireless Networks with Cluster Organizations"
- U.S. patent # 7,274,676 awarded on September 25, 2007: Ionut Cardei, Sabera Kazi, "Burst-mode weighted sender scheduling for ad-hoc wireless medium access control protocols"
- graduate thesis supervisor in the areas of system design automation and web service architectures
- developed tools for design automation using SysML Rhapsody modeler
- IEEE Senior Member

Mohammad Ilyas, PhD
Professor
College of Engineering & Computer Science
Florida Atlantic University, Boca Raton, Florida 33431
Email: ilyas@fau.edu
Tel: (561)297-3454, Mobile: (561)706-3029

Profile:

- More than 34 years of experience in academia with 21 years as an administrator with progressively increasing level of responsibility in research, graduate studies, and industry relations
- Established record of research and teaching with experience and knowledge of interdisciplinary research areas, compliance aspects, and intellectual property matters
- Established record of service in academic settings and professional organizations
- Open, fair, and inclusive administrative and management style based on mutual trust and team/consensus building.

Education/Leadership training:

- **PhD**, Educational Leadership, Florida Atlantic University, Boca Raton, FL, USA, 2015.
- **PhD**, Electrical Engineering, Queen's University, Kingston, Ontario, Canada, 1983.
- **MS**, Electrical and Electronic Engineering, Shiraz University, Shiraz, Iran, 1980.
- **BS**, Electrical Engineering, University of Engineering and Tech., Lahore, Pakistan, 1976.
- **MDP** (Management Development Program), Harvard University, Cambridge, MA, USA, 2004.
- **MLE** (Institute for Management and Leadership in Education), Harvard University, Cambridge, MA, USA, 2013.

Administrative/Academic experience:

- August 1991 – Present - **Professor**, Department of Computer Science and Engineering, Florida Atlantic University, Boca Raton, Florida, USA.
- November 2013 – July 2017 – **Dean**, College of Engineering and Computer Science, Florida Atlantic University, Boca Raton, Florida, USA.
- June 2011 – October 2013 – **Interim Dean**, College of Engineering and Computer Science, Florida Atlantic University, Boca Raton, Florida, USA.
- August 2002 – October 2013 – **Associate Dean, Research and Industry Relations**, College of Engineering and Computer Science, Florida Atlantic University, Boca Raton, Florida, USA.
- August 2009 – May 2011 – **Interim Chair, Department of Ocean and Mechanical Engineering**, Florida Atlantic University, Boca Raton, Florida, USA.
- July 2004 – October 2005 – **Interim Associate Vice President for Research, Division of Research and Graduate Studies**, Florida Atlantic University, Boca Raton, Florida, USA.
- March 2002 – August 2002 – **Interim Chair and Professor**, Department of Computer Science and Engineering, Florida Atlantic University, Boca Raton, Florida, USA.
- August 1994 – June 2000 – **Chairman and Professor**, Department of Computer Science and Engineering, Florida Atlantic University, Boca Raton, Florida, USA.
- August 1987 – July 1991 **Associate Professor** (tenured in 1988), Department of Computer Engineering, Florida Atlantic University, Boca Raton, Florida, USA.
- August 1983 – July 1987 **Assistant Professor**, Department of Electrical and Computer Engineering, Florida Atlantic University, Boca Raton, Florida, USA.

Research interests:

Sensor networks, Smart systems, Wireless communication networks, Healthcare technologies, Traffic characterization and traffic management in high-speed communication networks, Optical networks, Performance modeling and simulation, Globalization and higher education

Sponsored research:

Sponsored research for over \$8.5M on projects related to communication networks and education. Funding agencies include NSF, IBM, Siemens, Honeywell, and State of Florida.

Dissertation/Thesis supervision:

Supervised 12 PhD dissertations and 38 MS theses to completion.

Service:

Currently serving as a member of the editorial boards of three international journals, serving as a member of numerous international conference committees, and serving on several University and College committees.

Honors/Awards/Professional Recognition (Selected):

- Fulbright Specialist since June 2017
- Distinguished Engineering Educator Award by The Engineers' Council, Sherman Oaks, CA, 2014.
- FEEDS Exceptional Professor, 1997
- Awarded a plaque in appreciation of services to IEEE GLOBECOM '88.
- Member of Phi Kappa Phi, Tau Beta Pi, Upsilon Pi Epsilon

Selected publications (out of a total of over 200):

- **Ilyas, M.**, "Engineering Education and Global Competencies", WEEF & GEDC 2016, Seoul, South Korea, November 2016.
- **Ilyas, M.**, Alwakeel, S., Alwakeel, M. and Aggoune, H., "Sensor Networks for Sustainable Development" CRC Press, 2014.
- Shah, S. I., **Ilyas, M.**, and Mouftah, H. T., "Pervasive Communications Handbook", CRC Press, 2012.
- Ahson S. and **Ilyas, M.**, "Near Field Communications Handbook", CRC Press, 2012.
- Badi, A., M., Mahgoub, I., and **Ilyas, M.**, "The Next Challenge for Wireless Sensor Networks: Addressing Practical Issues", Eighth International Symposium on High Capacity Networks and Enabling Technologies, Riyadh, Saudi Arabia, 2011.
- Ahson S. and **Ilyas, M.**, "Cloud Computing and Software Services: Theory and Techniques", CRC Press, 2011.
- Anwar, S., Raja, M. Y. A., Qazi, S., and **Ilyas, M.**, "Nanotechnology for Telecommunications", CRC Press, 2010.
- Ahson S. and **Ilyas, M.** (Editors), "WiMAX – Applications, WiMAX – Standards and Security, WiMAX – Technologies, Performance Analysis, and QoS", CRC Press, 2008.
- **Ilyas, M.**, and Mahgoub, I. (Editors), "Handbook of Sensor Networks" CRC Press, 2005.

Membership of scientific and professional societies:

- Program evaluator for ABET
- Member of Global Engineering Deans Council
- Member of ASEE
- Member of ASEE Engineering Deans Council
- Senior member of IEEE

Dr. Hari Kalva

(a) Professional Preparation

S.V. University, Tirupati, India	Electronics and Comm. Engineering	B.Tech., 1991
Florida Atlantic University	Computer Engineering	M.S.C.E., 1994
Columbia University	Electrical Engineering	Ph.D., 2000

(b) Appointments

Professor, Associate Chair, Dept. of Computer Science and Engineering, Florida Atlantic University	8/14 – present
Associate Professor, Dept. of Computer Science and Engineering, Florida Atlantic University	7/08 – 7/14
Assistant Professor, Dept. of Computer Science and Engineering, Florida Atlantic University	8/03 – 6/08
Consultant, Mitsubishi Electric Research Labs, Cambridge, MA	11/01 – 07/03
Co-founder and V.P. of Engineering, Flavor Software Inc., NY	01/00 – 11/01
Research Staff Associate, ADVENT Project, Columbia University	01/95 – 08/96

(c) Products

(i) Products Most Closely Related

1. S. Roheda, H. Kalva, "A Multi-scale Approach to Skin Pixel Detection," Accepted. To appear in the proceedings of IS&T Electronic Imaging 2017.
2. Escudero, A., Kalva, H. (2014). "Software Package and Demo of a low complexity tool for counting crowds from public web cams," Software Package and Demo.
3. Kalva H, and Siddharth, R D (2014). "Detecting and extracting identifiable information from vehicles in videos" In Proc. SPIE, Vol.-, Video Surveillance and Transportation Imaging Applications 2015, IS&T/SPIE Electronic Imaging 2015, Feb. 2015.
4. Kalva, H., Marques, O., Aghera, S., Reza, W., Giusti, R., & Rahman, A. (2011). Design and Development of a System for Aerial Video Survey of Large Marine Animals. In LACCEI Conference (pp. 3-5).
5. Justo F, Kalva H, and Raviv D (2014). "Automatic parking lot occupancy computation using motion tracking" In Proc. SPIE, Vol.-, Video Surveillance and Transportation Imaging Applications 2014, IS&T/SPIE Electronic Imaging 2014, Feb. 2014.

(ii) Other Significant Products

6. Friedel, R., Figuerola, O., Kalva, H., & Furht, B. (2014). Asset identification using image descriptors. *Multimedia Tools and Applications*, 73(3), 2201-2221.
7. Parikh, S., Ruiz, D., Kalva, H., & Fernandez-Escribano, G. (2017). High Bit-Depth Medical Image Compression with HEVC. *IEEE Journal of Biomedical and Health Informatics*.
8. Friedel, R. and Kalva, H. (2012). "Software Package and Applications for 3D Visualization of Climate Data Developed Using VTK and Rendered on Multiple 3D Displays," Software Package and Demo.
9. Kalva, H., Parikh, A., and Srinivasan, A. (2013). "Accelerating video carving from unallocated space" In Proc. SPIE. 8665, Media Watermarking, Security, and Forensics 2013, 8665:86650H–86650H–4, 2013. doi:10.1117/12.2005743.

10. Castellanos, R., Kalva, H., Marques, O., & Furht, B. (2010, October). Event detection in video using motion analysis. In Proceedings of the first ACM international workshop on Analysis and retrieval of tracked events and motion in imagery streams (pp. 57-62). ACM.

(d) Synergistic Activities

Technology Transfer

1. **Co-inventor of key technology (US patent 7, 199, 836, 7, 149, 770)** for object based content representation licensed for the implementation of key modern video applications and services: ATSC broadcast/cable, Blu-ray, HEVC, and MPEG AVC/H.264 video coding that is used in all mobile devices, Bluray, and IP video.
2. **Founded Videopura**, a tech startup formed to spinoff video bandwidth reduction technology developed at Florida Atlantic University

Leadership in Related Research

3. **Lead Guest Editor, special issue Visual Information Processing and Perception.** Multimedia Tools and Applications, 74(22). **Lead Guest Editor, Special Issue on Perception Inspired video Coding**, IEEE Transactions on Special Topics in Signal Processing, June 2014 issue. **Organizer of Workshop on Perception Inspired Video Processing**, ACM Multimedia Conference, November 2014.

Contributions to International Standards

4. **ISO and ITU Standards Development:** US delegate to the ISO (MPEG, SC29/WG11) standards committees and contributed to the development of many new interactive multimedia technologies that are now part of the MPEG Standards.
5. **Digital Audio Visual Council (DAVIC) Standards** (1995 – 1996): Made contributions to the DAVIC standards development with technical proposals, chairing sessions, and e-mail discussions. Led DAVIC video on demand interoperability testbeds that interconnected 6 testbeds from three countries involving 12 research labs.

Taghi M. Khoshgoftaar**Motorola Endowed Chair Professor**

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Florida Atlantic University

Phone: (561) 297-3994, khoshgof@fau.edu, <http://www.cse.fau.edu/~taghi>

PROFESSIONAL PREPARATION

- 1982: Ph.D. in Statistical Computing, Virginia Polytechnic Institute and State University, Blacksburg, VA USA.
- 1985: M.S. in Computer Science, North Carolina State University, Raleigh, NC USA.
- 1979: M.S. in Applied Mathematics, Massachusetts Institute of Technology, Cambridge, MA USA.
- 1977: B.S. in Statistics (major) and Computer Science (minor), College of Statistics and Information Science, Tehran, Iran.

APPOINTMENTS

- 1985—Present: Professor, Department of Computer and Electrical Engineering and Computer Science, College of Engineering and Computer Science (and predecessor departments), Florida Atlantic University, Boca Raton, Florida USA.
- 1982-1985: Visiting Assistant Professor, Department of Mathematics and Computer Science, East Carolina University, Greenville, North Carolina USA.

PUBLICATIONS

Google Scholar: <https://scholar.google.com/citations?user=-PgNSCAAAAAAJ&hl=en> (**h-index 60**)

Research Publications Summary

- 185 refereed journal papers
- 432 refereed conference papers
- 35 conference papers based on refereed abstracts
- 28 book chapters
- 11 books edited

Related Publications

1. Zuech, R., Khoshgoftaar, T.M. and Wald, R. (2015). Intrusion Detection and Big Heterogeneous Data: A Survey. *Journal of Big Data*, 2:3 (41 pages)
2. Van Hulse, J., Khoshgoftaar, T.M., Napolitano, A. and Wald, R. (2012). Threshold-based Feature Selection Techniques for High-Dimensional Bioinformatics Data. *International Journal of Network Modeling and Analysis in Health Informatics and Bioinformatics*, Vol. 1, pages 47–61, Springer, New York.
3. Kotlarchyk, A., Khoshgoftaar, T.M., Pavlovic, M., Zhuang, H., and Pandya, A. (2011). Identification of MicroRNA Biomarkers for Cancer by Combining Multiple Feature Selection Techniques. *Journal of Computational Methods in Science and Engineering (JCMSE)*, Vol. 11, No. 5, pages 283-298.

4. Khoshgoftaar, T.M., Van Hulse, J. and Napolitano, A. (2011). Comparing Boosting and Bagging Techniques with Noisy and Imbalanced Data. *IEEE Transactions on Systems, Man & Cybernetics: Part A: Systems and Humans*, Vol. 41, No. 3, pages 552-568.
5. Khoshgoftaar, T.M., Van Hulse, J., and Napolitano, A. (2010). Supervised Neural Network Modeling: An Empirical Investigation Into Learning From Imbalanced Data With Labeling Errors. *IEEE Transactions on Neural Networks*, Vol. 21, No. 5, pages 813-830.

Other Publications

1. Prusa, J. D. and Khoshgoftaar, T.M. (2016). Designing a Better Data Representation for Deep Neural Networks and Text Classification. *Proceedings of the IEEE 17th International Conference on Information Reuse and Integration*. Pittsburgh, PA, pages 411-416.
2. Dittman, D., Khoshgoftaar, T.M., Wald, R. and Wang, H. (2011). Stability Analysis of Feature Ranking Techniques on Biological Datasets. *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine*, Atlanta, GA, pages 252-256.
3. Seliya, N. and Khoshgoftaar, T.M. (2011). The Use of Decision Trees for Cost Sensitive Classification: An Empirical Study in Software Quality Prediction. *WIREs Data Mining and Knowledge Discovery*, Vol. 1, No.5, pages 448-459.
4. Liu, Y., Khoshgoftaar, T.M., and Seliya, N., (2010). Evolutionary Optimization of Software Quality Modeling with Multiple Repositories. *IEEE Transactions on Software Engineering*, Vol. 36, No. 6, Nov/Dec 2010, pages 852-864.
5. Sloan, J. and Khoshgoftaar, T.M., (2009). From Web Service Artifact to a Readable and Verifiable Model. *IEEE Transactions on Services Computing*, Vol. 2, No. 4, pages 277-288.

Synergistic Activities

1. North American Editor of *Software Quality Journal* (July 1995 - June 1997), and Member of the Editorial Boards of the *Software Quality Journal* (1992 - Present), the *Empirical Software Engineering Journal* (2002 - 2006), the *Software Engineering and Knowledge Engineering* (2009-present), *Knowledge and Information Systems* (2009-2012), *Social Network Analysis and Mining* (2010-present) and *Journal of Fuzzy Systems* (2004- 2012). Co-Editor-in-Chief, *Journal of Big Data* (2014-present)
2. Program Chair (2004 and 2011) and General Chair (2005 and 2013) of *IEEE International Conference on Tools with Artificial Intelligence*.
3. Program Chair (2010) and Conference Chair (2012 and 2016) of the *IEEE International Conference on Machine Learning and Applications*.
4. Served on Technical Program Committees of various international conferences, symposia, and workshops; organized numerous technical sessions at various conferences; served on various panels; gave tutorials at conferences; and gave numerous invited talks in industry, conferences, research centers, and universities.
5. Served on the NSF panels for SBIR and Software Engineering and Languages, and reviewed other proposals (via email or mail).

Feng-Hao Liu

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Webpage: <http://faculty.eng.fau.edu/fenghao/>

1 Professional Preparation

Degree	Major	Institution	Year
B.S.	Electrical Engineering	National Taiwan University, Taipei, Taiwan	2005
M.S.	Computer Science	Brown University, Providence, RI	2009
Ph.D.	Computer Science	Brown University, Providence, RI	2013
Postdoc.	Cryptography	Maryland Cybersecurity Center, University of Maryland, College Park, MD	2013-2015

2 Appointments

05/2015- Present **Assistant Professor**
Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University

3 Products

3.1 Products Most Closely Related

The authors are listed alphabetically in the publications.

1. A. Kiayias, F. Liu, Y. Tselekounis. “Practical Non-Malleable Codes from 1-more Extractable Hash Functions.” ACM Conference on Computer and Communications Security (CCS), 2016, pp. 1317-1328.
2. S. Gordon, F. Liu, E. Shi. “Constant-Round MPC with Fairness and Guarantee of Output Delivery.” 35th Annual Cryptology Conference (CRYPTO), 2015, pp. 63-82.
3. D. Dachman-Soled, F. Liu, H. Zhou. “Leakage-Resilient Circuits Revisited - Optimal Number of Computing Components Without Leak-Free Hardware.” 34th Annual International Conference on the Theory and Applications of Cryptographic Techniques (EUROCRYPT) 2015, pp. 131-158.
4. A. Berkoff, F. Liu. “Leakage Resilient Fully Homomorphic Encryption.” 11th Theory of Cryptography Conference (TCC), 2014, pp. 95-112.
5. F. Liu, A. Lysyanskaya. “Tamper and Leakage Resilience in the Split-State Model.” 32nd Annual Cryptology Conference (CRYPTO), 2012, pp. 517-532.

3.2 Other Significant Products

1. D. Dachman-Soled, F. Liu, H. Zhou. “Locally Decodable and Updatable Non-malleable Codes and Their Applications.” 12th Theory of Cryptography Conference (TCC), 2015, pp. 427-450.
2. S. Gordon, J. Katz, F. Liu, E. Shi, H. Zhou. “Multi-Client Verifiable Computation with Stronger Security Guarantees.” 12th Theory of Cryptography Conference (TCC), 2015, pp. 144-168.
3. S. Goldwasser, S. Gordon, V. Goyal, A. Jain, J. Katz, F. Liu, A. Sahai, E. Shi, H. Zhou. “Multi-input Functional Encryption.” 33-rd Annual International Conference on the Theory and Applications of Cryptographic Techniques (EUROCRYPT), 2014, pp. 578-602.
4. K. Chung, Y. Kalai, F. Liu, R. Raz. “Memory Delegation.” 31st Annual Cryptology Conference (CRYPTO), 2011, pp. 151-168.
5. K. Chung, F. Liu. “Parallel Repetition Theorems for Interactive Arguments.” 7th Theory of Cryptography Conference (TCC), 2010, pp. 19-36.

4 Synergistic Activities

- Selected as a U.S. delegate to participate in the third Heidelberg Laureate Forum (2015) with an NSF workshop travel award via the NSF partner Oak Ridge Associated Universities (ORAU).
- Moderated a discussion panel at Strait Talk Symposium (Watson Institute, Brown University) for the topic: “Cyber-security and US-China-Taiwan Relations.”
- Program committee member of AsiaCrypt 2017, AsiaCrypt 2016, PKC 2016, AsiaCCS-SCC 2014, ISC 2014.

Imadeldin Mahgoub – Principal Investigator, Tecore Professor

**Computer & Electrical Engineering and Computer Science
Florida Atlantic University (FAU), Boca Raton, Florida 33431
Email: mahgoubi@fau.edu ; Tel: (561) 297-34548; Fax: (561) 297-2800**

PROFESSIONAL PREPARATION

The Pennsylvania State University, UP, PA	Computer Engineering	Ph.D.	1989
N.C. State University, Raleigh, N.C.	Electrical & Computer Engineering	M.S.	1986
N.C. State University, Raleigh, N.C.	Applied Mathematics	M.S.	1983
University of Khartoum, Khartoum	Electrical Engineering	B.S.	1978

APPOINTMENTS

1999 – present Professor, (**Tecore Professor** since September 1, 2014), Dept. of Computer & Elec. Eng. and Computer Science, FAU
1994 – 1999 Associate Professor, Dept. of Computer Science & Eng., FAU
1989 - 1994 Assistant Professor, Dept. of Computer Science & Eng., FAU
1978 – 1981 Electrical and Electronics Engineer, SSL Company

SELECTED PUBLICATIONS (10 out of 185)

Closely related

- Steve Glass, Imad Mahgoub, and Monika Rathod, “Rapid Prototyping of Cooperative Caching in a VANET: A Case Study”, in press, the 2017 International Wireless Days Conference (WD 17), Porto, Portugal, March 29-31, 2017, pp. 201-204.
- Elnaz Limouchi, Imad Mahgoub, and Ahmed Alwakeel, “Fuzzy Logic-based Broadcast in Vehicular Ad hoc Networks”, Proceedings of the 2016 IEEE 84th Vehicular Technology Conference (VTC 2016-Fall), Montreal, Canada, September 18-21, 2016, pp. 1-5.
- Lina Altoaimy and Imad Mahgoub, “Mobility Data Verification For Vehicle Localization in Vehicular Ad Hoc Networks”, Proceedings of the IEEE 2016 International Wireless Communications and Networking Conference (WCNC2016), Doha, Qatar, April 3 – 6, 2016.
- Jamil Ibriq and Imad Mahgoub, “HIKES: Hierarchical Key Establishment Scheme for Wireless Sensor Networks”, International Journal of Communication Systems (Wiley), Vol. 27, No. 10, October 2014, pp. 1825-1856.
- Mike Slavik and Imad Mahgoub, “Spatial Distribution and Channel Quality Adaptive Protocol for Multi-Hop Wireless Broadcast Routing in VANET”, the IEEE Transactions on Mobile Computing journal, Vol. 12, No. 4, April 2013, pp. 722-734.

Other

- Mike Slavik and Imad Mahgoub, "Stochastic Broadcast for Vanet", Proceedings of the 7th IEEE conference on Consumer Communications and Networking, Las Vegas, Nevada, USA- January 09 - 12, 2010, pp. 205-209.

- Michael J Slavik and Imad Mahgoub, "Statistical broadcast protocol design for unreliable channels in wireless ad-hoc networks", Proceedings of the IEEE Globecom 2010- Wireless Networking Symposium, Miami, FL, Dec. 2010.
- Mahgoub, I., and Ilyas, M., Eds., *Sensor Network Protocols*, CRC Press, 2006.
- Mahgoub, I., and Ilyas, M., Eds., *Smart Dust: Sensor Network Applications, Architecture, and Design*, CRC Press, 2006.
- Ilyas, M., and Mahgoub, I., Eds., *Handbook of Mobile Computing*, CRC Press, 2005.

SPONSORED RESEARCH

- National Science Foundation (Senior Personnel), (Pending) I/ICRC for Advanced Knowledge Enablement, Phase II, FAU Site, April 2015 – March 2020.
- National Science Foundation (PI), MRI: Development of Instrumentation to Support Multi-Technology Vehicular Networking Systems Research, October 2012 – September 2015
- FAU NSF/IUCRC (PI), Efficient Protocols and Algorithms for Wireless Networks, February 2012 – May 2014
- FAU Foundation/Tecore Networks (PI), Design and Evaluation of Wireless Networks Protocols, January 2012 – May 2015
- DOD (Investigator), Secure Routing in Wireless Sensor Networks, September 2004 – January 2009
- Motorola, Plantation, Florida (Investigator), Time to Market Optimization for Cell Phones, January 2003 – December 2005
- National Science Foundation (PI), Infrastructure for Research in Mobile Computing, June 1999 – June 2003
- Xpoint Technology, Boca Raton, FL. (PI), Development and Evaluation of Data Management and Protection Schemes in Mobile Computing Environments, June 1998 – August 2001

DISSERTATION/THESIS SUPERVISION

Dr. Mahgoub has directed to completion 15 PhD dissertations and 33 MS theses and is currently directing 6 PhD dissertations.

SYNERGISTIC ACTIVITIES

- Dr. Mahgoub served as a member of the HBCU-UP NSF Advisory Board for the new Computer Engineering Program at Bethune-Cookman College in Daytona Beach funded by the National Science Foundation (2003-2008).
- Dr. Mahgoub and his graduate students have enhanced the JiST/SWANS wireless network simulator by developing and integrating new components to facilitate research in large scale wireless networks. Also, they have built a specialized simulation tool for broadcast protocol design called WiBDAT.
- He served as Chair, Vice Chair, Track Chair, Publicity Chair, Poster Chair and member of the technical program committees of many international conferences.
- He has served as editor of the International Journal of Communication Systems (Wiley), the International Journal of Computers and Applications, and the Encyclopedia of Wireless and Mobile Communications.

Dr. Oge Marques - Biographical Sketch

(i) Professional preparation

Universidade Tecnológica Federal do Paraná (UTFPR) (Curitiba, PR, Brazil)	Electrical Engineering	B.Sc. – 1987
Philips International Institute of Technological Studies (Eindhoven, the Netherlands)	Electronic Engineering	M.E.E. – 1989
Florida Atlantic University (Boca Raton, FL, USA)	Computer Engineering	Ph.D. – 2001

(ii) Appointments

Professor – Dept. of Computer & Electrical Eng. and CS Florida Atlantic University, Boca Raton, FL	2014 – Present
Associate Professor – Dept. of Computer & Electrical Eng. and CS Florida Atlantic University, Boca Raton, FL	2007 – 2014
Assistant Professor – Dept. of Computer Science and Engineering Florida Atlantic University, Boca Raton, FL	2001 – 2007

(iii) Publications

Publication summary: 9 books, 1 patent, 12 book chapters, 26 journal papers, 75 conference papers.

Selected recent publications

- B. Stojanović, **O. Marques** and A. Nešković, “Latent overlapped fingerprint separation: a review”. *Multimedia Tools and Applications* (2016). DOI:10.1007/s11042-016-3908-y
- M. Taschwer and **O. Marques**, “Automatic Separation of Compound Figures in Scientific Articles”. *Multimedia Tools and Applications* (2016). DOI: 10.1007/s11042-016-4237-x
- J. Gibson and **O. Marques**, “Sparsity in Optical Flow and Trajectories”, *Signal, Image and Video Processing*, March 2016, Volume 10, Issue 3, pp 487-494.
- M. Lux and **O. Marques**, “Visual Information Retrieval Using Java and LIRE”, *Morgan & Claypool*, 2013.
- S. Chatzichristofis, C. Iakovidou, Y. Boutalis, and **O. Marques**, “Co.Vi.Wo.: Color Visual Words Based on Nonpredefined Size Codebooks”, *IEEE Transactions on Systems, Man, and Cybernetics. Part B, Cybernetics*, July 2012.
- **O. Marques**, “Practical Image and Video Processing Using MATLAB[®]”, *Wiley-IEEE Press*, New York, NY, 2011.
- **O. Marques**, E. Barenholtz, and V. Charvillat, “Context modeling in computer vision: techniques, implications, and applications”, *Multimedia Tools and Applications*, January 2011.

(iv) Synergistic activities

Recent Sponsored Research

Date	Project Title	Sponsor	Role	Total amount
2015-2020	<i>NSF I/U CRC for Advanced Knowledge Enablement (CAKE) – Phase II</i>	NSF	Co-PI	US\$ 225,000.00
2017-2018	<i>Cross Disciplinary / Inter-Generational Tech Translation Teams (T3's)</i>	Farris Foundation	Co-PI	US\$ 100,000.00
2017-2018	<i>Multi-channel real-time video enhancement</i>	NSF CAKE	Co-PI	US\$ 30,000.00
2016-2017	<i>Medical image analysis using deep learning techniques</i>	NSF CAKE	PI	US\$ 59,734.00

Recent awards

- *ACM Distinguished Speaker* – 2014.
- *Outstanding Mid-Career Teaching Award*, American Society for Engineering Education - Southeastern Section (ASEE-SE) – 2011.
- *Excellence and Innovation in Undergraduate Teaching Award*, FAU – 2011.

Other Professional Activities

- Editor-in-Chief (with Borko Furht), *Encyclopedia of Multimedia* (3rd ed.), Springer.
- Editorial Board member, *Multimedia Tools and Applications*, Springer.
- Visiting professor at TU Vienna University (Vienna, Austria) 2017-present
- Visiting professor at Klagenfurt University (Klagenfurt, Austria) 2008-present
- Visiting professor at ENSEEIHT / University of Toulouse (Toulouse, France) 2010-present
- Visiting professor at UTFPR (Curitiba, Brazil) 2003-present
- Senior Member of the ACM and the IEEE

(v) Collaborators and other affiliations

a. Collaborators

- Borko Furht, Hari Kalva (FAU)
- Mathias Lux, Laszlo Böszörményi (Klagenfurt University, Austria)
- Vincent Charvillat (University of Toulouse, France)
- Dubravko Culibrk (Faculty of Technical Sciences, Novi Sad, Serbia)
- Xavier Giro-i-Nieto, Ferran Marques (UPC, Barcelona, Spain)
- Humberto R. Gamba, Gustavo B. Borba (UTFPR, Brazil)

b. Ph.D. Dissertation Advisor

- Dubravko Culibrk (FAU, 2006)^(*)
- Liam M. Mayron (FAU, 2008)
- Gustavo B. Borba (UTFPR, Brazil, 2010)^(*)
- Joel Gibson (FAU, 2014)
- Aleksandar Colic (FAU, 2014)^(*)
- Mario Taschwer (Klagenfurt University, Austria, 2017)^(*)
- Nancy Van Nest (FAU, 2018 - *expected*)
- Luiz Zaniolo (FAU, 2018 - *expected*)

^(*)Co-advisor

PERAMBUR S. NEELAKANTASWAMY, PH. D., C. ENG., FELLOW IEE

Department of Computer and Electrical Engineering and Computer Science

Florida Atlantic University, Boca Raton, FL 33431

neelakan@fau.edu

a. PROFESSIONAL PREPARATION

Ph. D. Electrical Engineering, Indian Institute of Technology, Madras, India 1975

M. Eng. Electrical Communication Engineering, Indian Institute of Science, Bangalore, India, 1968 (Distinction/First Rank)

B. Eng. Electronics and Communication Engineering, CEG/University of Madras, India, 1966

PROFESSIONAL AFFILIATIONS

- Fellow of IEE (UK)
- Chartered Engineer/IEE (UK)

b. APPOINTMENTS

August 1991-Present	Professor (Tenured), FAU
July 1991-August 1991	Associate Professor (Tenured), FAU
July 1988-July 1991	Associate Professor (Tenure-track), FAU
Sept. 1987-June 1988	Associate Professor (Tenure-track), Dept. of Electrical Engineering, University of South Alabama, Mobile,
Sept. 1984-August 1987	Director of Electronics Program, RIT Research Corporation (a wholly-owned subsidiary of Rochester Institute of Technology), Rochester, New York 14623, USA).
June 1981-Sept. 1984	Senior Lecturer, National University of Singapore,
June 1978-May 1981	Associate Professor and Program Chairman, Electronics and Computer Science and Technology, University of Science, Penang, Malaysia.
June 1970-May 1978	Lecturer, Department of Electrical Engineering, Indian Institute of Technology, Madras, India
August 1968-May 1970	Lecturer, Department of Aeronautical and Aerospace Engineering, Indian Institute of Science, Bangalore, India (Tenured/Confirmed 1969).

c. PRODUCTS**Closely Related – Publications: Recent Exemplars**

1. P. S. Neelakanta and B. Sharma, "Conceiving THz Endometrial Ablation: Feasibility, Requirements and Technical Challenges," *IEEE Transactions on Terahertz Science and Technology*, vol. 3, no. 4, 402-408, July 2013.
2. P. S. Neelakanta and B. Sharma, "Conceiving THz Endometrial Ablation: Feasibility, Requirements and Technical Challenges," *IEEE Journal of Biomedical*

and *Health Informatics*, vol. 17, no. 4, 813-819, July 2013

3. P. S. Neelakanta and A. Noori: Technoeconomic price-worthiness of mobile networks :A hedonic heuristic perspective *Netnomics*, (Under Review)
4. P. S. Neelakanta and A. U. Noori: Technoeconomic performance of wireless networks supporting smart mobile devices and services: Evaluation of technology-centric cum marketing performance indicators, *Netnomics*, vol.16, 2015, 53-85

Other Significant Products: Books Published

Books

1. **Antennas for Information Super-Skyways** (Co-authored with R. Chatterjee) (RSP Ltd., UK: 2003)
2. **A Textbook on ATM Telecommunication Engineering** (CRC Press, Inc., Boca Raton, FL 2000)
3. **Information Theoretic Aspects of Neural Networks**, (CRC Press, Inc., Boca Raton, FL: 1999)
4. **The Handbook of Electromagnetic Materials: Monolithic and Composite Versions and Their Application** (Author), CRC Press, Inc. , Boca Raton, FL: 1995)
5. **Neural Network Modeling: Statistical Mechanics and Cybernetic Perspectives** (Co-authored with D. De Groff), (CRC Press, Inc., Boca Raton, FL: 1994)
6. **Next Generation Telecommunications and Internet Engineering**, Linus Publications Inc., NY:2009
7. **Wireless Devices: Network Services Related Performance Considerations** (Co-authored with Aziz U. Noori), Lambert Academic Publishing, Germany: 2015
8. **Smart Wireless Devices: Performance Aspects of Hardware Infrastructure** (Co-authored with Aziz U. Noori), Lambert Academic Publishing, Germany: 2015

Book Chapter

"Smart Materials" A Chapter in: *The Electrical Engineering Handbook*, CRC Press, Inc., Boca Raton: 1993.

d. SYNERGISTIC ACTIVITIES

Books Under Contract: (Tentative Titles)

- (a) **Electromagnetic Composite Materials: Applications, Analysis and Design**
(Contracted to write for: DesTech Publications Inc., PA)
- (b) **Introduction to Bioinformatics: Algorithms and Computational Methods**
(Being in contracted to write for: WORLD SCIENTIFIC)

Mehrdad Nojournian

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<http://faculty.eng.fau.edu/nojournian/>

Professional Preparation

- **PhD**, Computer Science - Security and Cryptography, [UWaterloo](#), Canada 2007-2012
Supervisor: [Professor Douglas R. Stinson](#)
Thesis: *Novel Secret Sharing and Commitment Schemes for Crypto Applications*
 - Visiting Scholar: Courant Institute, New York University, USA Feb-Apr'11
 - Visiting Scholar: Centrum Wiskunde & Informatica, Netherlands Nov-Dec'11
- **MSc**, Computer Science - Software Engineering, [UOttawa](#), Canada 2005-2007
Supervisor: [Professor Timothy C. Lethbridge](#)
Thesis: *Document Engineering of Complex Software Specifications*

Appointments

- Visiting Faculty Fellow, Air Force Research Lab, Cyber Assurance Branch, NY Sum 2017
- Assistant Professor, Department of CEECS, Florida Atlantic University, FL 2015-Now
- Assistant Professor, Department of CS, Southern Illinois University, IL 2012-2014

Products

Five Relevant Publications:

1. Abd M. A., Gonzalez I., **Nojournian M.** and Engeberg E. D., Impacts of Robot Assistant Performance on Human Trust, Satisfaction, and Frustration, *To appear in Robotics, Science and Systems: Morality and Social Trust in Autonomous Robots (RSS)*, Boston, USA, 2017.
2. Traverso G., Garcia C., **Nojournian M.**, Demirel D., Azarderakhsh R., Habib S. and Buchmann J., Evidence-Based Trust Mechanism Using Clustering Algorithms for Distributed Storage Systems, *To appear in 15th IEEE Conference on Privacy, Security and Trust (PST)*, Calgary, Canada, 2017.
3. Abd M. A., Gonzalez I., **Nojournian M.** and Engeberg E. D., Trust, Satisfaction and Frustration Measurements for Real-Time Human-Robot Interaction, *30th Florida Conference on Recent Advances in Robotics (FCRAR)*, pp. 89-93, Boca Raton, USA, 2017.
4. **Nojournian M.**, Trust, Influence & Reputation Management Based on Human Reasoning, *4th AAAI Workshop on Incentives & Trust in E-Communities (WIT-EC)*, pp. 21-24, Austin, Texas, USA, 2015.
5. **Nojournian M.** and Lethbridge T., A New Approach for the Trust Calculation in Social Networks, *E-business & Telecommunication Networks (E-BTN): Best Papers of ICETE 06*, Springer CCIS, vol. 9, pp. 64-77, 2008. **Acceptance Rate: 29/326: 9%**

Five Additional Publications:

6. **Nojournian M.**, Golchubian A., Saputro N. and Akkaya K., Preventing Collusion Between SDN Defenders and Attackers Using a Game Theoretical Approach, *To appear in IEEE INFOCOM, Advances in Software Defined & Context Aware Cognitive Radio Nets (SCAN)*, Atlanta, USA, 2017.

7. **Nojournian M.** and Stinson D., Socio-Rational Secret Sharing as a New Direction in Rational Cryptography, *3th Conference on Decision and Game Theory for Security (GameSec)*, Springer LNCS 7638, pp. 18-37, Budapest, Hungary, 2012. **Acceptance Rate: 10/37: 27%**
8. **Nojournian M.**, Stinson D., and Grainger M., Unconditionally Secure Social Secret Sharing Scheme, *IET Information Security (IFS), Special Issue on Multi-Agent and Distributed Information Security*, vol. 4, issue 4, pp. 202-211, 2010.
9. **Nojournian M.** and Stinson D., Efficient Sealed-Bid Auction Protocols Using Verifiable Secret Sharing, *10th International Conference on Information Security Practice and Experience (ISPEC)*, Springer LNCS 8434, pp. 302-317, Fuzhou, China, 2014. **Acceptance Rate: 36/158: 23%**
10. **Nojournian M.** and Stinson D., Unconditionally Secure First-Price Auction Protocols Using a Multicomponent Commitment Scheme, *12th Inter Conf on Info & Communications Security (ICICS)*, Springer LNCS 6476, pp. 266-280, Barcelona, Spain, 2010. **Acceptance Rate: 31/135: 23%**

Synergistic Activities

1. Scientific Innovations

- Human-Inspired Trust Models: Best Paper in ICETE: [Publication 4, 5].
- Socio-Rational Secret Sharing (SRS): [Publication 7].
- Social Secret Sharing (SSS) [Publication 8].
- New Tool for PDF-to-Multilayer Hypertext Conversion [MSc Thesis].

2. Selected Invited Talks

- Air Force, 4th Colloquium on Game Theory Applied to Cyber Security, USA Jun 01, 17
- University of Toronto - Main Campus, Computer Science, Canada May 11, 12
- University of California - Berkeley, Computer Science, USA Apr 04, 12
- Microsoft Research - Silicon Valley, MSR Theory Seminar, USA Mar 21, 12
- Centrum Wiskunde & Informatica, Cryptology Group, Netherlands Dec 16, 12

3. Course Developments

- Secret Sharing Protocols
- Applied Cryptography
- Data Structures/Algorithms
- Hot Topics in Cybersecurity
- Discrete Mathematics
- Intro to Computer Science

4. Outreach: Teaching for High School Students

- ENG 1935: Intro to Security & Crypto: It was offered to students from local high schools in Sum'16.

5. Professional Services

- Program Committee: GameSec'2017~2013, PST'2016~2013, ICISSP'2017~2015, SecurWare'16.
- Journal Reviewer: Info Security (IET), Distributed Computing (Springer), International Journal of Ad Hoc and Ubiquitous Computing (Inderscience), Designs, Codes & Crypto (Springer), Transactions on Info. Forensics & Security (IEEE), Visual Communication & Image Representation (Elsevier).
- Conf. Reviewer: ICTAI'15, ESORICS'13, AfriCrypt'13, EuroCrypt'11, ACISP'11, CANS'09, SAC'09.

MIRJANA PAVLOVIC, MD, Ph.D.

Department of Computer and Electrical Engineering and Computer Science
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Professional Preparation

Ph.D. University of Belgrade 1984

M.S. University of Belgrade, 1980

B.S./MD University of Belgrade, 1972

Appointments

Visiting Instructor /Bioengineering 2016 – Present

Adjunct Professor, CEECS, FAU 2009-2016

Visiting Professor, CEECS, FAU, 2009-2011

Research Associate/Assistant, Life Science, FAU, 2001-2007

Research Physician, SFBMSCTI, Boynton Beach, FL, 2002-2008

Research Assistant Professor in FAU Immunology Laboratory 2007-2008

Neuroscience Research Institute, Inc., 1998-2000

Executive Research Director, University of Pennsylvania School of Medicine, 1993–97

Postdoctoral Research Associate, Yale University School of Medicine, 1990-1993

Postdoctoral Associate, Institute for Nuclear Sciences – Vinca, 1988-1990

Associate Professor, Institute for Medical Research.1980-88

Institute of Biochemistry, Medical Faculty, Novi Sad, Yugoslavia, 1977-1980

Assistant Research Professor, Institute for Medical Research and Clinical Hematology

Belgrade, Yugoslavia, 1973-1977

Products

Five Relevant Publications:

1. Guest Editors: Perambur S. Neelakanta, Mirjana D. Pavlovic, and Hanqi Zhuang, Florida Atlantic University, USA: Special Issue on: "Viral DNA Analysis and Rational Vaccine Design", International Journal of Bioinformatics Research and Applications (IJBRA), ISSN online: 1744-5493 ISSN print: 1744-5485 2011
2. Mirjana Pavlovic (Ed), Bela Balint: Stem cells and Tissue Engineering (Springer Briefs in Electrical and Computer Engineering), Springer NY Heidelberg Dordrecht London, (2013)
3. Mirjana Pavlovic (Ed): Bioengineering: A Conceptual Approach/Springer Verlag 2014/ NY, Monograph: October 14, (2014).
4. Mirjana Pavlovic, (Ed) Bela Balint: Bioengineering and Cancer Stem Cell Concept. Springer/Verlag, (2015).
5. Mirjana Pavlovic (Ed), Ksenija Radotic (2016): Animal and plant stem cells: concepts, propagation and engineering. Published, Springer, NY

Five Additional Publications:

1. Pavlovic, M., Chen, R., Kats, A., Cavallo, M., Saccocio, S., Keating, P., Hartmann, X.J.; Highly specific novel method for isolation and purification of Lupus anti-DNA antibody via oligo- (dT) magnetic beads. In, *Autoimmunity, Part D: Autoimmune Disease, Annus Mirabilis*, Yehuda Shoenfeld, M. Eric Gershwin (eds.) Wiley, 2008.
2. Banton S., Roth Z., Pavlovic, M. Mathematical Modeling of Ebola Virus Dynamics as a Step towards Rational Vaccine. In, *Design*, Herold, Keith E., Vossoughi, Jafar, Bentley, William E. (eds.) College Park, Maryland, 26th Southern Biomedical Engineering Conference SBEC 2010,
3. Pavlovic, M., Cavallo, M., Kats, A., Kotlarchyk, A., Zhuang, H, Shoenfeld, Y.; From Pauling's Abzyme Concept to the New era of Hydrolytic Anti-DNA autoantibodies: A link to the rational vaccine design? In, (Special Issue of) *IJBRA* 7,3, 220-238
4. Balint, B., Obradovic, S., Todorovic, M., Pavlovic, M., Mihaljevic, B.; Stem cell– based (auto)grafting: from innovative research toward clinical use in regenerative medicine. In: *Biology in Normal Life and Diseases*, K. Alimoghaddam (ed.), 111–35.
5. Pavlovic, M., Mayfield, J., Balint, B.; Medical technology breakthroughs in tissue engineering within last decade. In: *Handbook of Medical and Healthcare Technologies*, B., Furht, A. Agarwal (eds.), 41–78. New York: Springer. 2013.

Synergistic Activities

- Nirma University and Science Institute, Ahmedabad, India, Teaching grant \$15,000
- Tech Fee for Bioengineering wet lab \$ 85,504,38
- OWL GEMS project for International undergraduate student's competition in Boston, November, 2017

Vance Peterson, Ph.D.
Instructor of Electrical Engineering
Department of Computer and Electrical Engineering and Computer Science
Florida Atlantic University, Boca Raton, FL 33431
vpeterso@fau.edu

(a) Professional Preparation

- Ph.D. in Electrical Engineering, Florida Atlantic University, Boca Raton, Florida, 2004.
- M.S. in Electrical Engineering, Florida Atlantic University, Boca Raton, Florida, 1986.
- B.S.E.E in Electrical Engineering, Tuskegee University, Tuskegee, Alabama, 1973.

(b) Appointments

Instructor, Dept. of CE, EE & CS, FAU, 2014 – Present
Instructor and Academic Advisor, Dept. of CE, EE & CS, FAU, 2010 – 2014
Instructor, Dept. of CE, EE & CS, FAU, 2005 – 2010

(c) Products

- “Mixer Circuit and Communication Device Using the Same.”
- “Differential Feed-Forward Amplifier Power Control for a Radio Receiving System.”
- “Selective Call Receivers with Stepwise Gain Control.”
- “Phase Locked Loop Circuit Current Mode Feedback.”
- “Zero-IF Receiver with Tracking Second Local Oscillator and Demodulator Phase Locked Loop Oscillator.”

(d) Synergistic Activities

1. Development of online Electronics Laboratory 1 experiments to support student owned portable USB-powered oscilloscopes, function generators and other electronic equipment. Fall 2017
2. Development of online Electronics Laboratory 2 experiments to support student owned portable USB-powered oscilloscopes, function generators and other electronic equipment. Fall 2017
3. Undergraduate Academic Advisor, Department of Computer and Electrical Engineering and Computer Science, Boca Raton, Florida 2010 – 2014
4. Training courses taken for teacher certification, Florida Department of Education May 2004-July 2005.

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URL: <http://faculty.eng.fau.edu/maria/>

Education

B.S. in Mathematics, Barry University, Miami, Florida, USA, 1973
M.C.S. in Computer Science, Florida Atlantic University, Boca Raton, Florida, USA, 1986
PhD in Computer Engineering, Florida Atlantic University, Boca Raton, FL, USA 1992

Academic/Professional Appointments

1985-present **Florida Atlantic University**, Boca Raton, FL, USA
2003- Professor, Dept. of Computer & Electrical Engineering and Computer Science
2009-2017 Professor and Associate Dean of Engineering - International Affairs
2003-2008 Professor and Associate Dean of Engineering - Academic & International Affairs
2002-2003 Associate Dean of Engineering, Academic & International Affairs
1998-2003 Associate Professor, Computer Science & Engineering, College of Engineering
1992-1998 Assistant Professor of Computer Science & Engineering, College of Engineering
1985-1992 Instructor of Computer Science, College of Business
1973-1992 **Palm Beach County Public School District**, FL, USA
Tenured High School Mathematics and Computer Science Teacher, Rank 4: highest rank

Selected Publications: 214 refereed publications, 2 Best Paper awards, index 12.29

1. L. F. Zapata Rivera, and M. M. Larrondo Petrie, "Models of Collaborative Remote Laboratories and Integration with Learning Environments," *International Journal of Online Engineering*, **12**(9), 2016.
2. O. Boulais, M.E. Torres, J.R. Solano, J.D. Ramirez, and M.M. Larrondo Petrie, "Developing Leadership and Global Professional Engineer Competences in Students," *IEEE RITA*, **10**(3):134-142, IEEE Educational Society, 2015.
3. M. M. Larrondo Petrie, "Engineering for the Americas: Progress on the Action Plans of the Ministers of Science and Technology of the Organization of American States," in *Procs. 2015 ASEE International Forum*, American Society of Engineering Education (ASEE), 2015.
4. M. M. Larrondo Petrie, H. Alvarez (eds.). *Engineering Education Facing the Grand Challenges: Procs. 13th LACCEI International Multi-Conference for Engineering and Technology*, 2015.
5. I.N. Bonilla Villarreal, and M. M. Larrondo-Petrie, "A UML model towards a portal and search engine to facilitate academic and research collaboration in engineering and education," *Procs. 12th LACCEI Latin American and Caribbean Conference for Engineering and Technology* Guayaquil, Ecuador, 2014
6. I. E. Esparragoza, M. M. Larrondo-Petrie, Z. Otero-Gephardt, M Auer. "A LACCEI-IGIP Partnership: Developing Internationally Recognized Engineering Faculty Excellence for the Americas", in *Procs. World Engineering Education Forum*, Buenos Aires, AR, 2012.
7. M. M. Larrondo Petrie and I. E. Esparragoza, "MIND Links 2011: Resources to Motivate Minorities to Study and Stay in Engineering", in *Proc. of the 118th ASEE Conference and Exposition* (ASEE 2011), Vancouver, B.C., CA, 26-29 June 2011, ASEE, 2011. *Best Paper Award*.
8. M.M. Larrondo Petrie, R. Jordan, L. Morell, D. Marcek, and J. Páez, "Initiatives to Develop Global Engineers in the Americas", in *Procs. SEFI-IGIP Joint Annual Conf.*, Miskolc, Hung., 1-4 July 2007.
9. M. M. Larrondo Petrie, "An Engineering Education Capability Maturity Model," in *Proceedings of the ASEE Global Colloquium*, Rio de Janeiro, Brazil, 9-12 October 2006, ASEE, 2006.

10. M. K. Hamza, B. Alhalabi, S. Hsu, M. M. Larrondo-Petrie, and D. M. Marcovitz, "Remote Labs: The next high-tech step beyond simulation for distance education," in *Journal of Computers in the Schools*, **19**(3/4):171-190, Haworth Press, 2002

Research Grant/Contract Activities. Total **\$2,894,011** for 35 awards. Most recent:

- **National Science Foundation.**
Planning Grant for Colombia – US Collaboration in STEM, 2012-14 – Co-PI - \$35,000
Global Engineering Education Challenge for the Americas, 2007 – Co-PI - \$50,000
An Industry-Academia Partnership for Students in STEM Disciplines, 2004-2008, Co-PI - \$426,503
- **Argentine Education Ministry.** Travel Grant for Pan American Mobility Program, 2014, \$3,000
- **State of Florida Governor’s Grant. Engineering Scholars Program 2003-2009, PI - \$159,096**
- **U.S. Department of Defense.** *Net Enabled Command Capability*, 2007-2008, Co-PI - \$167,245
- **Defense Information Security Agency.** *Secure Web Services in the Wireless Environment.* 2004-2006, Co-PI- \$251,402

Synergistic Activities

Pan American Academy of Engineering

Nominated to be inducted to this hemispheric academy of engineering on September 2016.

International Federation of Engineering Education Societies (IFEES)

Executive Committee (2006-2011), Vice President of the Americas (2007-2009), First Vice President (2009), Co-Chair of Global Engineering Education Summit (2007, 2008), Planning Committee for Indo-US Collaboration for Engineering Educ. (IUCEE) Initiative. Appointed US Mentor to the State of Gujarat for the IUCEE Initiative by Government of India. Awarded the IFEES Duncan Fraser Global Excellence in Engineering Education (2016).

Organization of American States (OAS) Engineering for the Americas (EftA)

Vice Chair for Engineering Education Innovation, on OAS EftA Advisory Board (2009-present). Member, OAS Working Group 2: Human Resource Development and Training (2010-present); Representative speaker of Civil Society at the OAS’ Ministers of Science & Technology meeting, (2006-present). OAS Engineering for the Americas Summit (previously Encounter) organizer (2006-present).

American Society for Engineering Education (ASEE)

International Advisory Board of the *Journal of Engineering Education* (2008-present); International Division Board, Secretary/Treasurer (2005-07), Web-Master (2007-present); Women in Engineering Div. Board, Member-At-Large (2007-09); Minorities in Engineering Div. Board, Member-At-Large (2003-10, 2016-present). International Activities Committee (2015-present). Strategic Doing Working Group-Globalization (2016). ASEE International Forum Co-Chair (2014).

Latin American and Caribbean Consortium of Engineering Institutions (LACCEI)

Executive Director (2008-present); Editorial Board of the *Latin American and Caribbean Journal of Engineering Education* (2007-present); Executive Vice President (2005-2007); Vice President of Research, Board of Directors and Conference Chair (2003-2008); Board Member in representation of LACCEI for ASIBEI (Ibero-American Engineering Education Society) (2010-present)

Institute of Electrical and Electronic Engineers (IEEE)

Member at Large, Board of Governors, IEEE Education Society (2015-present). Committee on International Accreditation Activities (2017-present). Senior Member

Association of Computing Machinery (ACM)

ACM SIGGRAPH Education Committee and Chair of Curriculum Subcommittee (1994-1999)

Collaborators (Past 5 years)

A. Abtahi, O. Ajaj, H. Álvarez, M. Archibold McPherson, M. Auer, M. Beltran-Martinez, M. Bermudez, I.N. Bonilla Villarreal, O. Boulais, I.A. Buckley, N. Delessy-Gassant, I.E. Esparragoza, E.B. Fernandez, Z.O. Gephardt, A.K. Hashizume, P. Ordoñez, C. Nieto, A. Paez Pino, R. Panoff, C. Rodriguez Arroyave, J.D. Solano, M.E. Torres, B.H. Trivedi, R. GarrisonTull, M. VanHilst, L.F. Zapata Rivera

Saeed Rajput, Ph.D.

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Florida Atlantic University, Boca Raton, FL 33431
srajput@fau.edu

1 Professional Preparation

- Ph.D. Electrical Engineering, Viterbi School of Engineering, Univ. of Southern California, (USC) May 1992. Communications Sciences Institute <http://commsci.usc.edu/>. Dissertation advisor [Lloyd Welch](#) (as in [Baum-Welch algorithm](#), and [Berlekamp-Welch decoding algorithm](#)) A Co-designed Decision Feedback Equalizer, Deinterleaver, and Decoder. (CSI-92-05-03) Novel technique of co-designing channel decoder and equalizer using interleaving. Provided significant gains over systems with simple cascades of equalizers and decoders.
- Masters in Electrical Engineering, Univ. of Southern California, May 1990. Communications Sciences Institute.
- Masters in Electronics Engineering, Philips International Institute (PII), Eindhoven, The Netherlands, 1987, (Distinction). Thesis advisor [J.W.M. Bergmans](#) at Philips Research Labs. Simulating and implementing communication receivers based on Viterbi Detector using signal processors.

2 Intellectual Property (Approved patents only)

- [US 8,590,034 B2](#): “Method, System And Apparatus For Providing Stateful Information Redaction,” with Basit Hussain, Issued November 19, 2013.
- [US6401206](#): “Method and Apparatus for Binding Electronic Impressions Made by Digital Identities To Documents,” Issued June 4, 2002. (<http://www.delphion.com/details?pn=US06401206>)
- [US6199054](#): “Automated software metering of digital payloads,” Issued, March 6, 2001.

3 Academic Appointments

At Florida Atlantic University

- Adjunct Professor Computer Science 2017 – Current.
- Affiliated member of [Center for Cryptology and Information Security](#), Charles E. Schmidt College of Science 2012-present.
- Acted as coordinator of Computer Science (CS) program at Port Saint Lucie Campus, 2002-06.
- Visiting Associate Professor, Department of Computer Science and Engineering (CSE) 2002-06.

At Nova Southeastern University

- Professor, College of Engineering and Computing (CEC), 2016-2017.
- Associate Professor, Math Science and Technology (MST), Farquhar College of Arts and Sciences (FCAS), 2010-15.
- Assistant Director, Math, Computing and Technology (MCT), FCAS, 2008-14.
- Coordinator of Mathematics (Dual Appointment), FCAS, 2007-08.
- Coordinator of Computer Science (CS) and Information Systems (CIS) programs, FCAS, 2006-08.

At University of Miami (UM)

- Visiting Assistant Professor, 2000-01 (Part-time).
- Adjunct Professor, 1997-99 (Part-time).
- Senior Research Associate, Center for Medical Imaging and Medical Informatics (CMIAMI), 1996-97.

At National University of Science and Technology (NUST), Islamabad, Affiliated with MSU

- Associate Professor, 1993-95.
- Project Manager, Computerized Examination System (CES) and test question bank, 1994-92 (Part-time).

4 Appointments in Industry

At Think-Sync Inc., Florida (Start-up)

- Co-founder and Vice President Engineering, Think-Sync, Inc. FL 2005-07 (part time).

At Cerebit Inc., Florida (Start-up)

- Co-founder and Vice President Engineering, Cerebit, Inc, FL, 2001-06 (partially part time).

At eTrango Inc., California (Start-up)

- Director Security & Infrastructure Services Dev.: eTrango, Inc, CA, 2000-01 (part time).

At Cybear, Florida

- Manager, HL-7 messaging group 2000-01.

At Milgo Solutions (f.k.a.) Racal Datacom, Florida

- Software/Security Architect 1997-2000.

At Skylight Software, California (Start-up)

Director R&D, 1997-99 (Part-time).

At Central Telecommunication Research Laboratories (CTRL)

- Project leader: TMS system, 1993-95 (Part-time).
- Project Leader: Developed automatic fault detection system for phone exchanges, 1986-85.

5 Academics Products

Programs Created

- Internship program for CS and CIS Students: 2007-14.
- Mathematics, BS, program at NSU, implemented Fall 2013.
- Computer Engineering (CE), BS, program at NSU, implemented Fall 2011.
- Software Engineering (SE), BS, program at NSU, implemented Fall 2011.
- Information Technology (IT), BS, program at NSU, implemented Fall 2011.
- Applied Mathematics, Masters at NSU, waiting for budget allocation.
- Applied Statistics, Masters at NSU, waiting for budget allocation.
- Information Engineering Technology, BS, (BSIET), at FAU, implemented in 2006.
- Established new presence of CS program at Port St. Lucie campus, FAU, 2002.
- Electrical Engineering in Communications, MS, at NUST, implemented in 1994.
- Entire faculty (department) of Electronics, BS, at GIKI, implemented in 1993.

Laboratories Created

- Circuits and Devices Laboratory at NSU, 2010.
- Network, Communications, and Security (NCS) lab at NSU, 2008.
- Application Security Framework, (ASF) group in TCN laboratory at FAU, 2003.
- Communications System Laboratory, at NUST, 1994.
- Logic Design Laboratory at GIKI, 1993.

Central Library and Information Center Conceptualized/Designed: At GIKI 1992-93

Campus Communication Network Infrastructure Conceptualized: At GIKI 1992-93.

6 Research and Development Experience

- Jan. 1996 - Aug. 1997: Senior Research Associate: University of Miami, Miami
- Jul. 1993- Apr. 1995: Project Leader at Central Telecommunication Research Laboratories
- Jul. 1992- Aug. 1994: Development on Contract for National University of Science and Technology (NUST)
- Jun. 1989- May 1992: Research Assistant at Communications Sciences Institute, University of Southern California, Los Angles (<http://commsci.usc.edu/>)
- May 1986 - Aug. 1986 and Dec. 1986 - Jul. 1987: Research Assistant at Philips Research Laboratory

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mrathod@fau.edu

a. PROFESSIONAL PREPARATION

- Ph.D. Florida Atlantic University, 2014
- M.S. Florida Atlantic University, 1999
- MBA Florida Atlantic University, 1997
- MBA University of Poona, 1992
- B.S. Osmania University, 1990

b. APPOINTMENTS

- Instructor, Dept. of CEECS, FAU, 2014 – 2016 2017 – Present
- Adjunct Professor, Dept. of CEECS, FAU, 2014 – 2016
- Post Doctoral Researcher, Dept. of CEECS, FAU, 2014 – 2016

c. PRODUCTS

Product Closely Related

1. M. Rathod and I. Mahgoub, Formulating Message Priority as a Context for Hybrid Data Dissemination in Vehicular Networks, *Journal of Communications and Networking*, October 2015, Vol 5, no.10.
2. M.Rathod, I.Mahgoub and M.Slavik. Observing the Impact of Context-Awareness on Collisions for Dynamic Hybrid Data Dissemination in Vehicular Networks, *Journal of Communications and Networking*, June 2014, Vol 4, no.6.
3. M. Rathod, I. Mahgoub, M. Slavik, and E. Gamess. Adapting the Hybrid Data Dissemination Protocol to Density by Dynamically Controlling the Broadcast Zone Radius. In *Global Information Infrastructure and Networking Symposium (GIIS)*, 2012, pp 1–4, 2012. doi:10.1109/GIIS.2012.6466768
4. M.Rathod,I.Mahgoub,and M.Slavik, Investigating the Impact of Message Size and Broadcast Frequency on Hybrid Data Dissemination Protocol for VANETs. In *Wireless Advanced (WiAd)*, 2012, pp 11–15, Jun. 2012. doi:10.1109/WiAd.2012.6296546.
5. M.Rathod, I.Mahgoub, and M.Slavik, A Hybrid Data Dissemination Scheme for VANETs. In *Wireless Days (WD)*, 2011 IFIP, pp 1–7, Oct. 2011. doi:10.1109/WD.2011.6098219.
6. M. Rathod and S. M. Miranda, Telework and Psychological Distance: the Mediating Effects of Culture and Technology in Four Countries. In *Proceedings of ACM SIGCPR conference on Computer personnel research (SIGCPR '99)*, New Orleans, Louisiana, April 1999.

7. E. Gamess, I. Mahgoub, M. Rathod. Scalability Evaluation of Two Network Simulation Tools for Vehicular Ad hoc Networks, *Wireless Advanced (WiAd)*, 2012 , vol., no., pp. 58, 63, 25-27 June 2012 doi: 10.1109/WiAd.2012.6296568
8. M. Slavik, I. Mahgoub, and M. Rathod. Statistical Broadcast Protocol Design with WiBDAT: Wireless Broadcast Design and Analysis Tool. In *Proceedings of IEEE Wireless Communications and Networking Conference (WCNC 2010)*, Cancun, Mexico, March 2011.

Other Significant Products

1. S. Glass, I. Mahgoub, and M. Rathod, Leveraging MANET based Cooperative Cache Discovery Techniques in VANETs, *IEEE Communications Surveys and Tutorials*, Early Access ISSN: 1553-877X, pp. 1-22, DOI: 10.1109/COMST.2017.2707926
2. S. Glass, I. Mahgoub, and M. Rathod, Rapid Prototyping of Cooperative Caching in a VANET: A Case Study, *IEEE Wireless Days Conference 2017*, March 2017.
3. Edwards, I. Mahgoub and M. Rathod, Investigation of RFID Based Localization for SmartDrive Vehicular Network Testbed, *IEEE UEMCOM*, October 2016, pp. 1-6
4. L. Altoaimy, I. Mahgoub, and M. Rathod, Weighted localization in vehicular ad hoc networks using vehicle-to-vehicle communication, in *Global Information Infrastructure and Networking Symposium (GIIS)*, 2014, Sept 2014, pp. 1–5
5. C. Carryl, M. Ilyas, I. Mahgoub, M. Rathod. The PEV Security Challenges to the Smart Grid: Analysis of Threats and Mitigation Strategies. pp. 300 – 305, *ICCVE* December 2013, doi:10.1109/ICCVE.2013.6799810
6. F.M. Padron, I. Mahgoub, M. Rathod. VANET-Based Privacy Preserving Scheme for Detecting Traffic Congestion, *High Capacity Optical Networks and Enabling Technologies (HONET)*, 2012 9th International Conference on, vol., no., pp 066, 071, 12-14 Dec. 2012 doi: 10.1109/HONET.2012.6421436

d. SYNERGISTIC ACTIVITIES

1. I. Mahgoub, M. Rathod, C. Kelley, Data and Vehicular Communications Lab: Unmanned Aerial Vehicles”, Technology Fee grant, Florida Atlantic University, 2016 - Total award: \$27675.72
2. I. Mahgoub, “Vehicular Multi-technology Communication Device”, National Science Foundation Major Research Instrumentation, 2012–2015 (Grant #1229616),” NSF, \$300,000, 7/15/2016-7/14/2021.

Daniel Raviv – Bio Sketch – 2017

(a) Professional Preparation

- Technion, Israel Institute of Technology, Haifa, Israel, Electrical Engineering, B.Sc., 1980
- Technion, Israel Institute of Technology, Haifa, Israel, Electrical Engineering, M.Sc., 1982
- Case Western Reserve University, Cleveland, Ohio, Electrical Engineering and Applied Physics (EEAP), Ph.D., 1987

(b) Appointments

- Professor, CEECS Department, since 1999
- Associate Professor, EE Department, 1993-1999
- Assistant Professor, EE Department, 1989-1993
- Visiting Assistant Professor, EE Department, 1988-1989

Positions held and visiting appointments

- Director, Innovation and Entrepreneurship Lab., Since 2012
- Director and PI, CAMPUS 2020 Project, 2012-2016
- Co-PI, I/UCRC CAKE NSF Center, present
- Assistant Provost for Innovation and Entrepreneurship, part of 2009-2010
- Special Assistant to the Provost, 2007-2008
- Visiting Professor, 2016 –2017
 - Technion, Israel Institute of Technology, CS, EE, and MBA Faculties
 - Shantou University, China, College of Engineering
- Visiting Professor, 2008 –2009
 - Johns Hopkins University, Electrical and Computer Engineering Department, working with the Center for Leadership Education (CLE), and
 - University of Maryland, Electrical and Computer Engineering Department, working with Maryland Technology Enterprise Institute (M-Tech)
- Visiting Researcher at the National Institute of Standards and Technology (NIST), Gaithersburg, Maryland. (1989-1990 working at NIST. The collaboration continued until 1995) 1989-1995

(c) Publications

- (Authors listed in alphabetical order) Madeline González-Muñiz, Lee Klingler, Susan Moosai & Daniel Raviv (2012): Taking a College Algebra Course: An Approach That Increased Students' Success Rate, PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, 22:3, 201-213
- D. Raviv, P. Reyes and J. Baker, "A Comprehensive Step-by-Step Approach for Introducing Design of Control Systems," ASEE National Conference, Columbus, Ohio, June 2017.
- D. Raviv, and J. Jimenez, "A Visual, Intuitive, and Experienced-Based Approach to Explaining Stability of Control Systems," ASEE National Conference, Columbus, Ohio, June 2017.
- D. Raviv and A. Harris, "Estimation as an Essential Skill in Entrepreneurial Thinking," ASEE Conference, New Orleans, June 2016
- D. Raviv, L. Gloria, "Using Puzzles for Teaching and Learning Concepts in Control Systems," ASEE Conference, New Orleans, June 2016

● D. Raviv, P. Benedict Reyes, and G. Roskovich, "A Visual and Intuitive Approach to Explaining Digitized Controllers," ASEE Conference, New Orleans, June 2016

● D. Raviv and J. Ramirez, "Experience-Based Approach for Teaching and Learning Concepts in Digital Signal Processing," ASEE Conference, Seattle, WA, June 2015

● D. Raviv and L. Cortes Coy, "Project-Based Learning of System-of-Systems," ASEE Conference, Seattle, WA, June 2015

● D. Raviv, Y. Nakagawa and G. Roskovich, "A Visual and Engaging Approach to Learning Computer Algorithms," ASEE Conference, Indianapolis, Indiana, June 2014

● D. Raviv and G. Roskovich, "An intuitive approach to teaching key concepts in Control Systems," ASEE Conference, Indianapolis, Indiana, June 2014

(d) Synergistic Activities

US Patent(US) "Safety Promoting Techniques for Mobile Communication," US patent number: 8,644,812. February 2014.

Program/Division Chair, ENT Division, American Society of Engineering Education (ASEE), 2012-14

Led a group of College Algebra Professors and Instructors (2012): **Implementation of some of the recommendations resulted in reduction of College Algebra DFW rate from nearly 70% to 28%**

● Awards

- University Researcher of the Year, Abacus Award, 2005-06, awarded by AeA (American Electronics Association)
- Distinguished Teacher of the Year (DTOY) for 2004-2005
- The Faculty Talon Award, Florida Atlantic University, 2002
- President's Leadership Award, Florida Atlantic University 2001

● Books

- Daniel Raviv (with Tal Raviv): "*Everyone loves Speed Bumps, Don't You? A Guide to Innovative Thinking*," 2011
- Daniel Raviv (with Elizabeth Johnson): "*Eight Simple Ways to Outsmart a Mosquito: A Hands-on Guide to Innovative Thinking*," 2013
- Daniel Raviv (with Megan Geiger): "*Partly Funny With a Chance of Brain Storm: A Guide to Divergent Thinking*," 2014
- Daniel Raviv (with George Roskovich): "*Understood! A Visual and Intuitive Approach to Teaching and Learning Control Systems: Part 1*," 2014
- Daniel Raviv (with Megan Geiger): "*Math-less Physics! A Visual Guide to Understanding Newton's Laws of Motion*," 2016

(e) Collaborators & Other Affiliations

- M. Cardei, L. Cortes Coy, M. Geiger, A. Ginton, Madeline González-Muñiz, B. Jones, F. Justo, , H. Kalva, Lee Klingler, A. Kotlarchyk, Susan Moosai, , Y. Nakagawa, A. Radzin, J. Ramirez, G. Roskovich, Yueshi Wu, I. Zankina -- Total 17
- M.Sc. Thesis and Ph.D. Dissertation Supervision: Luis Cortes, Naga Prakash Danda, Erkut Ergen, Kunal Joarder, Tom Kelly, Sridhar Kundur, William Mackunis, Eiki Martinson, Bruce Mooney, Brandon Moore, Nissim Ozery, Krishnan Srivatsan, Fransisco Justo Torres, Hakan Yakali, Lingdi Yang -- Total 15
- Dissertation Advisors: K. Loparo, Y.H. Pao
- Thesis Advisor: E.T. Schoen

William T. Rhodes, Ph.D.

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Florida Atlantic University, Boca Raton, Florida 33431

wrhodes@fau.edu

Professional Preparation

Stanford University	Physics	B.S. 1966
Stanford University	Electrical Engineering	M.S. 1968
Stanford University	Electrical Engineering	Ph.D. 1971

Appointments

Florida Atlantic University, Professor of Electrical & Computer Engineering and Computer Science and Affiliate Professor of Physics	2005-present
Georgia Institute of Technology, Professor of ECE	1971-2005
Research Director, Georgia Tech Lorraine	1997-2002
Associate Director, Electro-Optics Lab, Georgia Tech Research institute	1992-1993
University of Colorado at Boulder, Professor of EE	1990-1991

Select Publications and Presentations

1. Jean-Marc Merolla, Yuri Mazurenko, Jean-Pierre Goedgebuer, Henri Porte, and William T. Rhodes, "Phase-modulation transmission system for quantum cryptography," *Optics Letters* 24 No. 2 (January 1999), pp. 104-106.
2. Jean-Marc Merolla, Yuri Mazurenko, Jean-Pierre Goedgebuer, Laurent Duraffourg, Henri Porte, and William T. Rhodes, "Quantum cryptographic device using single-photon phase modulation," *Physical Review A*, Vol. 60, No. 3, September 1999, pp. 1899-1905.
3. Duraffourg, J.-M. Merolla, J.-P. Goedgebuer, N. Butterline, and W. T. Rhodes, "Photon counting in the 1540-nm wavelength region with a Germanium avalanche photodiode," *IEEE Journal of Quantum Electronics*, Vol. 37, No. 1, January 2001, pp. 75-79.
4. Vladimir S. Udaltsov, Jean-Pierre Goedgebuer, Laurent Larger, and William T. Rhodes, "Communicating with optical Hyperchaos: Information Encryption and Decryption in Delayed Nonlinear Feedback Systems," *Physical Review Letters*, Vol. 86, No. 9, 26 February 2001, pp. 1892-1895.
5. J.-B. Cuenot, L. Larger, J.-P. Goedgebuer, and William T. Rhodes, "Chaos shift keying with an optoelectronic encryption system using chaos in wavelength," *IEEE Journal of Quantum Electronics*, Vol. 37, No. 7, July 2001, pp. 849-855.
6. Laurent Duraffourg, Jean-Marc Merolla, Jean-Pierre Goedgebuer, Yuri Mazurenko, and William T. Rhodes, "Compact transmission system using single-sideband modulation of light for quantum cryptography," *Optics Letters*, Vol. 26, No. 18 (September 15, 2001), pp. 1427-1429.
7. William T. Rhodes, Angela M. Guzman, and Jean-Pierre Goedgebuer, "Correlation optics at the single-photon level: device physics and quantum mechanics," in *Fifth International Conference on Correlation Optics*, O. Angelsky, ed. (Proc. SPIE, Vol. 4607, 2002), pp. 1-12.
8. William T. Rhodes et al., "High-resolution imaging through horizontal-path turbulence," in *Tribute to Joseph W. Goodman, H. Caulfield and H. Arsenault*, eds., SPIE Vol. 8122, 2011.
9. William T. Rhodes, "Time-average Fourier telescoping: a scheme for high-resolution imaging through horizontal-path turbulence," *Applied Optics*, Vol. 51, No. 4, pp. A11-A16 (2012).

10. Diego Pava and William T. Rhodes, "Spatio-temporal nonredundant arrays for Fourier telescropy imaging," submitted to Journal of the Optical Society of America A.
11. Paula Andrea López, Yezid Torres Moreno, and William T. Rhodes, "Generation of high-dimensional quantum key by coherence modulation at the photon-counting level," presented at the 27th Colombian National Physics Conference, Cartagena, Colombia, 3-6 October 2017.
12. Invited presentation, "High-resolution imaging through atmospheric turbulence," August 2017, Bogota optics student congress, Bogota, Colombia
13. Invited plenary talk, "Spatial frequency domain point spread function for Fourier telescropy imaging," III International Conference on Applications of Optics and Photonics, Faro, Portugal, May 2017.
14. William T. Rhodes, Abdellatif Boughanmi, and Yezid Torres Moreno, "High-security communication by coherence modulation at the photon-counting level," *Appl. Opt.* 55, 3952-3957 (2016)
15. William T. Rhodes, Abdellatif Boughanmi, and Yezid Torres Moreno, "Coherence modulation at the photon-counting level: A new scheme for secure communication." *Journal of Physics: Conference Series*. Vol. 672. No. 1. IOP Publishing, 2016.
16. William T. Rhodes, Nishantha Randunu Pathirannehelage, Diego Pava, and Yezid Torres Moreno, "Optical Imaging Through Horizontal-Path Turbulence: A New Solution to a Difficult Problem."
17. N.R. Pathirannehelage, Y. Torres Moreno, W.T. Rhodes, A. Guzmán, and O.J. Tíjaro, "Simulation of Youngs Fringes in Time-Average Fourier Telescropy"

Selected Honors

- Fellow, Georgia Tech Research Institute (elected 1993)
- Fellow, International Society for Optical Engineering (SPIE) (elected 1981)
- Fellow, Optical Society of America (elected 1980)
- Research fellowship, Alexander von Humboldt Foundation (Erlangen, Germany) - 1976

Synergistic Activities

- Associate Director, Imaging Technology Center, Florida Atlantic University, 2005-2013.
- Founding Editor, *SPIE Reviews*, 2009-2011
- Editor, Springer Graduate Series in Physics, 2009-present
- Editor-in-Chief, Springer-Verlag monograph series on Optical Sciences, 1997-present
- Editor-in-Chief, *Applied Optics*, 1989-1993
- Editor-in-Chief, American Institute of Physics book series on Theoretical and Applied Optics, 1993-1997
- Board of Directors, Optical Society of America, 2005-2006
- Board of Governors, SPIE (International Optical Engineering Society)
- Chair, Publications Council, Optical Society of America, 2005-2006
- Director, International Centre for Theoretical Physics Winter College on Optics in Imaging, Trieste, 2011
- Co-PI and Program Chair, NSF-funded Pan-American Advanced Studies Institute on Frontiers in Imaging Science, Bogota, 2011

October 2017

Biographical Sketch

ZVI S. ROTH

Professor

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1. Academic Degrees

Ph.D. in Systems Engineering, Case Western Reserve University, Cleveland, Ohio, December 1982

M.Sc. in Electrical Engineering, Technion, Israel Institute of Technology, Haifa, Israel, July 1979.

B.Sc. in Electrical Engineering, Technion, Israel Institute of Technology, Haifa, Israel, September 1974

2. Employment History

2009 – Present Professor, CEECS Department, FAU

2009 – 2013 Associate Chair, CEECS Department, FAU

1982 - 2009 Professor, Department of Electrical Engineering, FAU

2005 – 2008 Interim co-Director, Florida-Israel Institute

1993 - 1997 Professor and Chairman, Dept. of Electrical Engineering, FAU

1985 - 1994 Director of the Florida Atlantic University Robotics Center

- 3. Courses recently developed or modernized:** Undergraduate level: Fundamentals of Engineering (hands-on freshmen-level course), Electronics I* and II* (with PSPICE computer-aided analysis and design), Control Systems I* (with Matlab / Simulink system design), Introduction to DSP (with Matlab). Graduate level: CMOS Amplifiers (with PSPICE and ADS design), Biosystems Modeling and Control* (with Matlab / Simulink), and Control Systems II [* - Full set of lecture videos in www.vimeo.com]

- 4.** Thesis Advisor to 9 Ph.D. (Drs. Tuula Ruokonen, Hanqi Zhuang, Xu Hua, Jian Wang, Kuanchih Wang, Shui Hu-Motaghedi, Ying Bai, Wilfredo Rivas-Torres and Aura-Maria Cardona - graduated between 1989-2014) and one current PhD candidate (Rosana Melendez) and 11 M.S. students.

5. Current Research Interests

a) Kinematic Modeling, Metrology (Vision and Laser Tracking), Kinematic Identification, Control and Calibration of Robots and Manufacturing Machinery.

b) Control Systems – PID Control, Control of Smart Grids.

c) Analog Electronic Design – Computer-Aided design of deep sub-micron CMOS amplifiers devices and systems.

d) Bioengineering: Glucose Metabolism and Closed-loop Drug Delivery in Diabetes, Automation Design for HTS, Rational Vaccine Design.

6. Publications

Dr. Roth authored 2 Books, 3 Book Chapters, 32 Journal Papers, 32 Refereed Conference Papers and 49 non-refereed Papers and Technical Reports.

6.1 Books

- a) B. W. Mooring, Z. S. Roth and M. R. Driels, "*Fundamentals of Manipulator Calibration*", Book, John Wiley and Sons, 1991.
- b) H. Zhuang and Z. S. Roth, "*Camera-Aided Robot Calibration*", Book, CRC Press, 1996.

6.2 Recent Papers

- 1) Widiyant, M. Hashizume, S. Suenaga, H. Yotsuyanagi, A. Ono, S.K. Lu and Z. Roth, "A Built-in Test Circuit for Electrical Interconnect Testing of Open Defects in Assembled PCBs", IEICE Transactions on Information & Systems, Vol. E99-D, No. 11, November 2016, pp. 2723-2733.
- 2) Aura-Maria Cardona, Zvi Roth and Chingping Han, "Queue Clearing and Throughput Enhancement Strategies in Biotechnology Automation", Proceedings of the 2015 Florida Conference on Recent Advances in Robotics, May 2015.
- 3) Wilfredo Rivas-Torres and Zvi Roth, "Determination and Study of MOSFET Technology Current", Canadian Journal on Electrical and Electronic Engineering, Vol. 4, No.2, April 2013, pp. 75-82.
- 4) Aura-Maria Cardona, Zvi S. Roth and Chingping Han, "High-Throughput Automation Design Considerations for Biotechnology Processes Involving RNA Purification Protocols using Multi-Centrifuge Bioseparation Steps", Journal of Robotics and Computer-Integrated-Manufacturing, October 2011
- 5) Banton, S.A., Roth, Z., Pavlovic, M. *A bioengineering approach for rational vaccine design towards the Ebola Virus*. **BMC Bioinformatics**, Special Issue: ISMB (Intelligent Systems for Molecular Biology) 2010, July 8-11, 2010, Boston, Massachusetts

7. Recent Sponsored Research

- a) NSF (RAPD Program) (with Drs. Zhuang and Masory), "Results-Oriented Multi-Disciplinary Capstone Design to Aid Persons with Disability" \$125,000 (2011-2015),

8. Honors and Awards

1. Senior Member of the IEEE (conferred in 1992)
2. 2001/2002 FAU Award for Excellence in Undergraduate Teaching.
3. Finalist, 2005-2006, 2011-2012 and 2017 FAU Distinguished Teacher of the Year Award

RAVI SHANKAR

Faculty Profile site: <http://faculty.eng.fau.edu/shankar/>

Google Scholar: <http://bit.ly/1Hqmd9Q> ; Research center URL: <http://csi.fau.edu/>

Apps & IOT Open Source Repos: <https://github.com/MODSApps> ; <https://github.com/RaspberryPIApps>

Smart Web Analytics: <https://github.com/Semantic-Web> ; <https://github.com/SocialWebApps>

Course sites: <http://android.fau.edu/>, <http://semanticweb.fau.edu/> , and <http://robotics.fau.edu/>

Professional: <https://www.linkedin.com/in/shankar14>, http://www.researchgate.net/profile/Ravi_Shankar55

PROFESSIONAL PREPARATION:

Johns Hopkins Univ. (via Coursera)	Data Sciences (non-credit)	Certificate, 2015
Florida Atlantic University (FAU)	College of Business	MBA, 2000
State of Florida	Professional Engineer	1984-Present
Univ. of Wisconsin, Madison, WI	Elect. and Comp. Eng.	Ph.D., 1982
Univ. of Wisconsin, Madison, WI	Elect. and Comp. Eng.	M.S., 1977
Karnataka University, Dharwad, India	Telecom Eng.	B.S., 1971

APPOINTMENTS:

8/91 – Present:	Professor , Computer & Electrical Engineering and Comp Science, FAU
8/94 – Present:	Director , Center for Systems Integration, FAU
1/01- 8/03	Technical Account Manager , Cadence Design Systems, on Leave
8/92 – 7/93	Director , R&D, Vasocor Inc., Technology Transfer of my patents
8/91 – 8/02	Consultant , Vasocor and Motorola
8/86- 8/91	Associate Professor , Elect & Comp Eng., FAU
8/82 – 8/86	Assistant Professor , Elect & Comp Eng., FAU
8/77- 5/82	Teaching & Research Assist. , Univ. of Wisconsin, Madison, WI

PRODUCTS (Currently, I collaborate with multidisciplinary groups in teaching and research to address complex system challenges in health and education. My relevant areas of expertise: semantic & intelligent web technologies, open source tools, mobile apps, and complex systems integration)

1. Cyberlearning and App development focus: (a) Shankar, R., McAfee, F., and Harris, M., Smart Phone App Development - A Multi-College Approach; and (b) Shankar, et al., A Tool for ABET Accreditation, both presented at *ASEE annual conference*, Atlanta, GA, 2013; (3) Donate, K., Shankar, R., Mitsova-Boneva, D., McAfee, F., Searching the World Wide Web – Finding the Right Information the First Time, *122nd Annual ASEE Conference*, Seattle, WA, 2015; (4) Urban planning App repository at <https://bitbucket.org/shankarfau/profile/teams> . See Dr. Mitsova's bio for a recent paper.
2. Industry Collaboration focus: (a) Borrás, et al., Mobile Technology Consortium (MTC): An Industry-University Alliance; and (b) Shankar, et al., Impact of Motorola's Vision on FAU's Engineering Curriculum, both at *Conf. on Industry and Education Collaboration (CIEC)*, Phoenix, AZ, Feb 2013.
3. Semantic Web focus: (a) Semantic Web Technologies, Workshop presented at the *IEEE SysCon Conf.*, 2013; (b) Islam et al., Intelligent Health Information System to Empower Patient with Chronic Diseases, *IEEE IRI Workshop on Health Informatics*, 2012; and (c) Fonoage, et al., Mechanisms for Requirements Driven Component Selection and Design Automation, *IEEE Systems J.*, Sept 2010
4. Innovation in Biomedical Engineering: (a) Pulsatile Measurement of Cardiac Malfunction Conditions, *US Patent* No. 8,197,416, 6/12/12; (b) Noninvasive Glucose Measurement, *US Patent*, No. 8,185,182, 5/22/2012; and (c) three older US patents on early and noninvasive detection of atherosclerosis, *US Patent* Nos. 5,343,867, 5,297,556, and 5,241,963, issued in 1993-94.
5. Innovation in Computer Engineering: (a) A Dynamically Reconfigurable Power-Aware, Highly Scalable Multiplier with Reusable and Logically Optimized Structures, *US Patent* No. 7,873,823, 1/18/11; and (b) High Speed Scalable Multiplier *US Patent* No 7,080,114, 6/18/06,

OTHER PRODUCTS

1. Multidisciplinary Publications: (1) Shankar, R., Mentor and Mentee Pipeline in Smart Phone App Development, *Annual Mentoring Conference*, at the Mentoring Institute, UNM, Albuquerque, NM, 2014; and (2) Shankar, R., McAfee, F., Harris, M., Behara, R., and Fowlkes, J., Android Exchange (AEx) - A Virtual Community for Students on eTeams, *EEE'13* - Las Vegas, NV, 2013.
2. Online Learning Focus: (a) eLearning Designer/Facilitator Certification at the *Center for eLearning*, FAU, honors, 2012; and (b) Certificate of Achievement, Web 2.0 Tools You can Use to Improve Learning, 2012, and (c) Mobile Learning Mastery Series, 2014, *Both* from the *Sloan Consortium*
3. Biomedical Publications: (a) Shankar and Webster, "Noninvasive Measurement of Compliance of Human Leg Arteries," *IEEE Trans. Biomed Eng.*, 38, 1, January 1991; (b) Shankar, and Bond, "Correlation of Noninvasive Arterial Compliance with Anatomic Pathology of Atherosclerotic Nonhuman Primates," *Atherosclerosis*, 85, Dec 1990. See the personal website for other publications.
4. Systems Integration Publications: (a) Agarwal, et al., Survey of NoC Architectures and Contributions, *Journal of Engineering Computing and Architectures*, Vol. 3, 2009; (b) Agarwal, et al., A Concurrency Model for Network on Chip Design Methodology, *Journal of Modeling and Simulation*, Vol. 29, 2009. The Faculty profile site lists other publications
5. Design and Automation Focus: Shankar, R., and Fernandez, E., *VLSI and Computer Architecture*, 490 pages, Academic Press, Inc., August 1989. The Faculty profile site lists other publications.

SYNERGISTIC ACTIVITIES:

1. **Android Smart Phone Apps ('09 - present):** SBA funded (PI: Shankar) to develop courses on Android Mobile phone App development in 2009. Since then, we have offered courses for high school to graduate level and beyond, and have involved students and faculty members from arts, anthropology, urban planning, business, and engineering to develop marketable Apps. Offered it as an eLearning course in 2012. Please see above for our websites with resources and app repositories.
2. **Semantic Web and IOT/ Robotics ('11 - present):** Multi-disciplinary efforts that utilize my various backgrounds in biomedical, electrical, computer engineering, computer science, innovation, and management, to evolve a university infrastructure of research enhancement, social entrepreneurship, and STEM. Pre-Engineering to Graduate courses on Robotics and Semantic Web also developed. Two recent graduate course offerings of Semantic Web focused on academic and medical Apps. We have web sites that support these domains. Please see above for web site addresses.
3. **Health Technology Transfer ('92- '15):** Biomed Patents resulting from pilot studies on human and monkey subjects were licensed to Vasocor Inc. Led a 30+ technical group in developing Vasogram I. Vasogram II was used in a multi-center (successful) clinical validation study. (Herrington et al., *Circulation*, Vol. 110, July 27 2004, pp. 432-437). **Current** NSF I/UCRC project with ARC Devices, FL, at \$100K on Medical Device integration at hospitals. Royalty and Grants Received: \$2.05 M.
4. **Academe-Industry Collaboration ('03 - '08):** Led groups of 20+ computer science, computer and electrical engineering faculty members & students (Co PIs: Furht and Agarwal) on a major 6 year Motorola project on radically increasing engineering design productivity. Achieved a six fold improvement (per Motorola). Grants from Motorola, IBM, NSF, DARPA during 1987-2010: \$2.36 M
5. **Industry Research & Development ('01- '03):** As a senior manager at Cadence, supported all system and chip design activities at Motorola. Gained insight in their design flow and proposed a new approach for increasing engineering design productivity (see item 4 above).

MENTORS, ADVISORS, AND DOCTORAL STUDENTS:

1. Industrial Mentors: Jaime Borrás, ex-VP and CTO, iDEN, Motorola, FL, now President, MTC (mobile Technology Consortium), FL; Jerry Merckel, ex- Senior Manager, IBM, Boca Raton, FL.
2. Research Advisors (1): John G Webster, Professor Emeritus, University of Wisconsin, Madison, WI, and M. G. Bond, Professor Emeritus, Bowman Gray School of Medicine, Winston-Salem, NC
3. PhD Advisees (8): S. Islam (current), F. Wissinger, A. Agarwal, J. Suryaprasad, E. Callaway, E. Horvath, L.C. Agba, & O. Karralli

1. Name

Tami Sorgente

2. Education –

Master of Science in Computer Science, Florida Atlantic University, 2004

Bachelor of Fine Art, Florida Atlantic University, 1990

3. Academic experience –

Florida Atlantic University, Senior Instructor, (2015 – present), full time

Florida Atlantic University, Instructor and Undergraduate Advisor, (2005 – 2015), full time

As an advisor and instructor I work as part of a team to effectively advise undergraduate students pursuing Bachelor of Science degrees in Computer Science, Computer Engineering, Bachelor of Information and Engineering Technologies, and the combined BS/MS (Bachelor of Science/ Master of Science) programs.

Course taught: Computer Operating Systems, Computer Animation, Foundations of Computer Science (C++), Introduction to Programming in C, Formal Languages and Automata Theory, Directed Independent Studies (varied topics).

Florida Atlantic University, Computer Science and Engineering Special Projects
Assemble and edit department newsletters, research materials, a multimedia encyclopedia, PowerPoint presentations, and video editing (2004 – present)

Florida Atlantic University, Research Assistant

Federal Earmark Project, Secure Telecommunication Networks, *Topics include:* A survey of web services security, A methodology for secure software design of complex applications, and Secure architecture for integrating web services into a wireless infrastructure(2004 – 2006)

University Consortium for Intermodal Transportation Safety and Security

Florida Atlantic University, MacArthur Campus, Jupiter, FL

Programmer for 3D and 4D simulations using C++ (2003 - 2004)

4. Non-academic experience –

Palm Beach County K-12, substitute teacher, (2000-2001)

Freelance Designer/Artist

Mural paintings, computer graphics, designed patterns digitized for embroidery (1990-2001)

5. Certifications or professional registrations

6. Current membership in professional organizations

7. Honors and awards

1st Place - 1st IEEE Graduate Student Research Showcase (2005)

8. Service activities (within and outside of the institution)

Computer Science online program coordinator

Assist in the preparation of a fully online Computer Science degree program.

Florida Atlantic University, Department of Computer and Electrical Engineering and Computer Science, served on numerous committees including Accreditation Board for Engineering and Technology (ABET), Undergraduate Computer Engineering Program Committee, Undergraduate Computer Science program Committee, Student Affairs Committee, and Undergraduate Advising (2005 – Present)

Actively involved in new Masters Program for FAU Master of Science in New Media Technology and Entertainment, a joint program with the School of Communication and Multimedia Studies at FAU (2008- 2012)

Active member of the Secure Systems Research Group, Florida Atlantic University (2002-2008)

9. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

E. B. Fernandez, M.M. Larrondo-Petrie, T. Sorgente, and M. VanHilst, "A methodology to develop secure systems using patterns", to appear in *Integrating Security and Software Engineering: Advances and Future Vision*, H. Moratidis and P. Giorgini (Eds), IDEA Press, 2006.

10. Briefly list the most recent professional development activities

Florida Atlantic University department of Computer Science and Engineering, created an online course, Introduction to programming in C (2017)

Florida Atlantic University department of Computer Science and Engineering, created an online course, Computer Animation (2015)

Florida Atlantic University department of Computer Science and Engineering, created an online course, Computer operating systems (2014)

Florida Atlantic University department of Computer Science and Engineering, created a new course, Computer Animation (2007)

Yufei Tang
Biographical Sketch

(a) Professional Preparation

Hohai University, China	B.S.	2004-2008	Electrical Engineering and its Automation
Hohai University, China	M.S.	2008-2011	Power Systems
University of Rhode Island	Ph.D.	2011-2016	Electrical and Computer Engineering

(b) Appointments

- 2016-present, Assistant Professor, Computer & Electrical Engineering and Computer Science (CEECS), Florida Atlantic University, Boca Raton, FL
- 2016-present, Faculty Fellow, Institute for Sensing and Embedded Network Systems Engineering (I-SENSE), Florida Atlantic University, Boca Raton, FL

(c) Publications

(i) Most Relevant Publications

1. J. Yan, H. He, X. Zhong and Y. Tang, "Q-learning based vulnerability analysis of smart grid against sequential topology attacks," in *IEEE Transactions on Information Forensics and Security*, vol. 12, no. 1, pp. 200-210, Jan. 2017.
2. J. Yan, Y. Tang, Bo Tang, H. He and Y. Sun, "Power grid resilience against false data injection attacks," *IEEE Power and Energy Society General Meeting (PESGM)*, Boston, MA, July 17-21, 2016.
3. Y. Tang, C. Luo, J. Yang and H. He, "A chance constrained optimal reserve scheduling approach for economic dispatch considering wind penetration," in *IEEE/CAA Journal of Automatica Sinica*, vol. 4, no. 2, pp. 186-194, April 2017.
4. Y. Tang, H. He, et al., "Fuzzy-based goal representation adaptive dynamic programming," in *IEEE Transactions on Fuzzy Systems*, vol. 24, no. 5, pp. 1159-1175, Oct. 2016.
5. J. Yan, Y. Tang, H. He and Y. Sun, "Cascading failure analysis with DC power flow model and transient stability analysis," in *IEEE Transactions on Power Systems*, vol. 30, no. 1, pp. 285-297, Jan. 2015.

(ii) Other Publications

1. Y. Tang and J. Yang, "Dynamic event monitoring using unsupervised feature learning towards smart grid big data," *International Joint Conference on Neural Networks (IJCNN)*, Anchorage, AK, May 14-19, 2017.
2. Y. Zhu, J. Yan, Y. Tang, Y. Sun and H. He, "Joint substation-transmission line vulnerability assessment against the smart grid," in *IEEE Transactions on Information Forensics and Security*, vol. 10, no. 5, pp. 1010-1024, May 2015.
3. Y. Tang, H. He, J. Wen and J. Liu, "Power system stability control for a wind farm based on adaptive dynamic programming," in *IEEE Transactions on Smart Grid*, vol. 6, no. 1, pp. 166-177, Jan. 2015.
4. Y. Zhu, J. Yan, Y. Tang, Y. Sun and H. He, "Resilience analysis of power grids under the sequential attack," in *IEEE Transactions on Information Forensics and Security*, vol. 9, no. 12, pp. 2340-2354, Dec. 2014.
5. Y. Tang, P. Ju, et al., "Optimized control of DFIG-based wind generation using sensitivity analysis and particle swarm optimization," in *IEEE Transactions on Smart Grid*, vol. 4, no. 1, pp. 509-520, March 2013.

(d) Synergistic Activities

- i. Outreach Activities:
 - Representative of I-SENSE for *Science Center Engineer It Competition and Family Day*, South Florida Science Center and Aquarium, West Palm Beach, FL, Spring 2017.
- ii. Conference and Workshop Service:
 - PC member of Computational Intelligence in Big Data, IEEE Symposium Series on Computational Intelligence, Hawaii, USA, Dec. 2017.
 - PC member of Computational Intelligence in Cyber Security, IEEE Symposium Series on Computational Intelligence, Hawaii, USA, Dec. 2017.
 - PC member of Computational Intelligence in Big Data, IEEE Symposium Series on Computational Intelligence, Athens, Greece, Dec. 2016.
 - PC member of Computational Intelligence Applications in Smart Grid, IEEE Symposium Series on Computational Intelligence, Athens, Greece, Dec. 2016.
 - Secretary support for IEEE Symposium Series on Computational Intelligence, Orlando, Florida, Dec. 2014.
 - Secretary support for IEEE Computational Intelligence Society Workshop on “New Frontiers in Computational Intelligence: From Foundations to Applications,” University of Rhode Island, Kingston, Rhode Island, Oct. 2014.
- iii. Teaching and Mentoring:
 - Mentor for NSF Research Experiences for Undergraduates (REU) Site in Sensing and Smart Systems: Smart Grid Control and Optimization, I-SENSE, Florida Atlantic University, FL, Summer 2017.
 - Mentor for high school and undergraduate summer interns in Computational Intelligence and Self-Adaptive Systems (CISA) Laboratory, University of Rhode Island, Kingston, RI, 2013 & 2015.
- iv. Journal Referee (selected):
 - IEEE Transactions on Smart Grid
 - IEEE Transactions on Power Systems
 - IEEE Transactions on Neural Networks and Learning Systems
 - IEEE Transactions on Automation Science and Engineering
 - IEEE Transactions on Big Data
 - IEEE Power Engineering Letters
 - IEEE/CAA Journal of Automatica Sinica
 - IET Renewable Power Generation
 - Applied Energy Journal
 - Neurocomputing Journal
 - Evolving Systems Journal
 - Artificial Intelligence Review Journal
- v. Conference Referee (selected):
 - IEEE International Joint Conference on Neural Networks 2013-2017
 - IEEE Power and Energy Society General Meeting 2015-2017
 - IEEE World Congress on Computational Intelligence 2014, 2016, 2017
 - IEEE Symposium Series of Computational Intelligence 2013-2017

VICHATE UNGVICHIAN, Ph.D., P.E.

Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University, Boca Raton, Florida 33431
ungvich@fau.edu

a. PROFESSIONAL PREPARATION

Ph.D., Electrical Engineering Dept., The Ohio University, Athens, Ohio, 1981.
MSc., Electrical Engineering Dept., The Ohio State University, Columbus, Ohio, 1975.
BSEE, Electrical Engineering Dept., Khon-Kaen Univ., Khon-Kaen, Thailand, 1971.

b. APPOINTMENT

Professor, College of Engineering, FAU, 1994-Present.
Associate Professor and Director of the Electromagnetic Interference (EMI) R & D
Laboratory, FAU, 1988-1994.
Assistant Professor, Department of Electrical and Computer Engineering, FAU, 1982-
1988.

c. PRODUCTS

S. Osaklang, A. Keawrawang, A. Siritariwat, V. Ungvichian, R. Sivaratana, K. Prachumrasee, and A. Kruesubthaworn, "GHz-Frequency Electromagnetic Interference Suppression Technique using Magnetic Absorber for Hard Disk Interconnector", The Applied Computational Electromagnetics, Vol. 28, No. 10, 984-988, October 2013.

K. Prachumrasee, A. Siritariwat, V. Ungvichian, R. Sivaratana, A. Keawrawang, "A Methodology to Identify Crosstalk Contributor from 6-Line Suspension Assembly Interconnect to Ultra-High Capacity Hard Disk Drives", The Applied Computational Electromagnetics, Vol. 27, No. 1, 2012.

S. Osaklang, A. Kaewrawang, A. Kruesubthaworn, V. Ungvichian, P. Supnithi and A. Siritariwat, "A Practical Crosstalk Reduction Technique Applied to High-Density Hard Disk Interconnecting Suspension Assembly Traces", IEEE Trans On Magnetic, Vol 47., Issue 10, P 4014-4017, 2011

Y.T. Jean-Charles, V. Ungvichian, and A. Barbosa, "Effects of Substrate permittivity on Planar Inverted-F Antenna Performances", **Journal of Computers**, Issue 9, September, 2009.

A. Siritariwat, A. Kruesubthaworn and V. Ungvichian, "An EMI Immunity Study of TMR Heads in Quasi-Static Tester Due to the Direction of Sweeping Frequency", **Trans**

Tech Publications, Solid State Phenomena Vol. 152-153, 447-450, Switzerland, 2009.

Anan Kruesubthaworn, A. Pratoomthip, A. Siritaratiwat, and V. Ungvichian, “Anomalous Magnetic Responsiveness of Giant Magnetoresistive Heads Under Specific electromagnetic Interference Frequencies Using Quasi-static Tester”, **Journal of Applied Physics**, 103, 1, 2008

Kruesubthaworn, R. Sivaratana, V. Ungvichian, and A. Siritaratiwat, “Testing Parameters of TMR Heads Affected by Dynamic-Tester Induced EMI”, **Journal of Magnetism and Magnetic Materials**, Elsevier, Vol. 316, Issue 2, e142-e144, 2007.

d. OTHER PRODUCTS

K. Prachumrasee, A.Siritaratiwat, V. Ungvichian, R. Sivaratana, and A. Kaewrawang, “A methodology to identify crosstalk contributor from 6-line suspension assembly interconnect of ultra-high capacity hard disk drive”, INTERMAG 2011 Conference, April 2011 (Taiwan).

Y. T. Jean-Charles, V. Ungvichian and A. Barbosa, “A Study of Substrate Permittivity Effects on the Gain of Planar Inverted-F Antennas”, **IEEE SoutheastCon**, April 2008, (Huntsville, Alabama).

e. RESEARCH

Two Undergraduate Research Grant awards, 2015-2017, \$950.

MREU & CAKES “Evaluation of Mobile Renewable Energy Unit, May 2014-November 2014, \$7,080.

M.R. Research & CAKES “A Feasibility Study on Ordnance Reliability on Prolong Electromagnetic Environment” May 2013 - December 2013, \$13,000.

XM Satellite Inc., November 2008- February 2009, \$24,575.

XM Satellite Inc., March 2008- December 2008, \$46,775.

Dingding Wang

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Phone: 561-297-3228

<http://faculty.eng.fau.edu/wangd/>

Address: 777 Glades Road, EE510, Boca Raton, FL 33431

a. Professional Preparation

July 2003 B.S. in Computer Science, University of Science and Technology of China, P.R.China
December 2010 Ph.D. in Computer Science, Florida International University, Miami, FL, USA

b. Appointments

August 2014 - Present Assistant Professor, Computer Science, Florida Atlantic University
March 2011 - July 2014 Postdoctoral Associate, Center for Computational Science, University of Miami
September 2010 - March 2011 Data Scientist, DailyMe, Inc.
Summer 2007, 2008, 2009 Research Intern, NEC Laboratories America, Inc.

c. Products

(i) Five Most Relevant Products

- Dingding Wang, Sahar Sohangir, and Tao Li. **Update Summarization using Semi-Supervised Learning Based on Hellinger Distance**. In *Proceedings of the Conference on Information and Knowledge Management (CIKM 2015)*, pages 1907-1910, 2015.
- Dingding Wang, Shenghuo Zhu, Tao Li, and Yihong Gong. **Comparative Document Summarization via Discriminative Sentence Selection**. In *ACM Transactions on Knowledge Discovery from Data (ACM TKDD)*, 6(3):12:1-18, 2013.
- Dingding Wang, Tao Li, and Mitsunori Ogihara. **Generating Pictorial Storylines via Minimum-Weight Connected Dominating Set Approximation in Multi-view Graphs**. In *Proceedings of the Twenty-Sixth AAAI Conference on Artificial Intelligence (AAAI 2012)*, pages 683-690, 2012.
- Dingding Wang, Shenghuo Zhu, Tao Li, Yun Chi, and Yihong Gong. **Integrating Document Clustering and Multi-Document Summarization**. In *ACM Transactions on Knowledge Discovery from Data (ACM TKDD)*, 5(3):14:1-26, 2011.
- Dingding Wang and Tao Li. **Document Update Summarization using Incremental Hierarchical Clustering**. In *Proceedings of the Conference on Information and Knowledge Management (CIKM 2010)*, pages 279-287, 2010.

(ii) Other Products

- Dingding Wang, Mitsunori Ogihara, Calos Gallo, Juan A. Villamar, Justin D. Smith, Wouter Vermeer, Grace-lyn Cruden, Nanette Benbow, C. Hendricks Brown. **Automatic Classification of Communication Logs into Implementation Stages via Text Analysis**. In *Implementation Science*, 11(1):119, 2016.
- Longhui Zhang, Lei Li, Tao Li, and Dingding Wang. **PatentDom: Analyzing Patent Relationships on Multi-View patent Graphs**. In *Proceedings of the Conference on Information and Knowledge Management (CIKM 2014)*, pages 1369-1378, 2014.
- Lei Li, Dingding Wang, Tao Li, Daniel Knox, and Balaji Padmanabhan. **SCENE : A Scalable Two-Stage Personalized News Recommendation System**. In *Proceedings of the 34th Annual ACM SIGIR Conference (SIGIR 2011)*, pages 125-134, 2011.

- Dingding Wang, Tao Li, and Chris Ding. **Weighted Feature Subset Non-Negative Matrix Factorization and its Applications to Document Understanding**. In *Proceedings of 2010 IEEE International Conference on Data Mining (ICDM 2010)*, pages 541-550, 2010.
- Dingding Wang, Tao Li, Shenghuo Zhu, and Chris Ding. **Multi-Document Summarization via Sentence-Level Semantic Analysis and Symmetric Matrix Factorization**. In *Proceedings of the International ACM SIGIR Conference (SIGIR 2008)*, pages 307-314, 2008.

d. Synergistic Activities

- **Conference Organizers:** Publication co-chair of the 10th IEEE International Conference on Semantic Computing (ICSC 2016), program co-chair of the Conference on Web Information Systems Engineering (WISE 2015), poster and demo chair of 14th IEEE International Conference on Machine Learning and Applications (ICMLA 2015), local arrangement chair of 2014 IEEE International conference on Bioinformatics and Bioengineering (BIBE 2014).
- **Program Committee Member:** 2016 IEEE International Conference on Big Data (BigData 2016), 15th IEEE International Conference on Machine Learning and Applications (ICMLA 2016), The 9th IEEE International Conference on Semantic Computing (ICSC 2015), The 21st ACM International Conference on Information and Knowledge Management (CIKM 2012), The 10th IEEE International Conference on Machine Learning and Applications (ICMLA 2011), The Fifth International Joint Conference on Natural Language Processing (IJCNLP 2011), The 2010 Conference on Empirical Methods in Natural Language Processing (EMNLP 2010)
- **Journal Referee:** IEEE Transactions on Knowledge and Data Engineering, Knowledge and Information Systems, ACM Transactions on Intelligent Systems and Technology, Computational Intelligence, International Journal of Machine Learning and Cybernetics, Central European Journal of Computer Science, International Journal of Intelligent Systems Technologies and Applications, Theoretical Computer Science

KwangSoo Yang, PhD

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Dept. of Computer and Electrical Engineering and Computer Science.

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Email: yangk@fau.edu **URL:** <http://faculty.eng.fau.edu/yangk/home/>

Telephone: 561-297-1205 **Fax:** 561-297-2800

Professional Preparation

Yonsei University, Seoul	Electricity Engineering	B.S.	1998
University of Minnesota	Computer Science	M.S.	2010
University of Minnesota	Computer Science	Ph.D.	2015

Appointments

2015- Present	Asst. Professor,	Florida Atlantic University, Boca Raton
2010- 2015	Graduate Research Assistant	University of Minnesota
2001-2008	Software Engineer	LG-CNS (www.lgcns.com), Seoul

Research Interests:

Data and knowledge engineering, spatial database and data mining, and Geographic Information Systems.

Five Closely Related Products

1. Experiences with evacuation route planning algorithms." International Journal of Geographical Information Science 26, no. 12: 2253-2265 (2012) (w/S. Shekhar et.al.)
2. Lagrangian Approaches to Storage of Spatio-temporal Network Datasets," IEEE Transactions on Knowledge & Data Engineering, Volume:26, Issue:9, 2222–2236, (2014) (w/ M. Evans, et al.)
3. Capacity-Constrained Network-Voronoi Diagram", IEEE Transactions on Knowledge & Data Engineering, Volume: 27, Issue: 11, 2919 – 2932, (2015) (w/ A. Shekhar, et al.)
4. Intelligent shelter allotment for emergency evacuation planning: A case study of makkah." IEEE Intelligent Systems no. 30(5), 66-76, (2015) (w/ A. Shekhar, et al.)
5. A Critical-time-point Approach to All-departure-time Lagrangian Shortest Paths, IEEE Transactions on Knowledge & Data Engineering, Volume:27, Issue:10, 2591–2603, (2015) (w/ V. Gunturi, et al.)

Five Other Significant Products

1. A Dartboard Network Cut Based Approach to Evacuation Route Planning: A Summary of Results, proceeding of 7th Intl. Conference on Geographic Information Science, LNCS 7478: pages 325-339) (2012) (w/ V. Gunturi, et al.)
2. Spatial big-data challenges intersecting mobility and cloud computing, proceeding of the 11th ACM International Workshop on Data Engineering for Wireless and Mobile Access, pages 1-6 (2012) (w/ S. Shekhar, et al.)
3. Benchmarking Spatial Big Data." In Specifying Big Data Benchmarks, In Specifying Big Data Benchmarks LNCS 8163, pages 81-93. 2014 (w/ S. Shekhar, et al.)
4. Spatio-temporal Networks: Modeling, Storing, and Querying Temporally-Detailed Roadmaps." In Space-Time Integration in Geography and GIScience, pages 77-108. Springer, ISBN: 978-94-017-9204-2, (2015) (w/ M. Evans, et al.)
5. Distance-Constrained k Spatial Sub-Networks: A Summary of Results. In Proceedings of 9th International Conference on Geographic Information Science, Springer LNCS 9927: pages 68-84 (2016)

Synergistic Activities

- TPC member for GraphSM 2017
- PC member for ACM SIGSPATIAL 2016
- Editorial Board Member of Korea Spatial Information Society

XINGQUAN ZHU

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URL: <http://www.cse.fau.edu/~xqzhu>

Google Scholar: <http://scholar.google.com/citations?user=YhKZXtcAAAAJ&hl=en>

(i) Professional Preparation

- ❖ Xidian University, China, Communication Engineering, B.Eng., 1995
- ❖ Xidian University, China, Communication & Electronic Systems, M.Eng., 1998
- ❖ Fudan University, China, Computer Science, Ph.D, 2001

(ii) Appointments

- ❖ August 2012 - Date, Associate Professor, Department of Computer Science & Engineering, Florida Atlantic University, Boca Raton, FL 33431
- ❖ August 2006 - July 2012, Assistant Professor, Department of Computer Science & Engineering, Florida Atlantic University, Boca Raton, FL 33431
- ❖ August 2003 - July 2006, Research Assistant Professor, Department of Computer Science, University of Vermont, Burlington, VT 05405
- ❖ October 2002 - July 2003, Postdoctoral Associate, Department of Computer Science, University of Vermont, Burlington, VT 05405
- ❖ February 2001 - October 2002, Postdoctoral Associate, Department of Computer Science, Purdue University, West Lafayette, IN 47907

(iii) Publications (Selected from over 70 referred journal and 125 conference proceeding papers)

❖ Up to 5 publications most closely related to the proposed project

1. Daokun Zhang, Jie Yin, Xingquan Zhu, and Chengqi Zhang, User Profile Preserving Social Network Embedding, *International Joint Conference on Artificial Intelligence (IJCAI)*, Melbourne, Australia, August 19-25, 2017.
2. Chun Wang, Shirui Pan, Xingquan Zhu, Guodong Long, and Jing Jiang, MGAE: Marginalized Graph Autoencoder for Graph Clustering, *ACM International Conference on Information and Knowledge Management (CIKM)*, Nov. 6-10, 2017.
3. Ting Guo, Jia Wu, Xingquan Zhu, and Chengqi Zhang, Combining Structured Node Content and Topology Information for Networked Graph Clustering, *ACM Transactions on Knowledge Discovery from Data*, 11(3): 29:1-29:29, 2017.
4. Meng Fang, Jie Yin, and Xingquan Zhu, Active Exploration for Large Graphs, *Data Mining and Knowledge Discovery*, 30(3):511-549, 2016.
5. Xindong Wu, Xingquan Zhu, Gong-Qing Wu, and Wei Ding, Data Mining with Big Data, *IEEE Trans. on Knowledge and Data Engineering*, 26(1):97-107, 2014.

❖ Up to 5 other significant publications

1. Hanning Yuan, Meng Fang, Xingquan Zhu: Hierarchical Sampling for Multi-Instance Ensemble Learning. *IEEE Trans. on Knowledge Discovery Data Engineering*, 25(12): 2900-2905, 2013.
2. Xingquan Zhu, Cross-Domain Semi-Supervised Learning Using Feature Formulation, *IEEE Trans. on Systems, Man, and Cybernetics, Part B: Cybernetics*, 41(6):1627-1638, December, 2011.
3. Xingquan Zhu and Xindong Wu, Class Noise Handling for Effective Cost-Sensitive Learning by Cost-Guided Iterative Classification Filtering, *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, vol.18, no.10, pp.1435-1440, 2006.
4. Xingquan Zhu, Ahmed K. Elmagarmid, Xiangyang Xue, Lide Wu, Ann C. Catlin, InsightVide: Towards hierarchical video content organization for efficient browsing, summarization and retrieval, *IEEE Transactions on Multimedia*, vol.7, no.4, 2005.
5. Xingquan Zhu, Xindong Wu, Ahmed K. Elmagarmid, Zhe Feng, and Lide Wu, Video Data Mining: Semantic indexing and event detection from the association perspective, *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, vol.17, no.5, pp.665-677, May 2005.

(iv) Synergistic Activities (Up 5 Examples)

1. Associate Editor

- IEEE Trans. on Knowledge and Data Engineering (TKDE): 2008-2012, 2014-Date
- Journal of Big Data: 2013-Date
- Social Network Analysis and Mining (SNAM): 2010-Date
- Network Modeling Analysis in Health Informatics and Bioinformatics (NetMAHIB): 2014-Date
- International Journal of Monitoring & Surveillance Technologies Research (IJMSTR): 2014-Date
- Knowledge and Information Systems (KAIS) Journal: 2003-2008

2. Program Committee Co-Chair

- IEEE BIBE-2014: The 14th IEEE International Conference on BioInformatics and BioEngineering
- IEEE GRC-2013: The 2013 IEEE International Conference on Granular Computing
- IEEE ICTAI-2011: The 23rd IEEE International Conference on Tools with Artificial Intelligence
- ICMLA-2010: The Ninth IEEE International Conference on Machine Learning and Applications

3. Program Committee Vice Chair (Area Chair)

- BigData 2017; IEEE ICDM-2017; IEEE ICTAI-2017; IEEE ICDM-2013; ACM CIKM-2013; IEEE ICDM-2011; ICMLA-2011; ACM CIKM-2010.

4. Program Committee

- KDD 2007-2017; ICDM 2003-2017; SDM 2009-2017; (served over 200 times as program committee members for international conferences/workshops).

5. **Journal Referee:** IEEE Trans. on Pattern Analysis & Machine Intelligence; IEEE Trans. on Knowledge and Data Engineering; IEEE Trans. on Neural Networks and Learning Systems; IEEE Trans. on Multimedia; Data Mining and Knowledge Discovery; IEEE Trans. on Cybernetics; Information Sciences; Data and Knowledge Engineering; Neurocomputing Journal; Machine Learning Journal.

HANQI ZHUANG, Ph.D.

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Florida Atlantic University, Boca Raton, FL 33431
zhuang@fau.edu

a. PROFESSIONAL PREPARATION

- Ph.D. Florida Atlantic University, 1989
- M.S. Florida Atlantic University, 1986
- B.S. Shanghai University, 1982

b. APPOINTMENTS

- Professor and Assoc Chair, Dept. of CE, EE & CS, FAU, 2013 – Present
- Professor, College of Engineering, FAU, 1998 – Present
- Associate Professor, Dept. of Electrical Engineering, FAU, 1994 – 1998
- Assistant Professor, Dept. of Electrical Engineering, FAU, 1989 – 1994

c. PRODUCTS

Product Closely Related

1. Zhuang, H., Z. Roth, O. Masory and N. Erdol, “Assistive technology in capstone engineering design,” *IEEE IS3C*, X’ian China, July 2016.
2. Zhuang, H., O. Masory, and Z.S. Roth, “Result-oriented engineering capstone designs to aid persons with disabilities,” *ASEE 2013 Conference*, Paper ID #8226, Atlanta, GA, June 2013.
3. Zhuang, H., and S. Morgera, “Development of an undergraduate Course - Internet-based instrumentation and control,” *Int. J. Computer Education*, Vol 49, pp. 330-344, 2007.
4. Zhuang, H., and S. Morgera, “An undergraduate course – Internet-based instrumentation and control,” in *Online Proc. IEEE Conf. Frontier in Education*, 2004.
5. Zhuang, H., and S. Morgera, “Development of a web-based instrumentation and control lab,” in *Online Proc. ASEE*, 2003.

Other Significant Products

1. Esfahanian, M., H. Zhuang, N. Erdol, and E. Gerstein, “Two-stage detection of North Atlantic Right Whale upcalls using local binary patterns and machine learning algorithms,” *J. Applied Acoustics*, v 120, May 2017, pp 158-166.
2. Esfahanian, M., H. Zhuang, and N. Erdol, “Sparse Representation for Classification of Dolphin Whistles by Type,” *J. Acoustical Society of America – EL*, Vol. 136 (1), July, 2014.
3. Wang, X., D. Wang, H. Zhuang, and S. Morgera, “Fair energy-efficient resource allocation in wireless sensor networks over fading TDMA channels,” *IEEE*

- Journal on Selected Areas in Communications*, Vol. 28, No. 7, pp. 1063-1072, Sept. 2010.
4. Bai, Y., H. Zhuang and Z.S. Roth, "Application of a fuzzy logic controller in suppression of noises and coupling effects for a laser tracking systems," *IEEE Transactions on Control Systems Technology*, Vol. 13, No.1, Jan. 2005, pp. 113-121.
 5. Zhuang, H., "Self-calibration of parallel mechanism with a case study on Stewart platforms," *IEEE Trans. Robotics & Automation*, Vol. 13, No. 3, June 1997, pp. 387-397.

d. SYNERGISTIC ACTIVITIES

1. Zilouchian, A. (PI), N. Romance, N. Erdol and H. Zhuang, "HSI- STEM & Articulation Program: An Articulated State College-University Framework for Increasing Graduation Rates of Hispanic and Low-income Students in Computer Science," Department of Education. Total award: \$4,456,707, 10/01/2016-09/30/2021.
2. Agarwal, A. (PI); H. Zhuang, G. Gumus, L. Dunphy, R. Behara, "Phase II I/UCRC Florida Atlantic University Site: Center for Health Organization Transformation," NSF, \$300,000, 7/15/2016-7/14/2021.
3. Zhuang, H. (PI), Z. Roth, and O. Masory, "Result-oriented multidisciplinary capstone design to aid persons with disabilities," NSF, \$125,000, 7/1/2011 – 6/31/2016. Award #: RAPID-1033815.
4. Wu, J.(PI), (H. Zhuang is a co-PI), "Acquisition of a NUMA-based supercluster for high performance computing", NSF-MRI, \$470,940, 2005-2011. Award #: MRI-0521410.
5. Zhuang, H., "An autonomous approach for calibration and compensation of a new class of CNC machine tools," NSF Res. Init. Awards, \$97,000 from NSF and \$7,000 matched by FAU. 1995 - 1998. Award #: DMI-9409716.

Ali Zilouchian, Ph.D., PE

Associate Dean for Academic Affairs & Professor

College of Engineering and Computer Science

Florida Atlantic University

Boca Raton, Florida 33431

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EDUCATION

Ph.D. Electrical Engineering, The George Washington University (1986)

M.S. Electrical Engineering, Northrop University, Inglewood, California (1978)

B.S. Electrical Engineering, University of Science & Technology (1976)

APPOINTMENTS

2009- Present: *Associate Dean for Academic Affairs, FAU*

1998-Present *Professor, Electrical Engineering, FAU*

2005- 2009 *Assistant Dean for Graduate Studies, FAU*

1991-1998 *Associate Professor, FAU*

1986-1991 *Assistant Professor, FAU*

1981-1986 *Research and Teaching Assistant, GWU*

PUBLICATIONS

Author/co-author of 175 refereed articles, Book, Book Chapters and Conf. papers

RELEVANT PUBLICATIONS

- Zilouchian, A., and A. Saengrung, "Design and Implementation of Neuro-Fuzzy Controllers for PEM Fuel Cells", 2017 IEEE 30th Canadian Conference on Electrical and Computer Engineering (CCECE)-accepted, May 2017.
- Genesis Alvarez, Hadis Moradi and Ali Zilouchian, "Modeling a Grid-connected PV/Battery Micro-grid System with MPPT Controller", pp.1129-1134, September 2016.
- E. Limouchi, A. Zilouchian and I. Mohghob, "OFDMA-based WiMAX Connection Admission Control Based on Fuzzy Logic Controller", Proceeding of International Wireless Communications and Mobil Computing, pp.1129-1134, September 2016.
- D. Wang, Y. Bai and A. Zilouchian, "Quantization Error Calculation of Various Realizations of 2-D Separable-in-Denominator Recursive Filters", Proceeding of IEEE International Symposium on Circuits and Systems, pp. 2189-2192, May 2015.
- D. Wang, Y. Bai and A. Zilouchian, "On the Implementation of 2-D Separable-in-Denominator Recursive Filters", Proceeding of IEEE International Symposium on Industrial Engineering, pp. 1021-1025, June 2014.
- Zilouchian, A. & A. Abtahi, "A Certificate Program in Renewable Energy", Proceeding of American Society of Engineering Education, San Antonio, TX, June 2012.
- Zilouchian and A. Abtahi, "Development of a Prototype Fuel Cell Laboratory", Proceeding of American Society of Engineering Education, Austin, TX, June 2009.
- Zilouchian, A. and A. Abtahi, "Design and Implementation of a Fuel Cell Laboratory, 2008 National Science Foundation CCLI Conference, Washington, D.C., August 2008.

OTHER PUBLICATIONS

- Bennett, T., A. Zilouchian and R. Messenger, "Photovoltaic Model and Converter Topology Considerations for MPPT Purposes", J. of Solar Energy(*accepted*).
- Bennett, T., A. Zilouchian and R. Messenger, "A Proposed Maximum Power Point Tracking Algorithm Based on a New Testing Standard", J. of Solar Energy, Vol. 89, issue 7, pp. 23-81, 2013.

- Perez, A., A. Abtahi, and A. Zilouchian, “Experimental Analysis of Pulsing Techniques in a Proton Exchange Fuel cell”, *Journal of Power Sources*, Vol. 196, No. 3, pp. 1030-1035, 2011.
- Abtahi, A. and A. Zilouchian, “An Overview of Current Research Activities on PEM Fuel Cell Technology at Florida Atlantic University”, Spring Veleg-2010.
- Wang, D. and A. Zilouchian, “Comment on Model reduction of Discrete Linear Systems via Frequency-Domain Balanced Structure”, *IEEE Trans on Circuits and Sys*, Vol. 54, No. 3, pp. 683-684. March 2007.

SYNERGISTIC ACTIVITIES

(i) RECENT FUNDED PROJECTS:

- Ali Zilouchian (PI), and Nancy Romance (Co-PI) “*An Articulated Community College-University Framework for Increasing Graduation rate of Hispanic and Low-Income Students in Computer Science*” Sponsor: Department of Education (DOE), October 2016-September 2021. Amount: \$4,456,706.
- Ali Zilouchian (PI) “2015 *Sprouting STEM Magnets Innovative Programs*” Sponsor: Broward School Board, March-Dec. 2015 Amount: \$42,000.
- Ali Zilouchian (PI) “2014 *STEM Cross Curriculum Development*” Sponsor: Broward School Boards, Jan.-Dec. 2014, Amount: \$ 34,000.
- Ali Zilouchian (PI) “2013 *STEM Cross Curriculum Development*” Sponsor: Broward School Boards, May-Dec. 2013, Amount: \$ \$101,826.
- Ali Zilouchian (Co-PI) “City Scholars” Sponsor: J.P. Morgan Foundation- 2014-2015, \$75000.
- Ali Zilouchian (PI); “Computer Accelerated Pipeline To Unlock Regional Excellence (CAPTURE) Project; Sponsor: Board of Governor-State of Florida, \$3.4M, June 2014- June 2016.
- Ali Zilouchian (PI) “*Power Gate for Smart Grid*” Sponsor: Florida Power & Light / Department of Energy; 2011-2014, Amount: \$ 197,661.
- Ali Zilouchian (PI) “*2012 Growing STEM Professional Development*” Sponsor: Broward School Board, 2012-2013, Amount: \$ 124,900.
- Ali Zilouchian (PI) “*Curriculum Modules-Growing STEM Magnet Schools*” Sponsor: Broward School Board, 2011-2012, Amount: \$ 49,210.

AWARDS & PROFESSIONAL ACTIVITIES:

- FAU Presidential Leadership Award-April 2017
- NSF Reviewer (1999, 2000, 2001, 2010, 2011).
- College of Engineering Dean Award, Florida Atlantic University (Dec. 2002 Dec. 2003).
- Best Organizing Award, World Automation Congress (June 2002).
- University Award for Excellence in Undergraduate Teaching (May 2001).
- University Award for Excellence in Undergraduate Teaching (2001, 1996).
- Invited Panel member, Alternative Energy, ASME (2006)
- Keynote Speaker, The International Conference on Seawater Desalination technologies on the Threshold of the New Millennium, November 2000.
- Program Committee Member: CIRAS 2001, WAC 2002.
- Local and Organizer Chair: World Automation Conference, 2002.
- Associate Editor of International Journal of Computer and Electrical Engineering (1998-Present).
- Organizer and session chair at 9 international and regional conferences during the last 5 years.
- IEEE Senior member, 1993- Present.

RECENT Ph.D. STUDENTS SUPERVISED

- Ms. Hadis Moradi “Optimal Energy Management of a Multi-sourced Microgrid”, expected completion date, Dec. 2017 (Co-Chair).
 - Dr. Thomas Bennett “Developing a Photovoltaic Maximum Power Point Tracking System”, August 2012.
 - Dr. Anucha Saengrung, “Modeling and Control of PEM Fuel Cell Systems”, August, 2008.
 - Dr. H. Yousofizadeh, “Fairness Index Selection in BW Allocation for Multicast ABR”, Dec. 2006.
- Total of 19 Ph.D. and MS Students supervised.*