

**Florida Polytechnic University
Board of Trustees
Academic Affairs Committee
January 14, 2014**

Subject: Review of the Eight Proposed Academic Degree Programs

Proposed Committee Action

Review and discuss the eight proposed degree programs as well as the process for submission to the Board of Governors. The proposed programs are:

College of Engineering

- (1) Bachelor of Science Degree in Computer Engineering
- (2) Bachelor of Science Degree in Electrical Engineering
- (3) Bachelor of Science Degree in Mechanical & Industrial
- (4) Master of Science Degree in Engineering

College of Innovation & Technology

- (5) Bachelor of Science Degree in Advanced & Technology.
- (6) Bachelor of Science Degree in Computer Science & Information Technology
- (7) Bachelor of Science Degree in Science & Technology Management
- (8) Master of Science Degree in Innovation & Technology

Background Information

When Florida Polytechnic University begins classes in the fall of 2014 it plans to offer six undergraduate degrees and two master's degrees. All degrees under consideration are STEM focused and each degree offers multiple areas of concentration. The Florida Poly Board of Trustees conducted an exhaustive review of demand among employers and students. In addition, the Board closely analyzed current program offerings at all other institutions in the State University System of Florida to ensure that there would be no unnecessary duplication.

The final steps in the implementation of the University's first degree programs is for the programs to be reviewed and approved according to criteria established by the Board of Governors and to submit information about each of approved programs to the Board of Governors within four weeks of approval by the University.

BOG Regulation 8.011 requires the Board Office to maintain an Academic Degree Program Inventory for the State University System (SUS). New degree programs are approved by the University Board of Trustees. New degree programs that are approved by the University Board of Trustees must meet the following criteria as outlined by the BOG:

Institutional and State-Level Accountability:

- The Program is consistent with the State University System Strategic Plan, and the University Mission, University Strategic Plan, and University Work Plan.
- There is a demonstrated need for program graduates, research, and/or service;
- The program does not unnecessarily duplicate existing state university system degree programs;
- Financial planning and resources are sufficient for implementation;
- There is a sufficient projected benefit of the program to the university, local community, and state; and
- Access and articulation are maintained for all programs.

Institutional Readiness:

- The institution demonstrates an ability to implement a high-quality program;
- The curriculum is appropriate for the discipline and program level;
- Sufficient qualified faculty is available; and

After the Board of Trustees, or the designated committee, approves the degree programs, the University must notify the Board of Governors Office within four weeks in writing and provide an electronic copy of the “Request to Offer a New Program” form for each program.

The Request to Offer a New Program” form must be signed by the Chair of the Board of Trustees, the President, and the Vice President for Academic Affairs.

The BOG uses this information to identify the approved degree programs for each university so that universities may report enrollment, degree completions, and other information related to the delivery of instruction. To have our degrees added to the SUS Degree Inventory, we must complete the Board of Governors’ *Request to Offer a New Degree Program* form for each program.

The Board of Trustees reviewed the policy for the new degree program planning and approval during their meeting on December 17, 2013 to ensure that the policy was in compliance with the Board of Governors Regulation 8.011(Authorization of New Academic Degree Programs and Other Curricular Offering). Additionally the Board delegated the authority to the Academic Affairs Committee to approve new degree programs.

Supporting Documentation:

List of the Degree Programs and Concentrations

Request to Offer the Bachelor of Science Degree in Mechanical & Industrial Engineering

Prepared by: Dr. Mary Carpenter, Director of Programs and Curriculum

Classes start August 2014

2 Colleges offering 6 Bachelor and 2 Master degrees

COLLEGE OF ENGINEERING

Bachelor of Science Degrees

COMPUTER ENGINEERING

with one of the following concentrations:

Digital Logic Design
Embedded System Design
Machine Intelligence

ELECTRICAL ENGINEERING

with one of the following concentrations:

Control Systems
Digital & Hybrid Systems
Electrodynamics
Magnetics
Semiconductors

MECHANICAL & INDUSTRIAL ENGINEERING

with one of the following concentrations:

Geometric Dimensioning & Tolerancing
Motion Intelligence
Multifunctional Materials
Nanotechnology

Master of Science Degree

ENGINEERING

COLLEGE OF INNOVATION & TECHNOLOGY

Bachelor of Science Degrees

ADVANCED TECHNOLOGY

with one of the following concentrations:

Big Data Analytics
Cloud Virtualization
Health Informatics

COMPUTER SCIENCE & INFORMATION TECHNOLOGY

with one of the following concentrations:

Cyber Gaming
Information Assurance & Cyber Security

SCIENCE & TECHNOLOGY MANAGEMENT

with one of the following concentrations:

Logistics
Materials & Supply Chain

Master of Science Degree

INNOVATION & TECHNOLOGY

Board of Governors, State University System of Florida

Request to Offer a New Degree Program

Florida Polytechnic University
University Submitting Proposal

Fall 2014
Proposed Implementation Term

College of Engineering
Name of College(s) or School(s)

Mechanical & Industrial Engineering
Name of Department(s)/ Division(s)

Mechanical & Industrial Engineering
Academic Specialty or Field

BS in Mechanical & Industrial Engineering
Complete Name of Degree

14.1901
Proposed CIP Code

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees	President	Date
Signature of Chair, Board of Trustees	Date	Vice President for Academic Affairs
		Date

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	67	49.55	\$8,096	\$401,155	-	-	\$401,155
Year 2	127	93.7					
Year 3	179	127.4					
Year 4	228	161.3					
Year 5	266	186.5	\$4,147	\$773,500	-	-	\$773,500

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

(a) Bachelor of Science Degree in Mechanical & Industrial Engineering

(b) Four concentrations: 1.) Geometric Dimensioning & Tolerancing, 2.) Motion Intelligence, 3.) Multifunctional Materials, and 4.) Nanotechnology

(c) This program consists of 120 credit hours

(d) (1) Geometric Dimensioning & Tolerancing:

Geometric Dimensioning and Tolerancing (GD&T) is the standardized method used for communicating part requirements on engineering drawings and 3-D CAD models. GD&T uses its own notation to define allowable variations in the form, size and position of parts in assemblies. GD&T is used on a daily basis by a variety of professionals, including tool designers, mechanical engineers, technical inspectors, and engineering managers. The Geometric Dimensioning and Tolerancing program in the Industrial Engineering Department will give you a firm foundation in geometric systems, advanced practice in calculating tolerances, and hands-on training in international standards and real world applications for this essential skill set.

Major companies in the industry that would employ graduates include: Ardaman & Associates, General Electric, Honeywell, IBM, and Motorola. Graduates will also be prepared to pursue graduate studies.

(2) Motion Intelligence:

Motion Intelligence is a multi-disciplinary field of study that seeks to improve the flow of motion in various environments: large-city traffic, airports, hospitals, public transportation, shipping, banks, universities, and media. Advances in logistics and supply chain management, manufacturing, public transportation, communications, and high-performance computing have created a new opportunity for engineers and planners to work together. The Motion Intelligence program in the Industrial Engineering Department combines information technology, applied engineering, and social sciences to provide you with the diverse technical skills, entrepreneurial abilities, and global viewpoint required to manage the governing forces that move within the marketplace.

Major companies in the industry that would employ graduates include: CSX Intermodal, MITRE Corporation, Motion Industries, RAND Worldwide, and Siemens Energy & Automation, Inc. Graduates will also be prepared to pursue graduate studies.

(3) Multifunctional Materials:

Multifunctional material design is the science of engineering composite materials with new and unique capabilities. Traditional materials that provide high stiffness and strength, for instance, can be modified at the nanoscale to take on other properties such as energy absorption, self-healing, and even shape morphing. The design of new “smart” materials and systems has major implications for the defense, aerospace, energy, and semiconductor industries. The Multifunctional Materials program in the Industrial Engineering Department will give you a strong foundation in the fabrication, characterization, modeling and prototyping of multifunctional materials and other smart systems that improve safety, efficiency, and versatility.

Major companies in the field include: Saint-Gobain, General Motors, US Army, and NASA. Graduates will also be prepared to pursue a graduate degree.

(4) Nanotechnology

Nanotechnology is a revolutionary field incorporating engineering, chemistry, physics, materials science, biology, and a growing number of other disciplines. Literally, the “science of the small.” Nanoscience focuses on manipulating matter at the level of atoms, molecules, and supramolecular structures to address challenges ranging from medicine to manufacturing. The Nanotechnology program in the Industrial Engineering Department will train you in the use of specialized instruments, fabrication processes, and advanced analysis methods to create smarter materials and devices with unlimited applications.

Major companies in the field include Dais Analytic, Draper Labs, Lockheed Martin, NanoPharma, NASA, and Viagene. Graduates will also be prepared to pursue graduate studies.

- B. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support. (See the SUS Strategic Plan at [http://www.flbog.edu/pressroom/doc/2011-11-28 Strategic Plan 2012-2025 FINAL.PDF](http://www.flbog.edu/pressroom/doc/2011-11-28%20Strategic%20Plan%202012-2025_FINAL.PDF))**

Priority: Teaching and Learning, Strategic Priorities for a Knowledge Economy

Goal: Increase the number of degrees awarded in STEM and other areas of strategic emphasis

Senate Bill 1994 directed Florida Polytechnic University to “Initiate the development of the new programs in the 95 fields of science, technology, engineering, and mathematics.” The Mechanical & Industrial Engineering program is a STEM degree and addresses the above mentioned goal.

Priority: Community and Business Engagement

Goal: Strengthen quality and recognition of commitment to community and business engagement

Goal: Increase levels of community and business engagement

Goal: Increase community business and workforce

Florida Polytechnic University is committed to community and business engagement. Industry summits and partnerships with businesses like the following illustrates our commitment to engaging business and the community. This commitment is illustrated by the forming and conducting first Annual Industry Summit in September, 2013.

To date, the following companies have joined us as industry partners:

- Colo5;
- CNP;
- Pharmaworks;
- Stryker;
- JBT FoodTech;
- Harris Corp;
- Protected Trust;
- Saddle Creek Logistics Services;
- The Story Companies;
- A-C-T Environmental and Infrastructure;
- Prolexic Technologies; and
- nanoComposix.

This commitment also will assist in providing internship as well as future job opportunities for our graduates and will enhance our university research activities.

- C. If the program is to be included in an Area of Programmatic Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.**

The Areas of Programmatic Strategic Emphasis are:

1. Critical Needs:
 - Education
 - Health Professions
 - Security and Emergency Services
2. Economic Development:
 - Globalization
 - Regional Workforce Demand
3. Science, Technology, Engineering, and Math (STEM)

This program is included in the STEM area of programmatic strategic emphasis.

- D. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.**

This program will be offered at the Florida Polytechnic University campus.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

- A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.**

STEM job related opportunities are growing three times faster than non-STEM jobs. Nationally, approximately 1 million STEM and STEM-related jobs were added in the last five years (BLS, US Census). There is a broad consensus that the long-term key to United States competitiveness is the adequacy of supply and the quality of the workforce in STEM fields. Employers across Florida industries anticipate that the greatest growth in new hires over the next five years will be in computer-related occupations (Parthenon Survey, 2013). Also, as reported in the recent BOG, "Access and Educational Attainment" (2013), there is a significant gap in the number of degrees needed to meet the expected job growth – particularly in STEM Occupations. The projected percentage annual growth in the U.S. between 2010-2020 for Mechanical Engineers is 8.5%.

- B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.**

There is consistent student demand within the SUS as enrollment growth between 2006 and 2011 has increased by 52%. To date, twenty percent (20%) of the total applicants to the university have been for Mechanical & Industrial Engineering. These applicants are primarily FTIC as the focus on transfers will not occur until February.

- C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix B, provide data that support the need for an additional program as well as letters of support, or letters of concern, from the provosts of other state universities with substantially similar programs.**

This program was presented at the September 27, 2013 Council of Academic Vice Presidents (CAVP) meeting and received no negative input. On December 10, 2013 Florida Polytechnic University received via e-mail (addressed to all SUS provosts) from Provost Tony Waldrop's office that, "The provosts have agreed that the review by the Academic Program Coordination group replaces the provost's letter."

The Mechanical and Industrial Engineering Faculty compared Florida Polytechnic University's program to those offered by our sister universities. The results follow:

Mechanical & Industrial Engineering Core

Mechanical Engineering Programs

Industrial Engineering Programs

Florida Polytechnic University Core Courses

FAMU FAU FIU FSU UCF UF UNF USF FAMU NCF UF

Florida Poly STEM Cores:

Similar Programs:

Course Number	Course Name	Credits
STE 2030	Ethics	1
STE 3XXXL	Junior Capstone 1	3
STE 3417L	Junior Capstone 2	3
STE 4XXX	Engineering and Technology Project Management	3
STE 4910L	Senior Design Project	3
STE 4940	Internship	3

Mechanical & Industrial Engineering Core

MIE 3XXXc	Modern Instrumentation and Characterization	3
MIE 2XXX	Operations Research	1
COP 3275c	C/C++/Java	3
MIE 3XXX	Statics	3
STA 2032	Statistics & Probability for Science, Technology, and Engineering	3
MIE 3XXXc	Strength of Materials	3
MIE 3XXXc	Fluid Mechanics	3
MIE 2XXX	Thermodynamics	3
MIE 3XXXc	Materials Science – Structure & Property with Laboratory	3
MIE 4XXX	Heat Transfer	3
BSC 2010c	General Biology 1 with Lab	4

X

X

X

X

X

X

X

X

X

9

53%

17

Florida Polytechnic University’s programs and concentrations are unique within the SUS. Motion Intelligence is a newly emerging field and is not offered at any of the SUS universities; Nanotechnology is not offered at the bachelor’s level; Multifunctional Materials is a concentration more focused than broader materials science offerings; Geometric Dimensioning and Tolerancing provides a concentration focused on specific aspects of Mechanical and Industrial Engineering and the associated standards.

Florida Polytechnic University’s student population will be unique in their desire for applied learning and applied research from a Polytechnic University. The students’ commitment to STEM education will be higher by virtue of selecting to attend a STEM-focused University.

The potential impact on enrollment at other universities will be minimal. Our projected enrollment of 480 undergraduates in August of 2014 will have 6 majors to choose from. A reasonable estimate could be 80 students enrolling in this degree during the first years.

Florida Polytechnic University’s Innovation, Science and Technology building will facilitate collaboration. Research laboratory space is assigned to a group of faculty working on related interdisciplinary projects. This will enable and encourage faculty and students to all work together across various programs. This lab space sharing will allow for better space utilization and climate idle time. Additionally, classrooms are

designed to be user friendly by having moveable furniture, whiteboard walls and state of the art classroom technology that encourage collaboration.

Employment opportunities may be different for Florida Polytechnic University's students because of the focus on industry partnerships. Florida Polytechnic University is engaging with many industry partners for designing curriculum that will meet their job requirements, internship opportunities, and joined research. The University's industry partners will work with the student through an applied learning process that leads to relevant skills needed in the work place.

- D. Use Table 1 in Appendix A (A for undergraduate and B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 40 credit hours per year and graduate FTE will be calculated as 32 credit hours per year. Describe the rationale underlying enrollment projections. If, initially, students within the institution are expected to change majors to enroll in the proposed program, describe the shifts from disciplines that will likely occur.

Headcount and FTE projections are based on anticipated demand and growth. Validation of this enrollment was modeled using an outside analytic consultant. In addition, the projected enrollment followed a typical pattern for initial program start-up based on available resources to meet this demand. The FTE was calculated based on 40 credit hours per year. Little migration is expected between majors, although there may be some change in the concentration within this major that would not affect the total projection.

- E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date in the area below to indicate that the analysis required by this subsection has been reviewed and approved.

A Diverse Student Body

One of Florida Polytechnic University's major/key goals is to recruit the best and brightest students of diverse backgrounds. Diversity among our student body will foster a cultural environment that is reflective of the population of our state, nation, and the broader world. Given that Florida Polytechnic University's students will be expected to become leaders in their respective industries, exposure to a diverse student population on campus will help to prepare them to interact and communicate effectively with people of various backgrounds.

By attracting and preparing a well-rounded and diverse population of STEM students, Florida Polytechnic University will ensure ample opportunities for students to develop and exchange ideas about how best to meet the challenges of this century while at the same time building upon the strengths and assets derived from their diverse

backgrounds. Based on the breakdown of demographic information provided in the 2012 Census Bureau Report, “34 percent of the nation’s population now list themselves as belonging to a minority population group – indicating an 11 % increase than in 2000. Hispanics now account for 15 percent of the U.S. population, African Americans 13.5 percent, and Asians 5 percent.” Such demographic shift changes present a tremendous opportunity for Florida Polytechnic University’s programs to attract students that represent the richness of the diversity depicted across the state and nation. Florida Polytechnic University is situated in a unique environment in Central Florida allowing us to draw from a rich population of people who are attracted to the natural beauty and the convenience provided by the localities of Lakeland, Florida.

Recruitment Steps

Florida Polytechnic University will accomplish its goal by:

- Making personal contacts with local high school students and school personnel in order to continuously recruit and develop a diverse student body;
- Sending STEM faculty members or staff to area high schools where there are high representations of minority groups;
- Making sure faculty members and students have opportunities to participate in university-based recruitment events that foster diversity among undergraduate students;
- Disseminating campus information (via newspapers, social media, etc.) to STEM high schools and other programs;
- Creating unique invitations or information sources that focus on prospective minority students;
- Sponsoring events such as summer camps that draw heavily from diverse communities and bridging with high schools to form a pipeline into engineering and technology for such students;
- Securing funding for both merit-based and need-based scholarships to attract minority undergraduate students and;
- Inviting current minority students who earned a B or better in the first Math course to attend a special recruitment events.

Signature of Equal Opportunity Officer

Date

III. Budget

- A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current**

and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.) If the university intends to operate the program through continuing education on a cost-recovery basis or market rate, provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate.

Florida Polytechnic University is a startup university established through the State of Florida Legislation. In order to meet future workforce demands, the University will establish a degree program in Mechanical and Industrial Engineering. The concentrations will include Geometric Dimensioning and Tolerancing, Motion Intelligence, Multifunctional Materials, and Nanotechnology. The major funding source will be from recurring Education and General funds through state appropriations. With the completion of the Innovation, Science, and Technology building, the program will not require any additional capital outlay funding to start the program.

- B. If other programs will be impacted by a reallocation of resources for the proposed program, identify the program and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).**

As all programs are new to Florida Polytechnic, there are no negative impacts between programs. In fact, there is synergy between all programs particularly within the focused general education curriculum.

- C. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).**

As a new university, Florida Polytechnic University is developing all the degree programs at the same time. Cross-program impact has been considered and compensated for throughout the development of all Florida Polytechnic University degree programs.

- D. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.**

Florida Polytechnic University is actively pursuing business/industry partnerships with industry leaders in the Science and Technology Management field. These partnerships are being pursued to enhance the student experience by providing internships and potential co-ops to provide real world, practical experience for our students. Through these partnerships, the University aims to have external resources, both in funding and in kind services made available to involve faculty and research activities.

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for “Need and Demand” to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

This STEM degree will play a key role in the sustained growth and stability of the Florida economy by helping to close the gap in the number of STEM degrees needed. The STEM workforce, as estimated by the U.S. Science & Technology (ASTRA 2012), will grow significantly through 2018 to an estimated 8.7M STEM workers (currently 7.5M). This same study projects Science and Engineering occupations to grow at more than double the rate (20.6%) of the overall U.S. labor force (10.1%) through 2018.

V. Access and Articulation – Bachelor’s Degrees Only

- A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program’s approval. (See criteria in Board of Governors Regulation 6C-8.014)

This degree program includes a total of 120 semester credit hours.

- B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see the [Common Prerequisite Manual](#) at FACTS.org). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as “limited access.”

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional “track” of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

The CIP selected for this new degree is CIP 14.1901, Mechanical & Industrial Engineering. This CIP code is broad enough to cover all three of our Concentrations. The common prerequisites for this program are those courses listed in the Florida Common Prerequisite Manual. They are:

Cr. Hrs.

MAC 2311 or MAC X281	4
MAC 2312 or MAC X282	4
MAC 2313 or MAC X283	4
MAP 2302 or MAP X305	3
CHM 2045 + 2045L or CHM X045c or CHS 2440 and CHM 2046L	4
PHY 2048 + 2048L or PHY X048c or PHY X043 and PHY X048L	4
PHY 2049 + 2049L or PHY X049c or PHY X044 and PHY X049L	4

- C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that community college transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

The University does not seek formal limited access status for this program at this time.

- D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see [Statewide Articulation Manual](#) at FACTS.org). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

This degree program is not an AS to BS capstone.

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

- A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan.

Program Educational Objectives (PEOs)

Upon completion of the Mechanical & Industrial Engineering Degree in College of Engineering students will be able to:

- Apply modern engineering tools- The student will be able to apply modern engineering instruments, tools, and techniques necessary to improve products or processes;
- Design and conduct experiments- The student will be able to design and conduct experiments and to analyze and interpret data;
- Effective Communication Skills- The student will be able to express himself or herself effectively by written, oral, and visual means;
- Identify, formulate and solve engineering problems- The student will be able to identify, formulate and solve engineering problems. ;
- Work effectively on multidisciplinary teams- The students will be able to collaborate and perform effectively on a multidisciplinary team and;
- Adaptation to Audience- The student will be able to demonstrate the ability to formulate a clear, original message that has been adapted to the particular

audience.

These program objectives are in line with the Florida Polytechnic University mission:

Florida Polytechnic University’s mission is to educate students emphasizing Science, Technology, Engineering, and Mathematics (STEM) in an innovative, technology-rich, and interdisciplinary learning environment. The University collaborates with industry partners to offer students real-world problem-solving, work experience, and applied research and business leadership opportunities. Florida Polytechnic University prepares students to assume available leadership positions in the dynamic technological landscape in Florida, the nation, and the world.

- B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.**

Florida Polytechnic University is mandated by Senate Bill 1994 to “Initiate the development of the new programs in the 95 fields of science, technology, engineering, and mathematics.” The Mechanical & Industrial Engineering program is a STEM degree.

- C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology (table) of activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.**

Planning Process

Date	Planning Activity	Participants
February – March 2013	- Degree Demand Analysis - Partnership Models - Assess Potential Programs	Board of Trustees (BOT) contracted with MGT of America and the Parthenon Group
March 2013	- Develops a list of degree programs for exploration	VP Academic Affairs
April 2013	- BOT selects and approves programs	BOT
May – August 2013	- Gathers information related to the Board of Governors criteria for new programs	Consultants, Florida Polytechnic University Faculty and Staff
September 2013	Industry Summit – Industry Input	All Florida Polytechnic University
August – December 2013	Curriculum Developed	Faculty

Key Activities Leading to Implementation

Date	Implementation Activity
February 2013	Developed a list of potential degrees programs
February - March 2013	Performed Degree Demand Analysis, Partnership Models, and Assessment of Potential Programs
April 2013	BOT selected and approved programs
May 2013 - January 2014	Assured that: <ul style="list-style-type: none"> · The program is consistent with the existing SUS Strategic Plan, the University Mission, University Strategic Plan, and University Work Plan; · There is a demonstrated need for program graduates, research and service; · The programs do not unnecessarily duplicate existing SUS degree programs; · Financial planning and resources are sufficient for implementation; · There is a sufficient projected benefit of the programs to the University, local community, and state; · Access and articulation will be provided and maintained; · The University will have the ability to implement a high-quality programs; · The curriculum is appropriate for the discipline and programs level; · Sufficient qualified faculty is, or will be, available; and · Sufficient institutional resources are, or will be, available.
August 2013 - Ongoing	Hiring of faculty started
September - Ongoing	Identifying and signing agreements with key industry partners
September 2013	Presented plan/program to CAVP
January 2014	Presented to the BOT Academic Affairs Committee
February 2014	Submission of Request to Offer a New Degree Program sent to BOG
August 2014	Fall class starts

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

Not applicable at this time (new program).

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

Mechanical & Industrial Engineering - BS

The student learning outcomes related to this program include communication skills,

critical thinking skills and content specific skills needed to acquire proficiency within this domain. In addition, graduates will have problem-solving and leadership skills required to succeed in STEM-related positions. Graduates will also learn the fundamental engineering concepts needed to design and develop products or processes that improve economic, societal, or quality of life conditions.

For the Mechanical & Industrial Engineering program, the University will seek accreditation with the Accreditation Board for Engineering and Technology (ABET) as well as regional accreditation.

Methods of assessment will include; instructor constructed exams, quizzes, team projects, capstone course evaluation, class performance or presentations. The specific learning outcomes for the BS degree in Mechanical and Industrial Engineering are as follows:

1. Apply modern engineering tools – necessary to improve products or processes;
2. Design and conduct experiments – to analyze and interpret data;
3. Effectively communicate – effectively by written, oral, and visual means;
4. Identify, formulate and solve engineering problems;
5. Work effectively on multidisciplinary teams; and
6. Adapt to various audiences – demonstrate the ability to formulate clear original message that has been adapted to the particular audience.

The assessment plan for this program is included in Appendix A.

B. Describe the admission standards and graduation requirements for the program.

Admission Standards: Florida Polytechnic University is looking for students with a 3.0 GPA, SAT scores of over 550 on each section or ACT scores over 22.

Graduation Requirements:

Bachelor's Degree

Students must fulfill both the requirements for the major and University requirements to receive a bachelor's degree from Florida Polytechnic University.

The student must:

- Fulfill the requirements for the chosen major;
- Earn a minimum of 120 unduplicated credit hours with at least a "C" average (2.0 GPA) for all Florida Polytechnic University course work attempted;
- Earn at least 48 of these 120 credit hours in 3000-level courses or above (upper-division);
- Earn a minimum of 30 of their last 60 hours in regular courses at Florida Polytechnic University. (Credit by Examination may not be used to satisfy this requirement);

- Earn a minimum of 25% of the total hours required for the degree in residence at Florida Polytechnic University. For programs that require the minimum of 120 total hours, residency will be 30 hours;
 - Earn a minimum of 60 credit hours after CLEP credit has been awarded;
 - Apply no more than 45 credit hours in any combination of extension, correspondence, CLEP, University Credit by Examination and Armed Forces credits toward an undergraduate degree;
 - Fulfill the General Education Program requirements;
 - Fulfill the Gordon Rule requirements;
 - Fulfill the Foreign Language requirements and;
 - Be registered at Florida Polytechnic University during the semester of graduation.
- C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

Number of credit hours: The Mechanical & Industrial Engineering Degree is 120 credits.

Restricted electives: None at this time

Unrestricted electives: None at this time

Thesis requirements: None

Dissertation requirements: None

Total numbers of semester credit hours for the degree: 120

Composition of required core courses: Please see the following.

Engineering Core:		
All Engineering students will take the following courses listed in the table.		
Course Number	Course Name	Credits
COP 2271c	Computer Programming for Technology and Engineering	3
EGS 2113L	CAD	1
EGN 1002c	Introduction to Engineering	3
EGN 2006c	Introduction to Engineering Design	1
	TOTAL Engineering Core Credits	8

Mechanical and Industrial Engineering Core: These courses provide an essential foundation in Mechanical and Industrial Engineering.		
Course Number	Course Name	Credits
XXX XXXX	Modern Instrumentation and Characterization	3
XXX XXXX	Operations Research	1
COP 3276c	C/C++/Java Programming	3
XXX XXXX	Statics	3
STA 2032	Statistics & Probability for Science, Technology, and Engineering	3
XXX XXXX	Strength of Materials	3
XXX XXXX	Fluid Mechanics	3
XXX XXXX	Thermodynamics	3
XXX XXXX	Materials Science – Structure & Property with Laboratory	3
XXX XXXX	Heat Transfer	3
BSC 2010c	General Biology 1 with Lab	4
	TOTAL Industrial and Mechanical Engineering Core Credits	32

Concentration Core Nanotechnology: All Nanotechnology students are required to take the following courses.			Concentration Core Multifunctional Materials: All Multifunctional Materials students are required to take these courses.		
Course Number	Course Name	Credits	Course Number	Course Name	Credits
XXX XXXX	Integrative Nanotechnology	3	XXX XXXX	Functional Materials	3
XXX XXXX	Unique Nanoscale Phenomena and Interfaces with Laboratory	3	EEL 3111c	Circuits 1	4
XXX XXXX	BioNanotechnology with Laboratory	3	XXX XXXX	Materials for Energy Storage and Generation	3
XXX XXXX	Nanoscale Interface with Laboratory	3	XXX XXXX	Materials for Sustainability	3
XXX XXXX	NanoEHS risk assessment	3	XXX XXXX	Multifunctional Materials	3
XXX XXXX	Advanced Nanoscale Instrumentation and Characterization	3	XXX XXXX	Advanced Materials Instrumentation and Characterization	3
XXX XXXX	Nanotechnology	3			0
XXX XXXX	Nano Medicine and Nanotherapeutics	3			0
	TOTAL Concentration Core Credits	24		TOTAL Concentration Core Credits	19
ELECTIVES					
XXX XXXX	Business of Nanotechnology	3			
	Sustainable Nanotechnology	3			

Concentration Core Geometric Dimensioning and Tolerancing: All Geometric Dimensioning and Tolerancing students are required to take these courses.			Concentration Core Motion Intelligence: All Motion Intelligence students are required to take these courses.		
Course Number	Course Name	Credits	Course Number	Course Name	Credits
XXX XXXX	Collaborative Simulation	3	XXX XXXX	Software Engineering	3
XXX XXXX	Information Mapping, Visualization & Analytics	3	XXX XXXX	Crowd Sourcing & Social Media	3
XXX XXXX	Collaborative Digital & Hybrid System Design	3	XXX XXXX	Global Logistics Management	3
XXX XXXX	Sustainable Logistics	3	XXX XXXX	Human Factors & Social Impact	3
XXX XXXX	Active Video & Embedded Control	3	XXX XXXX	Mobile Device Applications	3
XXX XXXX	Optoelectronics	3			
XXX XXXX	Micro/NanoFabrication & Characterization	3			
XXX XXXX	Digital & Hybrid System Application	3			
	TOTAL Concentration Core Credits	24		TOTAL Concentration Core Credits	15

D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

Geometric Dimensioning & Tolerancing

Freshman Year Semester 1		
Course #	Course Name	Credits
CHM 2045	Chemistry 1	3
CHM 2045L	Chemistry 1 Laboratory	1
EGN 1002c	Introduction to Engineering	3
ENC 1101	English Composition 1: Expository and Argumentative Writing	3
MAC 2311	Analytic Geometry and Calculus 1	4
STE 2030	Ethics	1
Total Credits:		15

Sophomore Year Semester 1		
Course #	Course Name	Credits
BSC 2010c	General Biology 1 With Lab	4
PHY 2049	Physics 2	3
PHY 2049L	Physics 2 Laboratory	1
MAC 2313	Analytic Geometry and Calculus 3	4
ARH 2000 or PHO 2010	Humanities GenEd ARH 2000 or PHI 2010 or transfer	3
Total Credits:		15

Junior Year Semester 1		
Course #	Course Name	Credits
XXX XXXX	Collaborative Simulation	3
XXX XXXX	Modern Instrumentation and Characterization	3
STA 2032	Statistics & Probability for Science, Technology, and Engineering	3
XXX XXXX	Statics	3
XXX XXXX	Junior Capstone 1	3
Total Credits:		15

Senior Year Semester 1		
Course #	Course Name	Credits
STE 3XXX	Engineering and Technology Project Management	3
XXX XXXX	Information Mapping, Visualization and Analytics	3
XXX XXXX	Collaborative Digital and Hybrid System Design	3
XXX XXXX	Heat Transfer	3
STE 4940	Internship	3
Total Credits:		15

TOTAL:	120
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Freshman Year Semester 2		
Course #	Course Name	Credits
EGN 2006c	Introduction to Engineering Design	1
ENC 2210	Technical Writing	3
MAC 2312	Analytic Geometry and Calculus 2	4
PHY 2048	Physics 1	3
PHY 2048L	Physics 1 Laboratory	1
COP 2271c	Computer Programming for Technology and Engineering	3
Total Credits:		15

Sophomore Year Semester 2		
Course #	Course Name	Credits
MAP 2302	Differential Equations	3
XXX XXXX	Thermodynamics	3
COP 3276c	C/C++/Java Programming	3
EGS 2113L	CAD	1
ECO 2013	Social Science Elective - ECO 2013 or Appropriate Transf	4
XXX XXXX	Operations Research	1
Total Credits:		15

Junior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Sustainable Logistics	3
XXX XXXX	Strength of Materials	3
XXX XXXX	Fluid Mechanics	3
XXX XXXX	Active Video and Embedded Control	3
STE 3417L	Junior Capstone 2	3
Total Credits:		15

Senior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Optoelectronics	3
XXX XXXX	Micro/Nano Fabrication and Characterization	3
XXX XXXX	Digital and Hybrid System Applications	3
XXX XXXX	Geospatial Tagging Networks	3
STE 4418c	Senior Design Project	3
Total Credits:		15

Motion Intelligence

Freshman Year Semester 1		
Course #	Course Name	Credits
CHM 2045	Chemistry 1	3
CHM 2045L	Chemistry 1 Laboratory	1
EGN 1002c	Introduction to Engineering	3
ENC 1101	English Composition 1: Expository and Argumentative Writing	3
MAC 2311	Analytic Geometry and Calculus 1	4
STE 2030	Ethics	1
Total Credits:		15

Sophomore Year Semester 1		
Course #	Course Name	Credits
BSC 2010c	General Biology 1 With Lab	4
PHY 2049	Physics 2	3
PHY 2049L	Physics 2 Laboratory	1
MAC 2313	Analytic Geometry and Calculus 3	4
ARH 2000 or PHI 2010	Humanities GenEd ARH 2000 or PHI 2010 or transfer	3
Total Credits:		15

Junior Year Semester 1		
Course #	Course Name	Credits
XXX XXXX	Software Engineering	3
ECO 2013	Principles of Macroeconomics	3
STA 2032	Statistics & Probability for Science, Technology, and Engineering	3
XXX XXXX	Statics	3
XXX XXXX	Junior Capstone 1	3
Total Credits:		15

Senior Year Semester 1		
Course #	Course Name	Credits
XXX XXXX	Engineering and Technology Project Management	3
XXX XXXX	Sustainable Logistics	3
XXX XXXX	Crowd Sourcing and Social Media	3
XXX XXXX	Active Video and Embedded Control	3
STE 4940	Internship	3
Total Credits:		15

TOTAL:	120
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Freshman Year Semester 2		
Course #	Course Name	Credits
EGN 2006c	Introduction to Engineering Design	1
ENC 2210	Technical Writing	3
MAC 2312	Analytic Geometry and Calculus 2	4
PHY 2048	Physics 1	3
PHY 2048L	Physics 1 Laboratory	1
COP 2271c	Computer Programming for Technology and Engineering	3
Total Credits:		15

Sophomore Year Semester 2		
Course #	Course Name	Credits
MAP 2302	Differential Equations	3
XXX XXXX	Thermodynamics	3
COP 3276c	C/C++/Java Programming	3
EGS 2113L	CAD	1
ECO 2013	Social Science Elective - ECO 2013 or Appropriate Transf	4
XXX XXXX	Operations Research	1
Total Credits:		15

Junior Year Semester 2		
Course #	Course Name	Credits
ECO 2023	Principles of Microeconomics	3
XXX XXXX	Strength of Materials	3
XXX XXXX	Global Logistics Management	3
ACG 2071	Principles of Managerial Accounting	3
STE 3417L	Junior Capstone 2	3
Total Credits:		15

Senior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Human Factor and Social Impact	3
XXX XXXX	Geospatial Tagging Networks	3
XXX XXXX	Mobile Device Applications	3
XXX XXXX	Information Mapping, Visualization and Analytics	3
STE 4418c	Senior Design Project	3
Total Credits:		15

Multifunctional Materials

Freshman Year Semester 1		
Course #	Course Name	Credits
CHM 2045	Chemistry 1	3
CHM 2045L	Chemistry 1 Laboratory	1
EGN 1002c	Introduction to Engineering	3
ENC 1101	English Composition 1: Expository and Argumentative Writing	3
MAC 2311	Analytic Geometry and Calculus 1	4
STE 2030	Ethics	1
Total Credits:		15

Sophomore Year Semester 1		
Course #	Course Name	Credits
BSC 2010c	Biology 1 with Lab	4
PHY 2049	Physics 2	3
PHY 2049L	Physics 2 Laboratory	1
MAC 2313	Analytic Geometry and Calculus 3	4
ARH 2000 or PHI 2010	Humanities GenEd ARH 2000 or PHI 2010 or transfer	3
Total Credits:		15

Junior Year Semester 1		
Course #	Course Name	Credits
EEL 3111c	Circuits 1	3
XXX XXXX	Modern Instrumentation and Characterization	3
STA 2032	Statistics & Probability for Science, Technology, and Engineering	3
XXX XXXX	Statics	3
XXX XXXX	Junior Capstone 1	3
Total Credits:		15

Senior Year Semester 1		
Course #	Course Name	Credits
XXX XXXX	Engineering and Technology Project Management	3
XXX XXXX	Materials for Energy Storage and Generation	3
XXX XXXX	Materials for Sustainability	3
XXX XXXX	Heat Transfer	3
STE 4940	Internship	3
Total Credits:		15

TOTAL:	120
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Freshman Year Semester 2		
Course #	Course Name	Credits
EGN 2006	Introduction to Engineering Design	1
ENC 2210	Technical Writing	3
MAC 2312	Analytic Geometry and Calculus 2	4
PHY 2048	Physics 1	3
PHY 2048L	Physics 1 Laboratory	1
COP 2271c	Computer Programming for Technology and Engineering	3
Total Credits:		15

Sophomore Year Semester 2		
Course #	Course Name	Credits
MAP 2302	Differential Equations	3
XXX XXXX	Thermodynamics	3
COP 3276c	C/C++/Java Programming	3
EGS 2113L	CAD	1
ECO 2013	Social Science Elective - ECO 2013 or Appropriate Transf	4
XXX XXXX	Operations Research	1
Total Credits:		15

Junior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Multifunctional Materials	3
XXX XXXX	Strength of Materials	3
XXX XXXX	Fluid Mechanics	3
XXX XXXX	Functional Materials	3
STE 3417L	Junior Capstone 2	3
Total Credits:		15

Senior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Concentration Elective	3
XXX XXXX	Materials Science Structure and Property	3
XXX XXXX	Advanced Materials Instrumentation & Characterization	3
XXX XXXX	Concentration Elective	3
STE 4418c	Senior Design Project	3
Total Credits:		15

Nanotechnology

Freshman Year Semester 1		
Course #	Course Name	Credits
CHM 2045	Chemistry 1	3
CHM 2045L	Chemistry 1 Laboratory	1
EGN 1002c	Introduction to Engineering	3
ENC 1101	English Composition 1: Expository and Argumentative Writing	3
MAC 2311	Analytic Geometry and Calculus 1	4
STE 2030	Ethics	1
Total Credits:		15

Sophomore Year Semester 1		
Course #	Course Name	Credits
BSC 2010c	General Biology 1 With Lab	4
PHY 2049	Physics 2	3
PHY 2049L	Physics 2 Laboratory	1
MAC 2313	Analytic Geometry and Calculus 3	4
ARH 2000 or PHI 2010	Humanities GenEd ARH 2000 or PHI 2010 or transfer	3
Total Credits:		15

Junior Year Semester 1		
Course #	Course Name	Credits
XXX XXXX	Materials Science-Structure and Property with Laboratory	3
XXX XXXX	Modern Instrumentation and Characterization	3
STA 2032	Statistics & Probability for Science, Technology, and Engineering	3
XXX XXXX	Statics	3
XXX XXXX	Junior Capstone 1	3
Total Credits:		15

Senior Year Semester 1		
Course #	Course Name	Credits
XXX XXXX	Engineering and Technology Project Management	3
XXX XXXX	Nano Scale Interface with Lab	3
XXX XXXX	Nanomedicine and Nanotherapeutics	3
XXX XXXX	Heat Transfer	3
STE 4940	Internship	3
Total Credits:		15

TOTAL:	120
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Freshman Year Semester 2		
Course #	Course Name	Credits
EGN 2006	Introduction to Engineering Design	1
ENC 2210	Technical Writing	3
MAC 2312	Analytic Geometry and Calculus 2	4
PHY 2048	Physics 1	3
PHY 2048L	Physics 1 Laboratory	1
COP 2271c	Computer Programming for Technology and Engineering	3
Total Credits:		15

Sophomore Year Semester 2		
Course #	Course Name	Credits
MAP 2302	Differential Equations	3
XXX XXXX	Thermodynamics	3
COP 3276c	C/C++/Java Programming	3
EGS 2113L	CAD	1
ECO 2013	Social Science Elective - ECO 2013 or Appropriate Transfer	4
XXX XXXX	Operations Research	1
Total Credits:		15

Junior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Nanotechnology	3
XXX XXXX	Strength of Materials	3
XXX XXXX	Fluid Mechanics	3
XXX XXXX	BioNanotechnology with Lab	3
STE 3417L	Junior Capstone 2	3
Total Credits:		15

Senior Year Semester 2		
Course #	Course Name	Credits
XXX XXXX	Nano EHS Risk Assessment	3
XXX XXXX	Unique Nanoscale Phenomena and Interfaces with Lab	3
XXX XXXX	Advanced Nanoscale Instrumentation & Characterization	3
XXX XXXX	Integrative Nanotechnology	3
STE 4418c	Senior Design Project	3
Total Credits:		15

D. Provide a one- or two-sentence description of each required or elective course.

AMH 2020 American History

Credits: 3

Prerequisites: None

Course Description: This course presents a survey of the emergence of modern America as an industrial and world power; the Progressive Era; WWI; the Great Depression and the New Deal; WW II; and the Cold War era are discussed.

ARH 2000 Art Appreciation

Credits: 3

Prerequisites: None

Course Description: Introduction to the artistic experience through the examination of different ideas, approaches and purposes of art.

BSC 2010c Biology 1

Credits: 4

Prerequisites: None

Course Description: In this course students will study the chemistry of life, cell structure and function, photosynthesis, cellular respiration genetics, evolution, and the diversity of life

CHM 2045 Chemistry 1

Credits: 3

Prerequisites: MAC 1147 or the equivalent, passing score on ChRA or passing grade in CHM 1025

Co-requisites: CHM 2045L Chemistry 1 Laboratory

Course Description: This course covers stoichiometry, atomic and molecular structure, the states of matter, reaction rates and equilibria.

CHM 2045L Chemistry 1 Laboratory

Credits: 1

Co-requisites: CHM 2045 Chemistry 1

Course Description: Students will participate in laboratory experiments designed to reflect the topics presented in CHM 2045.

COP 2271c Computer Programming for Technology and Engineering

Credits: 3

Prerequisites: MAC 2311 Analytic Geometry and Calculus 1

Course Description: In this course students will use computers to solve technology, engineering, industry, and mathematical problems with a focus on innovation and applying problem solving skills to industry.

COP 3276c C/C++/Java Programming

Credits: 3

Prerequisites: COP 2271c Computer Programming for Technology and Engineering

Course Description: In this course, computer programming is used to improve quantitative problem-solving skills by developing algorithms that apply mathematical techniques. This is a comprehensive course in computer programming using the C, C++ and Java programming

languages. Structured programming in c, especially for solving numerical problems is covered in detail, and object-oriented programming in C++ is introduced. Java as a way to directly call C++ code is also covered.

ECO 2013 Principles of Macroeconomics

Credits: 4

Prerequisites: None

Course Description: This course presents the nature of economic aggregates such as investment, employment, and price levels. The interrelationship of business and government policies; applicability of economic theory to the problems of business forecasting; cyclical fluctuations and long-term economic trends are also examined.

ECO 2023 Principles of Microeconomics

Credits: 4

Prerequisites: None

Course Description: Theories of production, determination of prices and distribution of income in regulated and unregulated industries are discussed. Attention is also given to industrial relations, monopolies and comparative economic systems.

EEL 3111c Circuits 1

Credits: 4

Prerequisites: MAC 2312 Analytic Geometry and Calculus 2

Co-requisites: MAC 2313 Analytic Geometry and Calculus 3 and PHY 2049 Physics 2

Course Description: This course covers the basic analysis of direct current and alternating current electrical circuits. Topics include impedance, admittance, power, energy, network laws and theorems, transient analysis, and steady analysis using phasors. The use of simulation techniques to analyze electrical circuits is introduced. Students working in lab groups will address a real-industry issue. Opportunities will be provided for students to carry the lab project through to EEL 3112c Circuits 2. Teams are required to give verbal and written technical and managerial reports.

EGN 1002c Introduction to Engineering

Credits: 3

Prerequisites: None

Course Description: This course is an introduction to engineering and addresses: ethics and professional responsibility, creative thinking, software and calculator techniques, time and project management, and technical report presentation and writing. Students will have opportunities to interact with engineering professionals. In the combined lab, teams will build and test various devices and report findings on paper, in verbal presentations, and by using various computer applications.

EGN 2006 Introduction to Engineering Design

Credits: 1

Prerequisites: EGN 1002c Introduction to Engineering

Course Description: This course provides a first look at engineering design and focuses on creativity, teamwork, communication, leadership, and work across engineering disciplines. Students will participate in a design-build-test project. Teams are required to give verbal and written technical and managerial reports.

EGS 2113L CAD

Credits: 1

Prerequisites: COP 2271c Computer Programming for Technology and Engineering

Course Description: An introduction to the techniques for creating solid models of engineering designs. Topics include three-dimensional modeling of parts and assemblies, visualization, orthographic and isometric free-hand sketching, and computer-generated design documentation. Industry applications will be a specific focus.

ENC 1101 English Composition 1: Expository and Argumentative Writing

Credits: 3

Prerequisites: None

Course Description: This course focuses on the principal elements of writing clearly, efficiently and effectively. Logical arguments, technical and managerial reports, building research skills and developing critical thinking through reading, writing and discussion are also presented.

ENC 2210 Technical Writing

Credits: 3

Prerequisites: None

Course Description: This course focuses on the principal elements of writing clearly, efficiently and effectively. Logical arguments, technical and managerial reports, building research skills and developing critical thinking through reading, writing and discussion

FRE 1130 Beginning French 1

Credits: 3

Prerequisites: None

Course Description: This course is the first in a sequence of two courses designed to develop overall skill in the French language. This course is open to students with little or no background in French.

FRE 1131 Beginning French 2

Credits: 3

Prerequisites: FRE 1130 Beginning French 1

Course Description: This course is the second in a sequence of two courses designed to develop overall skill in the French language.

MAC 2311 Analytic Geometry and Calculus 1

Credits: 4

Prerequisites: Any of the following: minimal acceptable score on the online mathematics placement exam; a grade of C in a MAC course numbered 1147 or higher; AP credit for MAC 2311 Analytic Geometry and Calculus 1; IB credit for a MAC course numbered 1147 or higher. Any course grades, AP or IB scores used to meet this prerequisite must be on file by registration.

Course Description: This course is an introduction to analytic geometry; limits; continuity; differentiation of algebraic, trigonometric, exponential and logarithmic functions; applications of the derivative; inverse trigonometric functions; differentials; introduction to integration; and the fundamental theorem of calculus.

MAC 2312 Analytic Geometry and Calculus 2

Credits: 4

Prerequisites: MAC 2311 Analytic Geometry and Calculus 1

Course Description: Techniques of integration; applications of integration; differentiation and integration of inverse trigonometric, exponential, and logarithmic functions; sequences and series are presented in this class.

MAC 2313 Analytic Geometry and Calculus 3

Credits: 4

Prerequisites: MAC 2312 Analytic Geometry and Calculus 2

Course Description: This course covers solid analytic geometry, vectors, partial derivatives and multiple integrals.

MAC 2105 Linear Algebra

Credits: 3

Prerequisites: Appropriate score on the math placement exam, or mat 1033 with a "c" (2.0) or better, MAC 2313 Analytic Geometry and Calculus 3 and MAP 2302 Differential Equations

Course Description: This course covers linear equations, matrices, vector spaces, linear transformations, determinants, eigenvalues, and inner product spaces.

MAP 2302 Differential Equations

Credits: 3

Prerequisites: MAC 2312 Analytic Geometry and Calculus 2 (with a minimum grade of C)

Course Description: The relationship between differential equations and initial conditions to physical problems in engineering, physics, technology and other applied areas is discussed. Students will be able to formulate, solve, and analyze the results of mathematical models of elementary physical problems and apply them. Topics include: First-order ordinary differential equations, theory of linear ordinary differential equations, solution of linear ordinary differential equations with constant coefficients, the Laplace transform and its application to solving linear ordinary differential equations.

PHI 2010 Introduction to Philosophy

Credits: 3

Prerequisites: None

Course Description: This course is an introduction to the nature of philosophy, philosophical thinking, major intellectual movements in the history of philosophy, and specific problems in philosophy.

PHY 2048 Physics 1

Credits: 3

Prerequisites: High-school Physics, PHY 2020 or the equivalent, and MAC 2311 Analytic Geometry and Calculus 1

Co-requisites: MAC 2312 Analytic Geometry and Calculus 2

Course Description: This is the first of a two-semester sequence of physics for technology and engineering. The course covers Newtonian mechanics and includes motion, vectors, Newton's laws, work and conservation of energy, systems of particles, collisions, equilibrium, oscillations and waves.

PHY 2048L Physics 1 Laboratory**Credits:** 1**Co-requisites:** PHY 2048 Physics 1**Course Description:** This laboratory experience for PHY 2048 Physics with Analytic Geometry & Calculus 1 provides practical applications of Newtonian mechanics.**PHY 2049 Physics 2****Credits:** 3**Prerequisites:** PHY 2048 Physics 1, PHY 2048 Physics 1 Lab, MAC 2312 Analytic Geometry and Calculus 2**Co-requisites:** MAC 2313 Analytic Geometry and Calculus 3**Course Description:** The second of a two-semester sequence of physics for scientists and engineers. Content includes Coulomb's law, electric fields and potentials, capacitance, currents and circuits, Ampere's law, Faraday's law, inductance, Maxwell's equations, electromagnetic waves, ray optics, interference and diffraction.**PHY 2049L Physics 2 Laboratory****Credits:** 1**Co-requisites:** PHY 2049 Physics 2 or the equivalent**Course Description:** This laboratory experience for PHY 2049 Physics with Analytic Geometry & Calculus 2 illustrates the practical applications of Coulomb's law, electric fields and potentials, capacitance, currents and circuits, Ampere's law, Faraday's law, inductance, Maxwell's equations, electromagnetic waves, ray optics, interference and diffraction.**PSY 2012 General Psychology****Credits:** 3**Prerequisites:** None**Course Description:**

In this introduction to psychology, emphasis is placed upon psychology as a research enterprise. Students are required to participate as subjects in psychological research and write a paper on a psychological research article.

SPN 1130 Beginning Spanish 1**Credits:** 3**Prerequisites:** None**Course Description:** This course is the first in a sequence of two courses designed to develop the basic skills of listening, speaking reading and writing the Spanish language.**SPN 1131 Beginning Spanish 2****Credits:** 3**Prerequisites:** SPN 1130 Beginning Spanish 1**Course Description:** This course is the second in a sequence of two courses designed to develop the basic skills of listening, speaking reading and writing the Spanish language.**STA 2032 Statistics & Probability for Science, Technology, and Engineering****Credits:** 3**Prerequisites:** MAC 2311 Analytic Geometry and Calculus 1

This course covers probability and statistics with a focus on science, technology and engineering applications. Probability, discrete and continuous random variables, estimation and hypothesis testing, and linear and multiple regression are discussed. Data collection and analysis are also covered.

STE 2030 Ethics

Credits: 1

Prerequisites: None

Course Description: This course focuses on codes of ethics and moral reasoning, ethics and professionalism, the impact of engineering and technology problems/solutions/mistakes, engineering and technology as social experimentation, professional responsibilities and rights. Environmental and global issues are also discussed.

STE 3417L Junior Capstone 2

Credits: 3

Prerequisites: XXX XXXX Junior Capstone 1 and Permission from Program Director

Course Description: Working with clients on real-world problems, student teams define a problem, measure performance, analyze, model, and generate creative solutions which will be demonstrated at the end of the course. Engineering design trade-offs and documentation requirements are also covered. Verbal and written technical and managerial reports are also required.

STE 4940 Internship

Credits: 3

Prerequisite: Senior standing and Permission of Program Director

Course Description: Classroom theory will be integrated with a participatory and experiential learning and work experience in business, industry, government and other technology-oriented areas of student interest. Evaluation by work supervisor is required. Supervision by a faculty member or delegated authority, daily journal, and a post-internship report are also required.

STE 4418c Senior Design Project

Credits: 3

Prerequisites: Senior Standing and Permission from Program Director

Course Description: This course focuses on identifying and solving a business problem. Students will design individual projects with realistic constraints. The projects will be focused on providing experience in the practice and process of engineering design. Proficiency in all previous courses is required. Students will develop a solution to an open-ended engineering problem which will be demonstrated at the end of the course. A project proposal and verbal and written technical and managerial reports are also required.

XXX XXXX Active Video and Embedded Control

Credits: 3

Prerequisites: COP 3276c C/C++/Java Programming

Course Description: This course covers the scientific principles and concepts of active video and embedded control. Students will have opportunities to apply these methods.

XXX XXXX Advanced Materials Instrumentation and Characterization

Credits: 3 (3 Lecture)

Prerequisites: None

Course Description: The course provides an advanced inductive learning approach towards theory and real world experimentation utilizing instrumentation and characterization tools. In addition students will learn, the processes for inferring experimental values, imaging, related testing, error in the system and other mechanisms as well as principles of designing experiments, and validation of methods. Emphasis is placed on proper interpretation of data from experiments and communicating results, including how subtle differences in words and interdisciplinary applications.

XXX XXXX Advanced Nanoscale Instrumentation and Characterization

Credits: 3

Prerequisites: XXX XXXX Modern Instrumentation and Characterization or Permission of Program Director

Course Description: The theory of advanced instrumentation techniques; standard protocols and validation of methods; maintaining routine instrumentation; and processes for procuring new instrumentation are covered in this course.

XXX XXXX Bio-Nanotechnology with Laboratory

Credits: 3

Prerequisites: BSC 2010c Biology 1 Laboratory, CHM 2045 Chemistry 1, CHM 2045L Chemistry 1 Laboratory

Course Description: Biologically inspired nanomaterials; using biology to synthesize nanomaterials; nanostructured biological materials; and survey of nanomedicine concepts are presented.

XXX XXXX Collaborative Simulation

Credits: 3

Prerequisites: MAP 2302 Differential Equations

Course Description: This course covers modeling and simulation including continuum methods, atomistic and molecular simulation as well as quantum mechanics. Students will have opportunities to apply these methods. Additional topics include modeling & simulation development process, fidelity, accuracy, and resolution of models, verification & validation, systems modeling language (SysML), simulation methodologies, system engineering life cycle, simulation ROI, and standards.

XXX XXXX Crowd Sourcing and Social Media

Credits: 3

Prerequisites: None

Course Description: This course covers crowdsourcing data, data visualization, and social media. Topics include crowdmap, data gathering, blogosphere, RSS, Twitter, Wikipedia, E patents, social media, virtual reality, online collaboration and search engines.

XXX XXXX Discrete Math

Credits: 3

Prerequisites: MAC 2311 Analytic Geometry and Calculus 1, MAC 2312 Analytic Geometry and

Calculus 2

Course Description: This course covers discrete mathematical objects such as sets, relations and functions, graphs and trees, mathematical logic and reasoning. Concept of algorithm and its complexity is also covered. Parametric and nonparametric methods, analysis of central tendency, variability, proportions and categorical data are also discussed.

XXX XXXX Engineering & Technology Project Management

Credits: 3

Prerequisites: TBD

Course Description: This course discusses planning, controlling, and evaluating technology and engineering projects. Topics include modeling, project organization, risk analysis, technical forecasting, time and cost estimation and accommodation, and resource allocation and leveling.

XXX XXXX Fluid Mechanics

Credits: 3

Prerequisites: XXX XXXX Statics

Course Description: The properties and behavior of fluids at rest and in motion are discussed in this course. Topics include fluid statics; transport theorem; flow of incompressible fluids; flow of real fluids in closed conduits, impulse and momentum; and fluid measurement.

XXX XXXX Functional Materials

Credits: 3

Prerequisites: COP 3276c C/C++/Java Programming, XXX XXXX Materials, Science, Structure and Property

Course Description: This course will cover how to engineer materials to achieve desired functions. Computational modeling approaches for optimizing materials properties and designs will be covered.

XXX XXXX Geospatial Tagging Networks

Credits: 3

Prerequisites: 3

Course Description: This course focuses on techniques to efficiently store, manipulate, index and query geospatial information in support of real-world geographical decision-making applications. Topics include object-relational and spatial databases, spatial index structures, spatial queries, non-Euclidean spaces, spatial data outsourcing, privacy, and application.

XXX XXXX Global Logistics Management

Credits: 3 (3 Lecture)

Prerequisites: XXX XXXX Logistics in the Supply Chain

Course Description: This course compares global versus national transportation management. Global transportation management, decision making, operations, logistics, supply chain, and traffic management are discussed.

XXX XXXX Heat Transfer

Credits: 3

Prerequisites: XXX XXXX Thermodynamics, MAC 2312 Analytic Geometry and Calculus 2

Course Description: This course covers the basic principles of conduction, convection, and radiation heat transfer.

XXX XXXX Human Factors and Society Impact

Credits: 3

Prerequisites: None

Course Description: This course covers the optimization of the relationship between technology and humans. Human characteristics, behaviors, and factors associated with designing products and creating work environments that boost productivity while minimizing safety issues are also covered. Additional topics, include ergonomics, workplace safety, human error, product design, human capability, and human-computer interaction.

XXX XXXX Information Mapping, Visualization and Analytics

Credits: 3

Prerequisites: MAC 2311 Analytic Geometry and Calculus 1, COP 2271c Computer Programming for Technology and Engineering

Course Description: The basics of information mapping, scientific visualization, and information visualization for analytical reasoning are covered in this course.

XXX XXXX Integrative Nanotechnology

Credits: 3

Prerequisites: XXX XXXX Nanotechnology, XXX XXXX Junior Capstone 1, STE 3417L Junior Capstone 2

Course Description: The course explores the integration of nanotechnology into processes and devices across multiple systems, emphasizing interdisciplinary applications.

XXX XXXX International & Comparative Dimensions of Business

Credits: 3 (3 Lecture)

Prerequisites: Junior or senior standing in the Science and Technology Program

Course Description: Enterprises, markets, institutions, firm competitiveness, industry globalization, international business transactions, and entry strategies are discussed from a cross-cultural and international perspective.

XXX XXXX Introduction to Logistics, Materials and Supply Chain Management

Credits: 2 (2 Lecture)

Prerequisites: None

Course Description: This course is an introduction to the processes and functions of logistics, materials, and supply chain management and focuses on creating a competitive advantage.

XXX XXXX Junior Capstone 1

Credits: 3

Prerequisites: Junior Standing and Permission from Program Director

Course Description: This is a project course intended to be a culminating technical design experience for first semester junior students. Teams of students will design, build and test a solution to a real industry problem which will be demonstrated at the end of the course. Verbal and written technical and managerial reports are also required.

XXX XXXX Logistics in the Supply Chain

Credits: 3 (3 Lecture)

Prerequisites: XXX XXXX Introduction to Logistics, Materials and Supply Chain Management

Course Description: This course considers logistics as part of a market-driven supply chain process. Sound decision making using analytical methods is discussed. Topics include management, outsourcing, warehouse management, forecasting, third party logistics and service providers, and performance measurement.

XXX XXXX Materials for Energy Storage and Generation

Credits: 3

Prerequisites: XXX XXXX Materials, Science, Structure and Property

Course Description: Students will learn how material properties provides solutions for improving solar cells, ultracapacitors and battery technologies. Example topics will include how solar cells are designed and evaluated, how interconnects and electrode materials interface with energy harvesting and energy storage materials, how energy storage devices are designed and evaluated, and how “3D” architectures in energy materials could be enabled through nanotechnology.

XXX XXXX Materials for Sustainability

Credits: 3

Prerequisites: None

Course Description: This course will explore how materials can contribute to more sustainable products and processes. Also, study of how materials can be produced more sustainability. Concepts of life cycle analysis, and optimizing competing design properties will also be covered.

XXX XXXX Materials, Science, Structure, and Property

Credits: 3

Prerequisites: CHM 2045 Chemistry 1, PHY 2049 Physics 2

Course Description: Introduction to the fundamental concepts of materials science, determining structure-processing-property relationships, and optimizing complex systems for maximum design attribute achievement

XXX XXXX Materials Science – Structure & Property with Laboratory

Credits: 3

Prerequisites: CHM 2045 Chemistry 1, CHM 2045 L Chemistry 1 Laboratory, PHY 2048 Physics 1, PHY 2048L Physics 1 Laboratory

Course Description: Structure – processing – property – function relationships, chemical kinetics, experimental design to determine material properties are covered in this course.

XXX XXXX Mobile Device Applications

Credits: 3

Prerequisites: COP 3276c C/C++/Java Programming

Course Description: This course covers the evaluation, design, and creation of mobile device software. Mobile application genres and the various development tools, languages, and environments are also covered.

XXX XXXX Modern Instrumentation and Characterization

Credits: 3

Prerequisites: CHM 2045 Chemistry 1, CHM 2045L Chemistry 1 Laboratory, PHY 2048 Physics 1, PHY 2048L Physics 1 Laboratory, PHY 2049 Physics 2, PHY 2049L Physics 2 Laboratory

Course Description: This course provides an inductive learning approach towards theory and operation of instrumentation and characterization tools. Processes for inferring experimental values, error in the system and other mechanisms are covered. Additional topics include sample preparation and handling procedures, the principles of designing experiments, validation of methods and the business aspects of purchasing instruments. Emphasis is placed upon proper interpretation of data from experiments and communicating results.

XXX XXXX Multifunctional Materials

Credits: 3

Prerequisites: XXX XXXX Functional Materials

Course Description: This course will explore how to engineer multiple properties into materials, such as flexible electronics. Study of approaches for evaluating and optimizing multiple competing parameters.

XXX XXXX Nanotechnology

Credits: 3

Prerequisites: XXX XXXX Modern Instrumentation and Characterization or consent of instructor

Course Description: The basic principles of nanotechnology and how to teach them to science peers to identify collaborative research opportunities are covered in this course.

XXX XXXX Nano EHS Risk Assessment

Credits: 3

Prerequisites: XXX XXXX Nanotechnology

Course Description: This course covers the life cycle analysis of products and materials; exposure, hazard, and risk assessment models; and fate and transformations of nanomaterials.

XXX XXXX Nanomedicine and Nanotherapeutics

Credits: 3

Prerequisites: XXX XXXX Nanotechnology, BSC 2010c Biology 1 Laboratory

Course Description: The anatomy and physiology of health and disease states are covered in this course. Topics include basic immunology; passive and active targeting design; common synthesis; and characterization approaches for nanomedicines.

XXX XXXX Nano Scale Interface with Lab

Credits: 3

Prerequisites: XXX XXXX Nanotechnology, BSC 2010c Biology 1

Course Description: How a living cell "sees" nanomaterials is presented in this course. Topics include surface interactions between nanomaterials and other materials; the chemical modification of surfaces; physics of surface interactions; and structure-property relationships derived from the nanoscale interface.

XXX XXXX Operations Research**Credits:** 1**Prerequisites:** None**Course Description:** Basic approaches for modeling and solving operation efficiency challenges, and predicting and demonstrating cost-savings or other value-added gains.**XXX XXXX Statics****Credits:** 3**Prerequisites:** MAC 2312 Analytic Geometry and Calculus 2, PHY 2048 Physics 1**Course Description:** This course covers the equilibrium of particles frames, machine, trusses and rigid bodies in two and three dimensions using vector algebra.**XXX XXXX Strength of Materials****Credits:** 3**Prerequisites:** XXX XXXX Statics**Course Description:** Topics include properties of materials; Mohr's Circle; Hooke's Law for isotropic materials; stress and strain; stress strain diagrams; design loads; safety and working stresses; Shear and moment diagrams; Beams of two materials; indeterminate axially-loaded members; torsional shearing stresses and loads; displacements; and flexural and transverse shear stresses.**XXX XXXX Thermodynamics****Credits:** 3**Prerequisites:** XXX XXXX Statics**Course Description:** This course covers the properties and processes of thermodynamics. Topics include the first and second laws of thermodynamics; entropy; Carnot Cycle and Brayton Cycle.**XXX XXXX Unique Nanoscale Phenomena and Interfaces w/Lab****Credits:** 3**Prerequisites:** CHM 2045 Chemistry 1, CHM 2045L Chemistry 1 Laboratory, PHY 2048 Physics 1, PHY 2048L Physics 1 Laboratory, PHY 2049 Physics 2, PHY 2049L Physics 2 Laboratory**Course Description:** The principles of nanotechnology and nanomaterials are presented in this course. Topics include classes of nanomaterials; emergent nanoscale properties; common synthesis approaches; and widely employed applications of nanomaterials.

- E. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

Both round table discussions at an industry summit and continued discussions with industry partners are providing ongoing dynamic competencies that are specific to industry needs. Advisory Councils will guide curriculum development and to ensure a philosophy of applied research where students will gain experience in solving real-world problems through hands-on learning, research, exposure to industry leaders and internship opportunities. The Advisory Councils will meet formally twice yearly to advise the faculty and other administrative officers on strategies and means of developing resources for enhancing the goals of the department. The Advisory Councils also assist in promoting the programs to potential students, employers, legislative leaders, governmental agencies and industry.

- F. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

Florida Polytechnic University will seek ABET accreditation for this degree program.

- G. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

This is not a doctoral program.

- H. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

This Degree will be offered at the Florida Polytechnic University campus in a face-to-face format utilizing a polytechnic pedagogy. Collaboration, applied learning and applied research are very important to the Florida Polytechnic University delivery system. In Florida Polytechnic University's Innovation, Science, & Technology building, there is no research laboratory space assigned to single faculty, rather a set of large shared-resource spaces grouped by research objective. This will enable and encourage multiple faculty and students to all work together in the same spaces. This design and planned use is different from traditional silo-based university structures where a single professor has their own laboratory space. Additionally, classrooms are designed to have moveable furniture, collaborative whiteboard walls and IT systems that encourage collaboration. Therefore, from the ground up, the layout of the building encourages collaboration.

Our Student Information System will soon be available and consequently, the Chief Information Officer, is preparing the IT infrastructure for online delivery. Courses in this degree that may be offered in a hybrid or online format will be determined at that time.

We are exploring opportunities to collaborate with other universities. And already have a number of industry partners.

The delivery system will not require specialized services or greater than normal financial support.

IX. Faculty Participation

- A. Use Table 4 in Appendix A to identify existing and anticipated ranked (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).**

As a new member of the Florida State University System, Florida Polytechnic University's B.S. in Mechanical and Industrial Engineering Degree Program will not be launched until the 2014-2015 Academic Year. The projected information provided in Table 4, reflects the aggregate of existing faculty members as well as faculty members to be hired to teach, advise and supervise student internships in the program. In addition to the current degree program, faculty support is divided across five other undergraduate degree programs and two graduate degree programs.

- B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated ranked faculty (as identified in Table 2 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.**

The Mechanical and Industrial Engineering is a startup program and is one of the inaugural programs to be offered by Florida Polytechnic University. As an inaugural program all costs associated with the program are new. In years 1 and 5, Florida Polytechnic will employ 2.95 and 5.15 faculty positions respectively. The faculty cost was derived by allocating the individual faculty member's annual salary and benefits and multiplied by their respective program effort. The sum of the faculty participation's program effort was then taken to calculate the total program cost, \$401,155 in year 1 and \$773,500 in year 5. The Mechanical and Industrial Engineering program will also require the hiring of adjunct faculty positions. The costs for adjunct positions is estimated to be \$40,000 in year 1 and \$120,000 in year 5. All costs associated to the Mechanical and Industrial Engineering program will be funded through the Educational and General fund state appropriations.

- C. Provide in the appendices the curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).**

Please see Appendix C.

- D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.**

As a new university, Florida Polytechnic University's Degree Programs and classes will not be officially launched until the 2014-2015 Academic Year. Evidence that the academic unit(s)

associated with this new degree have been productive in teaching, research, and service will be become available next year and at that point the following will be provided: trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

X. Non-Faculty Resources

- A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.**
- B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 3 in Appendix A.**

Florida Polytechnic University has recently hired a Library Director (start date 1/22/2014). Faculty are compiling lists of appropriate volumes, serials and journals. In addition, the virtual library is in the planning process. Sufficient funding has been included in the budget.

Signature of Library Director

Date

- C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.**

Florida Polytechnic University has developed a list of laboratory equipment that it will have on campus for teaching and research needs with a focus on what is needed on Day 1 when the University doors open. We looked at the laboratory spaces within the Innovation, Science & Technology (IST) building, and then evaluated the curriculum to ensure all teaching needs will be met. First, the list for teaching general education laboratory requirements such as the general physics, general chemistry, and general biology was developed. Next, the list for college core requirements, such as circuits in Engineering or computer programming in Innovation and Technology, was developed, keeping in focus hands-on applied learning. Then, for each program and concentration, comparisons were made to peer institutions to determine a list of equipment that meets both the research and teaching needs of the students and faculty, while also maximizing the utilization of equipment across concentrations. Funds already allocated in the construction of the IST building will provide what is needed to stand up this program.

- D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (J) below.**

No additional space is needed.

- E. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.**

Florida Polytechnic University is purchasing the needed lab equipment. No specialized equipment is required.

- F. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

No additional specialized equipment is needed.

- G. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

No additional special categories of resources are needed.

- H. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

As Florida Polytechnic University is in its beginning stages of building its academic programs, we currently do not have any projected fellowships, assistantships, or scholarships ready to be allocated to the proposed programs, other than the Florida Polytechnic University Inaugural Scholarship. The Florida Polytechnic University Scholarship is not program specific, and is estimated to be a maximum amount of \$186,000 for year 1.

- I. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Internship opportunities will be provided for all students in this program. Florida Polytechnic University is connecting with business and industry leaders to establish an ongoing exchange of information which will help identify the knowledge and skills needed by our graduates to succeed in the industries related to this program. Industry partnerships are being focused on STEM-related businesses and are being developed for mutual benefit and that lead to joint endeavors.

To date, the following companies have joined us as industry partners:

- Colo5;
- CNP;
- Pharmaworks;
- Stryker;
- JBT FoodTech;
- Harris Corp;
- Protected Trust;
- Saddle Creek Logistics Services;
- The Story Companies;
- A-C-T Environmental and Infrastructure;
- Prolexic Technologies; and
- nanoComposix.

This commitment also will assist in providing internship as well as future job opportunities for our graduates and will enhance our university research activities.

- J. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and

student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

The Mechanical and Industrial Engineering program is included in the University master plan and does not require any additional capital expenditures.

APPENDIX A: Worksheets

APPENDIX A

**TABLE 1-A (DRAFT)
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES**

Mechanical & Industrial Engineering Baccalaureate Degree Program

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Upper-level students who are transferring from other majors within the university**	0	0	0	0	0	0	0	0	0	0
Students who initially entered the university as FTIC students and who are progressing from the lower to the upper level***	35	25.8	66	48.7	93	66.3	119	83.9	138	97
Florida College System transfers to the upper level***	31	22.7	58	43.1	82	58.6	105	74.2	122	85.8
Transfers to the upper level from other Florida colleges and universities***	1	0.74	2	1.4	3	1.9	3	2.4	4	2.8
Transfers from out of state colleges and universities***	0	0.31	1	0.5	1	0.6	1	0.8	2	0.9
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	67	49.55	127	93.7	179	127.4	228	161.3	266	186.5

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.

** If numbers appear in this category, they should go DOWN in later years.

*** Do not include individuals counted in any PRIOR CATEGORY in a given COLUMN.

Worksheet Table 1-A UG Enrollment

APPENDIX A

**TABLE 2
PROJECTED COSTS AND FUNDING SOURCES**

Instruction & Research Costs (non-cumulative)	Year 1							Year 5					
	Funding Source							Funding Source					
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	Other New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Auxiliary Funds	Subtotal E&G, Auxiliary, and C&G	Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	Auxiliary Funds	Subtotal E&G, Auxiliary, and C&G
Faculty Salaries and Benefits	0	0	361,155	0	0	0	\$361,155	653,500	0	0	0	0	\$653,500
A & P Salaries and Benefits	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
USPS Salaries and Benefits	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
Other Personal Services	0	0	40,000	0	0	0	\$40,000	120,000	0	0	0	0	\$120,000
Assistantships & Fellowships	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
Library	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
Expenses	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
Operating Capital Outlay	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
Special Categories	0	0	0	0	0	0	\$0	0	0	0	0	0	\$0
Total Costs	\$0	\$0	\$401,155	\$0	\$0	\$0	\$401,155	\$773,500	\$0	\$0	\$0	\$0	\$773,500

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "other new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

	Year 1	Year 5
Total Positions		
Faculty (person-years)	2.95	5.15
A & P (FTE)	0	0
USPS (FTE)	0	0

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	\$401,155	\$773,500
Annual Student FTE	49.55	186.5
E&G Cost per FTE	\$8,096	\$4,147

Worksheet Table 2 Budget

APPENDIX A

TABLE 3 (DRAFT) ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
Example: 555-555 World exploration fund (example)	0	0	\$0
	0	0	
Not applicable for this program.	0	0	
	0	0	
	0	0	
	0	0	
Totals	\$0	\$0	\$0

Worksheet Table 3 Reallocation

APPENDIX A

**TABLE 4 (BS IN ELECTRICAL ENGINEERING)
ANTICIPATED FACULTY PARTICIPATION**

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Jorge Vargas, Ph.D. Electrical Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
A	Elhami, Nasr Civil Engineering	Prof.	MYA	Fall 2014	12	0.50	0.12	0.06	9	0.50	0.12	0.06
A	Harvey Hyman, Ph.D. Business	Asst. Prof.	MYA	Fall 2014	9	0.75	0.00	0.00	9	0.75	0.00	0.00
A	Ryan Integlia Elec. & Comp. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.10	0.08	9	0.75	0.10	0.08
A	Robert MacCuspie Chemistry	Asst. Prof.	MYA	Fall 2014	9	0.75	0.19	0.14	9	0.75	0.19	0.14
A	Susan LeFrancois, Ph.D. Med. Science & Physiology	Asst. Prof.	MYA	Fall 2014	9	0.75	0.09	0.07	9	0.75	0.09	0.07
A	Anas Salah Eddin Electrical Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.09	0.07	9	0.75	0.09	0.07
A	Sesha Srinivasan, Ph.D. Physics	Asst. Prof.	MYA	Fall 2014	9	0.75	0.09	0.07	9	0.75	0.09	0.07
A	Willy Wrigers, Ph.D. Physics	Prof.	MYA	Fall 2014	9	0.75	0.09	0.07	9	0.75	0.09	0.07
B	New Hire, Ph.D. Mathematics	Asst. Prof.	MYA	Fall 2014	9	0.75	0.16	0.12	9	0.75	0.16	0.12
B	New Hire, Ph.D. English/Communications	Asst. Prof.	MYA	Fall 2014	9	0.75	0.16	0.12	9	0.75	0.16	0.12
B	New Hire, Ph.D. Language	Asst. Prof.	MYA	Fall 2014	9	0.75	0.16	0.12	9	0.75	0.16	0.12
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2014	9	0.75	0.18	0.14	9	0.75	0.18	0.14
B	New Hire, Ph.D. Engineering	Asst. Prof.	MYA	Fall 2015	9	0.75	0.00	0.00	9	0.75	0.18	0.14

Worksheet Table 4 Faculty

B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2015	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2015	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2015	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.09	0.07
	Physics											
B	New Hire, Ph.D.	Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.09	0.07
	Physics											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	Mathematics											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	English/Communication											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	Language											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2016	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2017	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2017	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2017	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2017	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2017	9	0.75	0.00	0.00	9	0.75	0.18	0.14
	Engineering											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.09	0.07
	Physics											
B	New Hire, Ph.D.	Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.09	0.07
	Physics											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	Mathematics											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	English/Communication											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	Language											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	Mathematics											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	English/Communication											
B	New Hire, Ph.D.	Asst. Prof.	MYA	Fall 2018	9	0.75	0.00	0.00	9	0.75	0.16	0.12
	Language											
	Total Person-Years (PY)							2.93				6.04

Faculty Code		Source of Funding	PY Workload by Budget Classification	
			Year 1	Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	0.68	0.68
B	New faculty to be hired on a vacant line	Current Education & General Revenue	2.25	5.36
C	New faculty to be hired on a new line	New Education & General Revenue	0.00	0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00	0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00	0.00
Overall Totals for			Year 1 2.93	Year 5 6.04

Worksheet Table 4 Faculty- continued

APPENDIX B: Learning Compact

Learning Compact

Florida Polytechnic University's Academic Learning Compact describes what students, who follow the major's study plan, will know and be able to do. These are listed as core student learning outcomes. Assessments that will measure these learning outcomes are also listed.

College:	Engineering
Program:	Mechanical and Industrial Engineering
Purpose of the Program:	To graduate students with BS degrees who have completed an applied learning program, possess a fundamental knowledge of mechanical or industrial engineering, and the problem-solving and leadership skills required to succeed in STEM careers and continued education.
Graduate will know and be able to do:	Graduates will know the fundamental engineering concepts needed to design and develop products or processes that improve economic, societal, or quality of life conditions.

Core Learning Outcomes:	Student Learning Outcomes:	The Outcomes Involve These Skills:		
	Upon completion of the Electrical Engineering Degree in the College of Engineering, students will be able to:	Content	Critical Thinking	Communication
	Apply modern engineering tools- The student will be able to apply modern engineering instruments, tools, and techniques necessary to improve products or processes.	X		
	Design and conduct experiments- The student will be able to design and conduct experiments and to analyze and interpret data.		X	
	Effective Communication Skills- The student will be able to express himself or herself effectively by written, oral, and visual means.			X
	Identify, formulate and solve engineering problems- The student will be able to identify, formulate and solve engineering problems.		X	
	Work effectively on multidisciplinary teams- The students will be able to collaborate and perform effectively on a multidisciplinary team.			X
	Adaptation to Audience- The student will be able to demonstrate the ability to formulate a clear, original message that has been adapted to the particular audience.			X

Assessments that will be used to determine student performance on the outcome:	Capstone Course Evaluation	X
	Class Performance or Presentation	X
	Course Report	X
	Instructor Constructed Exam	X
	Project Evaluation	X

APPENDIX C: Curriculum Vitae for Existing Faculty Members

JORGE VARGAS
439 S Florida, suite 300
Lakeland, FL 33801
E-mail: jvargas@floridapolytechnic.org
Phone: (863) 583-9091

EDUCATION

- **PhD in Electrical Engineering**, Dec. 2005
Research interests: Microelectronics, RF/Microwave, Spintronics, Superconductivity and MEMS.
Dissertation: Design and Fabrication of Superconducting MEMS (MicroElectroMechanical Systems) Switch for RF and Microwave Applications.
Florida International University (FIU), Miami, FL
- **Masters of Science in Electrical Engineering**, Dec. 2001
Thesis: Design, fabrication and testing of microwave filter using yttrium barium copper-oxide (YBCO) on yttria stabilized Zirconia (YSZ) buffered silicon-substrates.
Florida International University (FIU), Miami, FL
- **Bachelor of Science in Electrical Engineering**, Dec. 1999
Research experience: RF/Microwave Integrated Circuits Design and Superconductivity.
Florida International University (FIU), Miami, FL

EXPERIENCE

Florida Polytechnic University, Lakeland, FL Oct. 13 – present

Associate Professor in Electrical Engineering

- Develop the electrical engineering for undergraduate and graduate curriculums including magnetics and semiconductors concentrations.
- Establish a research environment in the electrical engineering department.
- Provide outreach projects to our community having the opportunity to meet and partner with local stake holders and other business institutions.
- Support collaborative educational grants for external funding opportunities.

Universidad del Turabo, Gurabo, PR Jan 06 – Sept. 2013

Associate Professor in Electrical Engineering

- Assemble thin-film radiation sensors based on Giant Magnetoresistance (GMR) and Tunnel Magnetoresistance (TMR) phenomena and thick-film radiation sensors based on magnetic oxide thick films (high-energy radiations) intended for energy systems.
- Build Micromachined Screen Printing (MaSprint) capability allowing a cost effective approach to integrating sensing elements into devices for testing and device level development.
- Conduct research in radio frequency (RF), micro-electro-mechanical (MEM) switches including structural integrity such as survivability and reliability and microwave engineering using software applications such as Sonnet, Spice, Labview, and Cadence.
- Validate RF design, fabrication, characterization and testing.
- Teach undergraduate electrical engineering courses as electrical circuits, electronics, logic design, RF design, antennas and electromagnetism.

FAST Center- Future Aerospace Science and Technology - US Air Force at FIU, Sept 02 - Dec. 2005

Electrical Engineer

- Research, develop, test, and implement technology to assist the Air Force in producing the next generation of SpaceBased communication and intelligence platforms.
- Assisted Electrical/ Microwave Engineering Professors with the design, simulation, fabrication and testing of superconducting Micro Electro Mechanical (MEM) Switches, filters and resonators on new RF devices and applications.
- Performed radio-frequency-integrated-circuit (RFIC) characterization and development process to considerably reduce time.

- Conducted RFIC yield and failure analysis.

IBM Microelectronics Division, Burlington, VT July 01- Aug 2002

Product Development Engineer

- Coordinated with designers, manufacturing/ logistics engineers strategies to debug and to scale mass production RF wireless communications integrated circuits using IBM's new Silicon Germanium technology.
- Developed tools to greatly reduce feedback time and improve visualization of data for analyzing manufacturing test data from integrated circuits.
- Collaborated with internal/external customers on means to resolve failure analysis processes, troubleshooting and up selling of RFIC mass production.

FAST Center- Future Aerospace Science and Technology - US Air Force at FIU, April 99 - July 2001

Graduate Research

- Designed radio frequency (RF)/Microwave Integrated Circuits (filters and resonators) using Sonnet simulation software.
- Fabricated and tested of superconducting films using an Agilent 8720ES Network analyzer, Labview and a Janis closed-cycle cryo-station.
- Verified characterization and development of high temperature superconductors.
- Designed VLSI circuits using Mentor Graphics technology.

PUBLICATIONS

- **Vargas J. M.**, Hijazi Y., Vlasov Y.A. and Larkins G.L., Jr. "Effectiveness of BaTiO₃ dielectric patches on YBCO thin films for MEM switches." *Journal of Physics: Conf. Series Institute of Physics (UK)*, 2013.
- **Vargas J. M.**, Bogozi A., Noel J., Hijazi Y., Vlasov Y.A. and Larkins G.L., Jr. "Reliability of suspended bridges on superconducting microstrip filters using MEMS switches." *IEEE Trans. On Appl. Supercond.* , 2011, v. 21, no. 3, p. 567-570.
- **Vargas J.M.**, Noel J., Brzhezinskaya M., Vlasov Yu.A., Larkins G.L., Jr. "Design and fabrication of two switched superconducting microstrip hairpin filters using series MEM switches. " *IEEE Trans. On Appl. Supercond.*, 2007, v. 17, no. 2, p. 898-901.
- Martinez J.A., Brzhezinskaya M., Bogozi A., **Vargas J.M.**, Vlasov Y.A., Larkins G.L. Jr. "Optimization of a MEMS Switched Superconducting Microstrip Hairpin Filter." *Advances in Cryogenic Engineering*, 2006.
- Bogozi A., Brzhezinskaya M., Martinez J., **Vargas J.M.**, Vlasov Y.A., Larkins, G.L. Jr., Datye A.V., Wu K.H. "Advances in Elastic Modulus Study of Gold Thin Film for Use as an Actuated Membrane in a Superconducting RF MEM Switch." *Advances in Cryogenic Engineering*, 2006.
- Noel J., Hijazi Y., Martinez J., **Vargas J.M.**, Vlasov Yu.A., Larkins G.L., Jr. "Design and Fabrication of Switchable Superconducting Microstrip "T" Resonator with a MEM Switch." *Advances in Cryogenic Engineering: Transactions of the International Cryogenic Materials Conference - ICMC*, Vol. 50B, 2004, pp. 732-739.
- Hijazi Y., Bogozi A., Brzhezinskaya M., Martinez J., Noel J., Hanna D., Lawrence L., Fairweather D., **Vargas J.M.**, Vlasov Yu.A., Larkins G.L. "Laser Ablated and RF Sputtered BaTiO₃ Thin Films for Use in a Superconducting RF MEM Switch." *Advances in Cryogenic Engineering: Transactions of the International Cryogenic Materials Conference - ICMC*, Vol. 50B, 2004, pp. 747-754.

- **Vargas J.M.**, Vlasov Yu.A., Larkins G.L., Jr. “Design, fabrication and testing of a microwave filter using YBCO on a YSZ buffered (1 0 0) Si substrate.” *Physica C: Superconductivity*, 2002, vol. 372-376, p. 536-539.
- **Vargas J.M.**, Sayed S., Vlasov Yu. A., Larkins G.L., Jr. “Gap-coupled half-wave microstrip meanderline resonator on YSZ buffered (100) silicon.” *Advances in Cryogenic Engineering*, 2002, v. 48b, pp. 429-436.
- **Vargas J.M.**, Hijazi Y., Brown P., Khan T., Vlasov Yu.A, Larkins G.L. Jr. “Superconducting Half-Wave Microwave Resonator on YSZ Buffered Si (100).” *IEEE Trans. On Appl. Supercond.*, 2001, v. 11, no. 1, p. 392-394.
- Vlasov, Y.A., **Vargas, J.M.**, Brown, P., Larkins, G.L., Jr. “YBa₂Cu₃O₇ on Y-stabilized ZrO₂ buffered (100) Si -“T” resonator microwave characteristics.” *IEEE Transaction on Applied Superconductivity*, 2001, v. 11, p. 385-387.

CONFERENCES

- Presenter at the European Conference in Applied Superconductivity in Genova, Italy (2013), “Effectiveness of BaTiO₃ dielectric patches on YBCO thin films for MEM switches.” *Journal of Physics: Conf. Series Institute of Physics*.
- Moderator at the International symposium on energy in the area of energy sustainability presented by Universidad del Turabo and the US Department of Energy in Gurabo, PR (2012-2013)
- Presenter at the Applied Superconductivity Conference (ASC) in Washington, DC (2010), “Reliability of suspended bridges on superconducting microstrip filters using MEMS switches.” *IEEE Transactions on Applied Superconductivity*.
- Presenter at the Applied Superconductivity Conference (ASC) in Chicago, IL (2008), “Design, fabrication and testing of a microwave filter using YBCO on a YSZ buffered Si substrate.” *IEEE Transactions on Applied Superconductivity*.
- Presenter at the Applied Superconductivity Conference (ASC) in Seattle, WA (2006). “Design and fabrication of two switched superconducting microstrip hairpin filters using series MEM switches.” *IEEE Transactions on Applied Superconductivity*.
- Presenter at the Cryogenic Engineering Conference (2006) “Advances in Elastic Modulus Study of Gold Thin Film for Use as an Actuated Membrane in a Superconducting RF MEM Switch.” / “Optimization of a MEMS Switched Superconducting Microstrip Hairpin Filter.” *Advances in Cryogenic Engineering*.

FUNDED PROPOSALS

Senior researcher of the grant titled “Samuel P. Massie Chair of Excellence in Environmental Disciplines by the US Department of Energy” at Universidad del Turabo Sub-Project: “Spintronic-Based Radiation Sensors” 2010-2015, total project funds \$1,152,920

- Fabricate novel thin-film radiation sensors based on GMR and TMR phenomena.
- Assemble thick-film radiation sensors based on magnetic oxide thick films.
- Build Micromachined Screen Printing (MaSprint) capability allowing a cost effective approach to integrating sensing elements into devices for testing and device level development.
- Train students in basic UV-LIGA and micromachining processes.
- Identify novel structures for future radiation sensing applications.

Lecturer of the grant titled “Alliance of Mathematics and Science of Puerto Rico” by the US Department of Education, Title II-B” 2007-2013, annual funds \$520,000

- Offer seminars and hands on activities in mathematics and science to elemental, middle and high school teachers based on the academic standards and expectations of the US Department of Education.

Graduate Research and Participant of the award proposal granted to the FAST Center- Future Aerospace Science and Technology by the US Air Force at Florida International University, 1999-2005

- Research, develop, test, and implement technology to assist the Air Force in producing the next generation of SpaceBased communication and intelligence platforms.
- Designed radio frequency (RF)/Microwave Integrated Circuits.
- Fabricated and tested of superconducting films using network analyzers, Labview and a Janis closed-cycle cryo-station.
- Validated RFIC characterization and development process to considerably reduce time.
- Conducted RFIC yield and failure analysis.

NOT FUNDED PROPOSALS

Participant (Co-PI) of the proposal titled “Electrical Engineering and Enterprise Systems Engineering Research Experience for Middle School Teachers at the Universidad del Turabo” Research Experiences for Teachers (RET) by the National Science Foundation. (2009)

Principal Investigator of the proposal titled “Study of the Electron Spin-Polarized Transport in Ferromagnetic Multi-layers” YIP by the Office of Naval Research. (2008)

Principal Investigator of the proposal titled “Design, Fabrication and Testing of Microwave Filters using Yttrium Barium Copper-oxide on Ytria Stabilized Zirconia Buffered Silicon-Substrates” YIP by the Air Force Office of Scientific Research. (2007)

Principal Investigator of the proposal titled “Design, fabrication and testing of a microwave filter using YBCO on a YSZ buffered Si substrate” by The United Negro College Fund Special Programs Corp. (2005)

Principal Investigator of the proposal titled “Universidad del Turabo Scholarship Program in STEM to Support Nuclear Energy Safety and Environmental Protection” by the Nuclear Regulatory Commission. (2012)

PROPOSALS IN PROGRESS

Participant (Co-PI) of the proposal titled “SPEED project- Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP)” by the National Science Foundation (NSF). (2012)

TECNICAL SKILLS

- Fabrication: Experienced in Photolithography, Focused Ion Beam (FIB), Pulsed Laser Deposition (PLD), RF/DC magnetron sputtering, evaporation, critical point CO₂ drying, and Reactive Ion Plasma etching.
- Characterization/ Thin film characterization techniques: X-ray diffraction, SEM, AFM, characterization of RF devices in a closed cycle cryogenic station and electrical characterization using multimeters, oscilloscopes, function generators, and power supplies.
- Modeling: RF simulation and design using Sonnet®, and Genesys® software suites.
- Computer: C++, PSPICE, VHDL, Labview, Micro Cap, Matlab, MathCAD, Adobe Illustrator, Mentor Graphics, Model Sim and Microsoft Office.

ACADEMIC SERVICES

- Ad-Hoc reviewer for IEEE Transactions on Applied Superconductivity.

ORGANIZATIONS

- Member of IEEE (Institute of Electrical and Electronics Engineers)
- Member of Eta Kappa Nu- Engineering Honor Society

- Member of SHPE (Society of Hispanic Professional Engineers)

UNIVERSITY SERVICES

- Assessment committee member for ABET accreditation in the school of engineering at Universidad del Turabo.
- Curricular program committee member in the school of engineering at Universidad del Turabo.
- Member of the academic counseling at Universidad del Turabo.
- Member of the internationalization committee at Universidad del Turabo.
- Member of the integrity and academic assessment committee at Universidad del Turabo.

LANGUAGES

- Fully bilingual in Spanish and English.

PROFESSIONAL ACADEMIC EXPERIENCE:

- **Associate Vice President of Academic Affairs and Professor,**
Florida Polytechnic University, 12/2103 - Present
 - Responsible for providing leadership and oversight for academic program development, including multidisciplinary programs, curriculum development and approval process, graduate program enhancement, academic policy review and enrollment management targeting student recruitment, enrollment, success, growth, retention and graduation, SACS compliance and academic accreditations, as well as academic advising and assessment fall within this position's oversight. This includes providing oversight over the following units: Graduate and Undergraduate Programs, Enrollment Services, International Student Services and Office Of Assessment and Professional Development as well as represent the University with external constituencies and actively participate in university leadership at the direction of the Provost.
 - Teaching undergraduate and graduate courses in Motion Intelligence, Engineering / Project Management.
 - Directing University Research Programs

- **Professor, Civil Engineering and Construction Engineering Management,**
California State University, Long Beach, College of Engineering, 1988 – 2013
 - 25 years of higher education experience with proven track record of commitment to an interdisciplinary, integrative, and innovative approach to teaching and learning with excellence in research and service.
 - Developing and teaching undergraduate and graduate courses in Engineering and Engineering Management including development and teaching 100% on-line Project Management graduate courses that facilitates learning within and across disciplines through integrative approaches and graduate students with multidiscipline perspectives.
 - Initiation and development of a 100% self-supported graduate Master of Science in Engineering Management (MSEM) degree, which is a 100% online and an interdisciplinary collaborative effort between California State University, Long Beach (College of Engineering) and California State University, Dominguez Hills (College of Business Administration) and College of Professional Development and Continuing Education.

- Extensively involved with CSU, Long Beach College of Continuing Education and Professional Development (CCPE), International Training Programs (ITP) in initiating, establishing, developing and offering a variety of multidisciplinary classes / certificates (customized professional and continuing education programs) to global audiences (i.e. China, Brazil, Germany, Dubai, Abu Dhabi, Lebanon) to actively promote academic and cultural exchanges internationally.
- Working extensively with the Deans and Associate Deans on development of new interdisciplinary academic programs, working with the Student Success Center to attract minority students, working with the Recruitment and Retention Office for development of successful educational strategies, contributing to the College of Engineering Graduation Initiative Program, development and marketing of new online graduate programs, building strong / effective relationships with alumni and international campuses, advisory boards, raising industry funds for establishment of innovative academic positions, development of long-lasting partnerships with industries to enhance students' learning experience and recruiting of new faculty members.
- **Professor, Project Management**, Keller Graduate School of Management, California, 1995 – 1997
 - Teaching graduate level courses in Project Management and Advance Project Management.
 - Master's Program Coordinator / Advisor for Graduate Students
 - Acted as an industry resource for Keller Project Management Graduate Program.
- **Universities Relations** (Executive Assistant, Student Advisor and Public Relations) with the Ministry of Higher Education of Saudi Arabia (Saudi Arabian Educational Mission (SAEM) to the United States in California and Texas), 1979-1984.
 - Implementation of Saudi national educational and training policies to provide Saudi Arabia with qualified graduates capable of achieving the country's goals of progress and development. This included working with many of Saudi Arabia agencies and educational institutions to assist (providing Students Services, Admissions and Counseling 15,000 graduate and undergraduate students in U.S. universities nationwide.

PROFESSIONAL INDUSTRIAL EXPERIENCE:

California Department of Transportation (Caltrans) 1988 – Present

- 25 years of progressive supervisory, managerial and leadership responsibilities both in the District (Los Angeles and Ventura Counties) and Statewide. I have had many diverse Project Management, Planning and Operations assignments where I demonstrated effectively my ability to perform high level administrative and policy-influencing functions. Additionally, illustrating my ability to plan, organize and direct the work of multi-disciplinary professional and administrative staff, ability to develop the needed overall policies that gains the confidence and support of top-level administrators to build an effective partnership with both internal and external stakeholders (major Local Agencies, Local Cities and Counties) in integrating activities of a diverse programs to attain common strategic goals. My accomplishments have been recognized on local, regional and statewide levels.
- **Office Chief, CALTRANS** , Office of Transportation Planning, 2000 – Present
 - Responsible for articulating a long-term vision for District 7 (Los Angeles and Ventura Counties) transportation system and implementing policies through partnership with State, regional, and local agencies
 - Program Advisor for the District State Transportation Improvement Program (STIP) overseeing multi-billions \$ program / multiple projects delivery per year playing a proactive role in influencing policies (HQ and District) to streamline project delivery in accordance with sound practices.
 - Promoting the effective use of the existing regional highway system and developing the District's long-range plan for new facilities, operational strategies and modal coordination consistent with the pertinent regional agencies long-range transportation plans, future land use plans, and environmental regulations.
 - Providing travel forecasts for planning and design of state owned and operated transportation facilities and the analysis of traffic impacts, coordinating with the Southern California Association of Governments (SCAG) in developing the Regional Transportation Plan (RTP), Regional Transportation Improvement Program (RTIP) and other key related regional planning policies.
 - Implementation of Statewide Resources Management and Risk Management.
 - Representing the District on Statewide development and implementation of Statewide and District's Strategic Plans
 - Representing the District on Statewide development and implementation of Continuous Improvement (Statewide Quality Improvement Efforts), District 7 focal Point of Contact with Consultants in the implementation of Project Management as well as several district and statewide task forces.
 - Regularly invited guest speaker to Project Management Academy, Project

Engineers Academy, Planning Academy and many other public speaking functions representing the department.

- **Chief Project Manager, CALTRANS**, State Delivery of Local Transit Projects (LTPD), 1999 - 2000.

In this position, I was responsible for providing statewide leadership, coordinating, planning, organizing and managing of local transit project delivery for the Department's Mass Transportation Program. My duties included the development and maintenance of a statewide strategy for assessing deficiencies in the delivery of local projects, ensuring that projects are delivered on time within budget, working closely with the California Transportation Commission (CTC), Regional Transportation Planning Agencies (RTPA), development of improved project monitoring systems, resolving barriers (e.g., statutory, regulatory) to facilitate projects delivery in conjunction with other Departmental, Districts, regional agencies and local agencies by directing resolution of highly technical and/or politically sensitive issues.

- **Project Manager, CALTRANS D7 Rail Program**, Office of Public Trans. and Rail, 1997 - 1999.

Successfully managed over one billion in executed state grants for locally and externally funded (intercity, commuter and urban rail) projects. Some of the key projects included: Southern California Regional Rail Authority's Metrolink commuter rail system, LACMTA's Metro Red Line subway project, Metro Green Line, Pasadena Blue Line, light rail projects, the Los Angeles Light Rail Vehicle Procurement, Alameda Corridor Grade Separations and numerous transit center projects for cities throughout Los Angeles and Ventura Counties.

- **Project Mgmt. Control Unit Chief**, Office of Program & Project Control, CALTRANS. 1992 - 97.

Responsible for the development of management systems and techniques that provide early identification projects' slippage or cost overruns (yearly average of 345 major projects totaling 420 Million Dollars). Other duties included: tracking project scheduling performance, implementing a workload assignment process that provides a balanced workload for project delivery, preparing project delivery reports that called attention to areas requiring the involvement of top management on an exception basis and identifying recommendations for presentations to District and Headquarters Management. In this assignment I dealt extensively with headquarters' personnel, regional staff, local government agencies and various consultants.

- **Lead Project Control, Project Control Branch, CALTRANS**. 1990 – 1992

My responsibilities included: monitoring monthly progress reports that summarized the status of projects progress, assessing work accomplished, conducting monthly meetings with the various Deputy District Directors and

Program / Project Managers to review and update schedules, balancing and forecasting the staffing requirements of each project while assuring that all project milestones were met, initiating procedures to get top management approval for schedule, cost and Scope changes and preparing District Progress Reports which summarized all District projects performance and delivery.

- **Civil Engineer, Construction Branch, CALTRANS. 1989 - 1990**

Assisted in Project Administration and reviewed project plans, specifications and estimates. Prepared periodical progress pay estimates and reports, performed periodic observation of materials and completed work to determine general compliance with plans & specifications, prepared daily reports, analyzed contract plans and specifications to determine if the design engineering assumptions were valid, performed surveying and calculations, prepared design changes for contract change orders, reviewed shop drawings and prepared final as-built plans and final reports upon completion of construction projects.

- **Civil Engineer, Project Development/ Design, CALTRANS. 1988 - 1989**

Assisted in the preparation of project plans, specifications, and estimates (PS&E). Confirmed and updated project schedules and estimates, prepared and reviewed project reports, proposals and recommendations by other departments & governmental Agencies, drafted special provisions and specifications for project contracts, evaluated and recommend preferred alternatives to reduce construction costs, prepared geometric alignments and structural design.

PUBLICATIONS: (co-Authored)

1. Tracking Systems in Construction Applications and Comparisons, Associated Schools of Construction (ASC) International Proceedings of the 49th Annual Conference, San Luis Obispo, California, 2013.
2. Performance Assessment of Distance Education Network (DEN) Methods, 4th Conference on e-Learning Excellence Middle East, Dubai, 2011.
3. Cost Estimating Models for Utility Rehabilitation Projects: Neural Networks Vs. Regression”, Journal of Pipeline Systems Engineering and Practice (ASCE), 2010.
4. Current Practice and Trends of E-Learning in Egypt, AUC 6th. Annual E-Learning Conference, 2008, (Invited Paper).
5. Cost Performance Comparison of Two Public Sector Project Procurement Techniques, Journal of Management in Engineering, 2007
6. Neural Network Cost Estimating Model for Utility Rehabilitation Projects, Journal of Construction Research, 2007.
7. A barcode-assisted system for Document Management of Construction Projects, Journal of Construction Education and Research (ASC), 2007.

8. Initiating a Framework of Surveying E-learning Efforts and Accomplishments in Egypt, 5th. Annual Conference on e-learning, American University in Cairo, 2007, (Invited Paper).
9. e-learning and Professional Project Management, 4th Annual Conference on e-learning, American University in Cairo, 2006.
10. Establishing the Framework of Arab Society of e-learning, 4th Annual Conference on e-learning, American University in Cairo, 2006
11. An AI - Based Cost Estimating System For The Construction Cost Of Underground Utility Projects, 1st International Construction Specialty Conference, Canadian Society for Civil Engineering, Calgary, 2006.
12. Project Management Certification Examination for a Public Sector Engineering Organization, Journal of Professional Issues in Engineering Education and Practice, ASCE
13. Performance Measurement in the Construction Industry: Current Practice, Trends and Future Directions, American Association of Cost Engineers, AACE International's 49th Annual Meeting - New Orleans, 2005.
14. A Model for maturity assessment of performance measurement in the construction industry, American Association of Cost Engineers, AACE International's 49th Annual Meeting - New Orleans, 2005.
15. Hybrid Courses Implementation in higher education, 3rd. Annual Conference in E-Learning Applications in Egypt, Sponsored by the American University in Cairo, 2005.
16. Bid Demand Influences to Bid Quality, the 48th Annual Meeting of AACE International, Washington D.C., 2004.
17. Controlling Design Phase Scope Creep, the 47th Annual Meeting of AACE International, Orlando, Florida, 2003.
18. Improvement of Worker Safety through Pareto Analysis of Construction Accidents CIB W65 Symposium, Cincinnati Ohio, 2002.
19. Transit Project Success Criteria, First International Structure Engineering and Construction Conference, Honolulu, 2001.
20. An Integrated Planning, Scheduling, and Costing System to Control Civil Engineering Design, ICCCB-E-VIII, ASCE, Stanford University, 2000.
21. A System to Control Civil Engineering Design, ICCCB-E-VIII, ASCE, Stanford University, 2000.
22. A Methodology to Develop Total Project Cost Success Factors Based Upon A Pareto Analysis of Completed Project Cost Control Data, AACE International's 44th Annual Meeting & the 16th International Cost Engineering Congress, AB, Canada, 2000.
23. A Method to Improve Worker Safety – Pareto Analysis of Construction Accidents, Construction Congress 6, American Society of Civil Engineers (ASCE), Orlando, Florida, 2000.
24. Personalities of Construction Project Managers – A Link to High Performance Teams, Construction Congress 6, ASCE, Orlando, 2000.

25. Project Management Training in California Government - A Case Study - California Department of Transportation (Caltrans), PMI '99 Annual Seminar, Project Management Institute, Philadelphia, Pennsylvania, 1999.
26. Learning Communication – Training People Skills”, PMI '99 Annual Seminar, Project Management Institute, Philadelphia, Pennsylvania, 1999.
27. A Pareto Analysis of Construction and Maintenance Operations Accidents, 2nd International Conference on Implementation of Safety and Health on Construction Sites, Honolulu, 1999.

Related Development & Research Grants:

1. California State University (CSU) Commission on the Extended University grant for developing 100% Online Master of Science in Engineering Management (MSEM) program which is an interdisciplinary collaborative effort between College of Engineering, College of Business Administration and College of Professional Development and Continuing Education.
2. 3 different CSULB Globalized Instructional Development Grants, Collaborative efforts between California State University, Long Beach (CSULB) and American University, Cairo (AUC) to provide interdisciplinary learning experience for students via Integration of interactive virtual classroom technology for graduate and undergraduate students to meet today's industry standards and expectations, 2011, 2012 and 2013.
3. US-Egypt Grant for the development and implementation plan of shared engineering course to be offered at California State University, Long Beach (CSULB) and American University, Cairo (AUC), 2011.
4. Renewable Energy Workforce Development, Department of Energy, 2010.
5. Energy Storage System, Contained Vacuum Energy Storage (CVES) system, Department of Energy, 2010.
6. Integrated Project Delivery, US-Egypt, Jr. Scientist Visit Grant, American University, Cairo, 2010.
7. Enhancing Integrated Project Delivery – Phase II, 2010, Bernard Construction Company.
8. Enhancing Integrated Project Delivery, Charles Pankow Foundation & Design Build Institute of America (DBIA), 2009.
9. US-Egypt, Jr. Scientist Visit Grant, American University, Cairo, 2008.
10. US-Egypt, Jr. Scientist Visit Grant, American University, Cairo, 2007.
11. Enhancing Science, Technology, Engineering and Math (STEM) Education through Interactive Visualizations, NSF-ITEST, Part of COE Proposal, 2009.
12. HP Innovations in Education grant application, IT-Based Engineering Education” project, Part of COE Proposal, 2009.

PROFESSIONAL MEMBERSHIP / AFFILIATION:

- Engineering honor society (Tau Beta Pi)
- Project Management Institute (PMI)
- Design-Build Institute of America (DBIA)
- American Society of Civil Engineering (ASCE)
- Construction Management Association of America (CMAA)
- Associated General Contractors of California (AGC)
- American Association of Cost Engineers (AACE)

HONORS AND AWARDS:

- Recipient of 2013 Associated Schools of Construction (ASC) Excellence in Teaching Award.
- Awarded California State University, Long Beach, Construction Engineering Management, Outstanding Professor of the year.
- Received Certificate of recognition from California State Senate in honor of dedicated service to the people of California, Los Angeles, and the Engineering Profession.
- Certificate of recognition from California State Assembly for contributions to the state of California and the Engineering Profession.
- Certificate of commendation from County of Los Angeles in recognition of dedicated service to the affairs of the community and for the civic pride demonstrated by the numerous activities serving the Affairs of the Community / Contributions for the benefits of all the citizens of Los Angeles County.
- Selected for who's who in America's "Best Professor" for exceptional performance.
- Awarded Construction Engineering Management Program Outstanding Instructor of the year for outstanding display of knowledge and teaching.
- Recipient of CALTRANS, Sustained Superior Accomplishment Award in recognition of exceptional performance.
- Recipient of CALTRANS, Superior Accomplishment Award in recognition of exceptional performance.
- Recipient of CALTRANS Legendary Service award in recognition of outstanding service.
- Nominated for Caltrans, District Director's Distinguished Service Award.
- Recipient of Academic Scholarship for Graduate (MSc & Ph.D.) Studies.

EDUCATION:

- Ph.D., Civil Engineering, University of Colorado, Boulder
- MSc., Civil Engineering, California State University, Long Beach
- BSc., Civil Engineering, California State University, Long Beach

PROFILE: Information Scientist with 20 + years experience:

- **Expert** in modern information retrieval theories and techniques.
- Foremost **expert and author** on system development and deployment, models and methods.
- Experienced operations and project manager, including military and government.
- **Inventor** of three (3) U.S. Patents.
- Business intelligence, **knowledge management, data warehousing, data mining.**
- **Legal** experience in complex, courtroom litigation.
- **Secret Level Clearance, J-PAS and USCG/DHS.**
- Service Disabled Veteran, Operation Iraqi Freedom.

Operational Accomplishments:

- Implemented reengineering plan for \$2.5 million company product line.
- Built and directed a software development department from the ground up.
- Developed **business intelligence** system designed to track \$1 billion in funds.
- Served as on-scene commander during maritime operations with multiple weapons platforms.

Legal Accomplishments:

- Conducted over 160 major jury trials in **complex litigation.**
- Small Business **General Counsel** for three (3) companies.
- Most trials in a single year at sixty (60) member law firm.
- Litigator of the Year.

Higher Education/Tenure Related Accomplishments:

- **SACS** assessment committee, data collection and rubric development.
- **ABET** assessment committee, data collection and rubric development.
- Usability Study of Library Web Services 2013, Georgia Southern University.
- Honors Thesis Advisor, Fall 2013: “*Survey of Data Analytics,*” Georgia Southern University.
- Mentoring and career placement for juniors and seniors.
- Subject owner for “*Most Important Course in GSU IT Degree Program.*”
- Initial curriculum and degree approval for Three (3) AT Concentrations at Florida Polytechnic.
- University course descriptions and selections for concentrations of study.
- Stand-up of research data center and computer labs.
- **ACM SIG-IR.**
- **Conference Reviewer:** ICIS 2013, ICSIT 2014.
- Information Systems Frontiers Journal: **Reviewer.**
- Florida Institute of Oceanography Advisory Board (recently appointed by Provost).
- Courses Architected and Taught: Systems Acquisition, IT Issues and Management.
- Additional Courses Architected: Web Application Development; Fundamentals of ESI; Ethics, Legal and Regulatory Issues in IT.

Software Products Developed:

- Configuration Management Database (CMDB) System: U.S.A.F. Uniform Office.
- Budgeting Business Intelligence System: U.S. Army program support office.
- Migrant Worker Education Tracking Project: SUNY Oneonta and Florida Department of Education.
- *Retrivika*TM: Information Retrieval System for Large Document Collection Users.

Patents Filed:

- Search Review Interface Design Patent (final adjudication pending).
- Query Interface Design Patent (final adjudication pending).
- Document Search and Management System Utility Patent (provisional).

Harvey Stuart Hyman, PhD

Publications: Books

- Systems Acquisition, Integration and Implementation for Engineers and IT Professionals, **Harvey Stuart Hyman, PhD**, Sentia Publishing. Scheduled Release: Summer, 2014.
- A Comparison of Cyber-Crime Definitions in India and The United States, Himanshu Maheshwari, **H.S. Hyman**, and Manish Agrawal, Cyber Security, Cyber Crime and Cyber Forensics: Applications and Perspectives, IGI Global Publications (2010).

Publications: Conference Papers and Proceedings

- *Trends in the Study of Cloud Computing: Observations and Research Gaps*, H. Nueseibeh, K. Alhayyan, International Conference on Society and Information Technology (ICSIT) Proceedings (2014), **H.S. Hyman, Conference Reviewer**.
- *Using Exploration and Learning for Medical Records Search: An Experiment in Identifying Cohorts for Comparative Effectiveness Research*, **H.S. Hyman** and Warren Fridy III, NIST Special Publication: Text Retrieval Conference (TREC) Proceedings (2012).
- *Non-Statistical Methods for Information Retrieval: Harnessing User Explanatory Knowledge*, **H.S. Hyman**, Computational Law Workshop, International Conference on Artificial Intelligence and Law (ICAIL) 2011.
- *Modeling Concept and Context to Improve Performance in eDiscovery*, **H.S. Hyman** and Warren Fridy III, NIST Special Publication: Text Retrieval Conference (TREC) Proceedings (2011).
- *Using Bag of Words and Standard Deviations to Represent Expected Structures for Document Retrieval: A Way of Thinking That Leads to Method Choice*, **H.S. Hyman** and Warren Fridy III, NIST Special Publication: Text Retrieval Conference (TREC) Proceedings (2010).

Studies In Progress:

- *Learning and Relevance Feedback in Information Retrieval*
- *Combining Context Based Information Retrieval with Search Terms to Enhance Performance*.
- *Using Skill Profiles to Predict Success in Project Management*
- *Retrivika ProjectTM: Stand alone and server based application for high volume information retrieval.*
- *Validation of New Scales to Measure Exploration Constructs for Information Retrieval.*

EDUCATION:

University of South Florida, College of Business

Degree: **PhD**, 2012

Information Systems/Decision Sciences

Charleston Southern University, School of Business

Degree: **MBA**, 2006

Sigma Beta Delta Honor Society

University of Miami, School of Law

Degree: **JD**, 1993

Florida International University, College of Business

Degree: **BBA**, 1989

Harvey Stuart Hyman, PhD

TEACHING CAREER:

- 2013 - Current Florida Polytechnic University, College of Advanced Technology
Assistant Professor of Advanced Technology
- 2012 – 2014 Georgia Southern University, College of Engineering and Information Technology
Visiting Professor of Information Technology

MILITARY CAREER:

- 2011 - 2013 United States Coast Guard, Department of Homeland Security
2004 - 2009 Positions Held: **Department Head, Project Manager, Supervisor, Tactical Instructor**
Operations: Oversight of over fifty (50) personnel, five (5) acres of property, three (3) physical plant buildings, vehicles, multi-million dollar maritime platforms and three (3) tenents. Execution of multiple platform mission at sea resulting in 100% qualification of personnel with 10,000 rounds of ammunition fired and NO casualties.
Awards: *Commendation Medal, Achievement Medal, Global War on Terrorism Medal.*

TECHNOLOGY CAREER:

- 2010 – Present *Retrivika™* Information Retrieval Project
Saint Petersburg, Florida
Position: **Co-Inventor/Co-Founder**
Results: Filing of three (3) U.S. **patents** and **commercial release** of a series of document retrieval and knowledge management software tools designed to revolutionize electronic document search and production for eDiscovery, EMR, FOIA and high volume inspection and review.
- 2010 – 2011 Trillium Research, Inc.
Tampa, Florida
Position: **Director, Software Development (interim)**
Results: Built company's program from the ground up including recruitment, hiring and management of talent; procurement and implementation of infrastructure; purchase and installation of hardware, network configuration and system administration.
Produced two active product lines and the company's network infrastructure.
- 2010 – 2011 Parses, Inc.
Tampa, Florida
Position: **Chief of Operations**
Results: Redesigned workflow process and communication chain for main product line.
Reduced communication overhead by half, while implementing infrastructure to support launch of a multi-year, multi-million dollar product line, offering multiple service levels.

LEGAL CAREER:

- 1998 - 2003 Office of the Public Defender, Tampa Florida
- **Senior Litigator:** Special complex litigation cases including the death penalty.
- **Lead Trial Attorney:** Supervised a team of four (4) junior lawyers and staff.
- 1993 - 1998 Office of the State Attorney for Miami-Dade County
- **Assistant Chief:** Environmental Crimes Unit.
- **Senior Trial Attorney:** Supervised two (2) junior attorneys.

Other Professional Licenses and Certifications:

- Florida Bar, since 1993.
- United States Supreme Court; Federal District Middle Florida; 11th Federal Appeals Circuit.
- Current Licensed Merchant Mariner (50 GRT Master of Inspected Vessels)
- Former Commodities Broker (series #3).
- Federal Law Enforcement Officer: USCG Sea Marshal, Maritime Transportation Safety Inspector.
- Pollution Investigator, Container Inspector, Hazardous Cargo Facility Inspector, Rad Haz Level II Ops.
- VA Certified, Service Disabled Veteran Owned Small Business Eligible.

Abridged Curriculum Vitae

Ryan Integlia, Ph.D.

439 S. Florida Ave., Lakeland, FL 33803
863-583-9098, rinteglia@floridapolytechnic.org

Educator and researcher working in subjects related to engineering, science and technology, while supporting interdisciplinary and entrepreneurial environments

Education

Rutgers, The State University of New Jersey, Piscataway, NJ

- Ph.D. in Electrical and Computer Engineering, 2011
Dissertation: *Dispersion of Silicon Based Micro- and Nano-Photonic Structures and Its Device Applications*
Advisers: Dr. W. Jiang, Rutgers University; Dr. W. Soboyejo, Princeton University
- Master of Science in Civil and Environmental Engineering, 2008
- Bachelor of Science with high honors in Electrical & Computer Engineering, 2001

Academic Experience

Florida Polytechnic University, Lakeland, FL (September 13, 2013-Present)

Assistant Professor of Electrical Engineering

- Developed electrical engineering, computer engineering and advanced technology curricula for undergraduate and graduate concentrations including Digital & Hybrid Systems, Control Systems, Electrodynamics and Health Informatics
- Established an interdisciplinary and collaborative research environment in the electrical engineering and advanced technology departments
- Enabled community outreach efforts that created the opportunity to partner with local stake holders and other business and academic institutions
- Supported collaborative educational and research grant development for external funding opportunities
- Provided service to the university through participation on a web development committee, recreation committee, e-classroom committee, classroom technology, faculty search committee, the information technology panel, branding and research committee, laboratory equipment committee, research plan development and other activities
- Established collegiate research and development internships
- Serves on the FESC steering committee and oversight groups
- Serves as a liaison between community and academic entrepreneurship programs and Florida Poly
- Provides local and global community service for sustainability, environmental impact and poverty alleviation

Rutgers University, Piscataway, NJ

Fellow and Teaching Assistant in the Rutgers–Princeton Nanotechnology for Clean Energy NSF IGERT, Jiang Research Group of Rutgers, Soboyejo Research Group of Princeton, Nanophotonics Laboratory, Microelectronics Research Laboratory, Princeton Institute for Science and Technology of Materials, Imaging and Analysis Center, Electrical and Computer Engineering Department

- Researched photonic crystals, resonator structures, switches and photovoltaic devices
- Researched microring resonators and parallel coupled dual racetrack ring resonators
- Researched the slow light effect in photonic crystal waveguides and the super prism effect
- Researched hybrid electrical, thermal, acoustic and optical sensors, switches and modulators
- Designed, fabricated and characterized silicon micro- and nano-photonic devices
- Participated in energy planning and public policy research
- Co-established a multi-university collaboration for device fabrication and characterization
- Co-developed the Nanophotonics Laboratory at Rutgers University

Rutgers University, Piscataway, NJ

Fellow in the Civil and Environmental Engineering Department, Electrical and Computer Engineering Department and Wireless Information Network Laboratory

- Researched, designed and deployed wireless sensor network applications related to infrastructure, transportation, emergency medical services, rail system monitoring, pre-fabrication, law enforcement and port & harbor
- Participated in Transportation Planning and Public Policy program

Teaching Experience

1. Laboratory Instructor, Department of Electrical and Computer Engineering, Rutgers, The State University of New Jersey: *Elements of Electrical Engineering Lab*
2. Independent Study Adviser, Department of Electrical and Computer Engineering, Rutgers, The State University of New Jersey: *Special Problems for Electrical and Computer Engineering*
3. Student Advisor, Department of Electrical and Computer Engineering, Rutgers, The State University of New Jersey: *Summer Research Program* Student Mentor, Department of Electrical and Computer Engineering, Rutgers, The State University of New Jersey: *ARESTY Honors Summer Research Program*
4. Student mentor for summer high school student research programs, Rutgers University.
5. Internship Adviser, School of Public Health, Rutgers, The State University of New Jersey: *Internship Program*
6. Internship Adviser, Mason Gross School of Fine Arts, Rutgers, The State University of New Jersey: *Internship Program*
7. Developed a multidiscipline independent study certificate program in sustainability, em[POWER] Energy Group
8. Served as an adviser to multiple student organizations, Rutgers University.
9. Served as a panelist for symposiums, competitions and workshops, Rutgers University, Princeton University.

Student Advising

I have advised many students from multiple universities, disciplines and cultures throughout their undergraduate programs and beyond.

Professional Experience

em[POWER] Energy Group, Inc., Highland Park, NJ

I co-founded the non-profit “[em\[POWER\] Energy Group, Inc.](#)” 501 (c)3, with the mission of helping individuals living in unregulated waste dump communities through the use of renewable energy systems and *renewable resource oriented development* methodologies supporting education, coop development, fair trade, health services and other types of community infrastructure.

- Built a multinational non-profit, established its 501(c)3, procured start-up capital, established student chapters that supported collaborative education forums and enabled an incubator for new nonprofits, while serving as an umbrella organization for existing non-profits

International Lemna Association, Mayfield, KY

I co-founded the nonprofit as a research and trade association integrated with a standardization body and public forums for efforts related to Lemna or Duckweed. Its purpose is to enable the creation of direct commodity competition with all other energy and feedstock sources. Additionally, it seeks to enhance job creation and collaboration beyond promoting and enforcing standardizations for protection of the industry against restraints of trade or limitations on technological development.

Siemens, Princeton, NJ

Graduate Research Intern in the RFID and Wireless Sensor Network Group, Siemens Corporate Research

- Researched and developed wireless sensor network (WSN) and RFID applications related to resource awareness, infrastructure monitoring, medical devices, interactive logistics and facilities management

- Contributed to user interface development

IBM, Poughkeepsie, NY

Memory System Development engineer working on system test, verification, error correction code, high frequency design and research tool development

- Participated in the Dream Team program, proposing a precursor smart grid system
- Worked with **Joint Electron Device Engineering Council** and **Intel**

Academic Honors and Awards

1. National Science Foundation graduate fellowship titled as the Rutgers-Princeton Nanotechnology for Clean Energy Integrative Graduate Education and Research Traineeship (IGERT) was awarded based on the proposal of a novel smart solar cell.
2. Center for Advanced Infrastructure and Technology Fellowship was awarded for the proposal of a novel transportation information system.
3. Nominated for Teaching Assistant of the Year for my performance as an instructor in the Elements of Electrical Engineering course at Rutgers University.
4. Certificate in Planning and Public Policy was a program integrated into my M.S. work in Civil and Environmental Engineering at Rutgers University.
5. Certificate in College Teaching was a program integrated into teaching assistantships, Rutgers University
6. Advanced Institute for Transportation Education Fellowship was awarded by the Civil and Environmental Engineering Department at Rutgers University.
7. Merit Scholarship awarded by the Rutgers School of Engineering.
8. Tau Beta Pi, Eta Kappa Nu, Golden Key Honor Societies awarded based on academic merit.

Skills and Tools (Past and Present)

Leadership: I have created various for-profits, non-profits, trade associations, steering committees, educational programs, student groups, university collaborations, international partnerships, joint ventures and other initiatives. My ability to strategically integrate technical and non-technical platforms across multiple disciplines has been demonstrated many times and most recently by the proposed development of an award winning incubator to house startups.

Fabrication: Electron Beam Lithography, Plasma Enhanced Chemical Vapor Deposition (PECVD), Photolithography, Nanoimprint Lithography (NIL), Laser Writer, Inductively Coupled Plasma (ICP) etch, Reactive Ion Etcher (RIE), plasma asher, dry and wet oxidization, Electron Beam Deposition, and wet etch

Process Characterization and Implementation: Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), Current-Voltage Characterization, Reflectometry, Profilometry, Ellipsometry; Including Skills related to Hardware Test and Verification and Wireless Sensor Network Implementation Hardware

Optical Characterization: Tunable lasers, ASE sources, fiber coupled laser sources, optical power meters, Optical Spectrum Analyzers, piezoelectric 3D stages

Design, Simulation and General Programming: Familiar with RSoft Simulation Tools, C++, Matlab; Including skills related to System Programming and Simulation; General Programming; Operating Systems; Circuit & Solid State Device Design, Simulation and Analysis; and Program Management Tools

Research Specializations

- Photonic crystal and resonator structure research for dispersion properties
- Sensing, actuation, computing and networking applications
- Alternative energy systems

- Solid state electronics and applications
- Local and international social entrepreneurship for sustainability, health and education

Publications

1. Integlia, R.; Song, W.; Yin, L.; Ding, D.; Pan, David Z.; Gill, D. M.; Jiang, W. “*Fabrication and characterization of parallel-coupled dual racetrack silicon micro-resonators.*” SPIE. 8266. Feb. 2012.
2. Integlia, R.; Song, W.; Yin, L.; Ding, D.; Pan, D. Z.; Gill, D. M.; Jiang, W. “*Parallel-coupled dual racetrack silicon microresonators for quadrature amplitude modulation.*” Optics Express. 19, 14892-14902. Aug. 2011.
3. Song, W.; Integlia, R.; Yin, L.; Jiang, W. “*Slow Light Loss due to Roughness in Photonic Crystal Waveguides: New Insight from Analytic Theory.*” Physical Review B. **82**, 235306. 2010.
4. Integlia, R.; Song, W.; Tan, J; Jiang, W. "Longitudinal and angular dispersions in photonic crystals: a synergistic perspective on slow light and superprism effects." Journal of Nanoscience and Nanotechnology. **10**, 1596-1605. April 2010.

Presentations and Conferences

1. Levi-Sanchez, S.; Integlia, R. “*Evolving Technologies in a Chaotic World: The Implications of New Social Media on Social Movements.*” International Studies Association. April 2013.
2. Integlia, R.; Van Zandt-Escobar, A.; Khanna, D.; A.; Pal, D.; Kretch, J.; Zhou, P.; Nachmany, R. Wan, A.; Friedman, N.; Chu, P.; Fakhoorian, T.; Felder, F. Lam, E. “*Water Purification to Energy.*” Clinton Global Initiative. March 2012.
3. W. Song, J. Tan, R. Integlia, L. Yin, and W. Jiang, “*Ultra-High Sensitivity in a Photonic Crystal Superprism Due to the Curvature Singularity of a Dispersion Surface,*” IEEE Photonics Conference, Washington, DC, October 2011.
4. R. A. Integlia, L. Yin, and W. Jiang, "Parallel-coupled dual racetrack silicon microresonators for quadrature amplitude modulation," Fifth International Conference on Nanophotonics, Shanghai, China, May 2011.
5. Integlia, R.; Song, W.; Tan, J.; Yin, L.; Chaha, M.; Soboyejo, W.; Jiang W. “*Parallel Coupled Dual Racetrack Ring Resonators.*” Rutgers University, Princeton University. University of Texas NSF IGERT Symposium, Austin. April 2010.
6. Integlia, R.; Song, Weiwei; Tan, Jun; Jiang, Wei. “*Longitudinal and angular dispersions in photonic crystals: a synergistic perspective on slow light and superprism effects.*” Materials Research Society - Africa Conference, Nigeria. December 2009.
7. Integlia, R.; Akande, Wali; Tong, Tiffany; Soboyejo, W.; Jiang, Wei. “*Socially Empowered Methane to Markets: A community Based Natural Gas Partnership in Nigeria*” Rutgers University, Princeton University. The Role of Science and Technology in African Development, Princeton. December 2009.
8. Integlia, R. “*Roadside Transportation Monitoring using Wireless Sensor Networks.*” Civil and Environmental Engineering Department, Rutgers University. November 2007.
9. B. Gungor, V. C.; Sastry, C.; Song, Z.; Integlia, R. “*Resource-Aware and Link Quality Based Routing Metric for Wireless Sensor and Actor Networks.*” IEEE International Conference on Communications, 2007. February 2007.

Funding Proposal Papers (Funded and Unfunded)

1. Lam, E.; Cheng, J.; Integlia, R.; Fakhoorian, T.; Martienssen, R.; Michael, T. *International Conference on Duckweed Research.* Proponent Institution: Rutgers University, International Lemna Association, em[POWER] Energy Group. Beneficiary Institution: NSF. Feb. 2013.

2. Integlia, R. *Dynamic Compound Interdigitated Photovoltaic Antenna*. Proponent Institution: Cognivent. Beneficiary Institutions: Shell International's Game Changer, US DOE. Jan. 2013.
3. Integlia, R. *Water Purification to Energy*. Proponent Institution: em[POWER] Energy Group. Beneficiary Institutions: ARPA-E. Dec. 2012.
4. Integlia, R.; Zhao, P.; Zhao, L.; Chen, J.; Shen, Q. *VoiceCrowd*. Proponent Institution: em[POWER] Energy Group. Beneficiary Institution: TigerLabs. March 2012.
5. Integlia, R.; D'Alonzo, D.; Gngang, E.; Levi-Sanchez, S. *Synergistic Media: Educational Applications*. Proponent Institution: em[POWER] Energy Group. Beneficiary Institution: Douglas Campus Administration. March 2012.
6. Cavanaugh, S.; Integlia, R.; Cavanaugh, J. *Tailored Trustworthy Spaces*. Proponent Institution: Internet Infrastructure Services Corporation; em[POWER] Energy Group. Beneficiary Institution: US Government. August 2011.
7. Jiang, W.; Integlia, R. *Hafnium Optical Ring Resonator CMOS Switch*. Proponent Institution: Rutgers University. Beneficiary Institution: NIST. August 2010.
8. Integlia, R. *Nanoperiodic Structures for Enhanced Charge Transfer and Absorption*. Proponent Institution: Rutgers University. Beneficiary Institution: Nanotechnology for Clean Energy NSF IGERT. August 2009.
9. Integlia, R.; Rishi, A.; Smith, C. *Immersion Social Gaming for Education and Awareness*. Proponent Institution: em[POWER] Energy Group. Beneficiary Institution: Rutgers University. Nov. 2009.
10. Integlia, R.; Khan, S. *Sustainable Communities and Schools through Renewable Resource Oriented Development*. Proponent Institution: em[POWER] Energy Group. Beneficiary Institution: Engineers Without Borders International. April 2008.

Books and Book Chapters

1. Levi-Sanchez, S.; Integlia, R. "New Social Media and Resistance." Routledge. September 2013.
2. Fakhoorian, T.; Integlia, R.; Shaar, H. "Lemna, Sustainability and Society." International Lemna Association. November 2014. (expected)

Professional Affiliations (Past and Present)

The International Society for Optical Engineering, Engineers Without Borders, IEEE, IEEE Intelligent Transportation Systems Society, Institute of Transportation Engineers, MIT Practitioner Program

Community Service (Past and Present)

I have served as a supporter of humanitarian aid efforts with student chapters of Engineers Without Borders, em[POWER], Princeton Global Development Network, Princeton Social Entrepreneurship Initiative and others. I have also supported professional service organizations, such as the em[POWER] Energy Group, Warm Heart, Change a Life Uganda, and others.

Robert I. MacCuspie, Ph.D.

Curriculum Vita

Work Address: Florida Polytechnic University
439 S. Florida Ave, Suite 300, Lakeland, FL 33801
Work Phone: 863-583-9093
Work Fax: 863-583-9070

Related Work Experience:

Florida Polytechnic University Lakeland, FL 2013 – present

- Director, Nanotechnology Program
- Director, Multifunctional Materials Program
- First faculty hired by Florida Poly
- Assistant Professor
College of Engineering

- Designed curriculum for Nanotechnology concentration and Multifunctional Materials concentration
- Initiated and developed Industry-University partnerships
- Led planning for laboratory instrumentation and equipment purchases for teaching and research
- Initiating Industry Advisory Board for Nanotechnology and Multifunctional Materials Programs
- Served as first faculty representative on Florida Polytechnic University's Board of Trustees
- Developed curriculum for

National Institute of Standards and Technology Gaithersburg, MD 2008 – 2013

- Research Chemist, Nanoparticle Metrology
Material Measurement Laboratory (MML), Nanomechanical Properties Group.

- Nanomaterial environmental, health & safety (nanoEHS) measurement expert
- Project management of numerous collaborative research project efforts simultaneously, with strong organizational and time-management skills
- Supervised 1 postdoc & 4 undergraduates; 2.0 years FTE total supervisory experience
- Consistently exceeded the key job performance metric by 2.5 – 3.5X annually (# of journal publications)
- Built consensus among key stakeholders from industry, government, and academia on nanoEHS risk assessment based on highest quality science (e.g., EPA, NIOSH, NCL, FDA).
- Organized 3 national conference symposia and workshops
- Scientific peer-reviewer to regulatory agencies on proposed regulatory protocols
- Initiated & led silver nanoparticle reference material product development & production
- Performed market research for planned NIST nanoscale reference materials, identified appropriate pricing and sales targets
- Communicated across an interdisciplinary team with several nationalities
- Experience with government procurements as technical expert, developed requirements, evaluated proposals
- Developed statistical models and implemented software for analyzing, mining and interpreting scientific data with greater accuracy towards underlying physical concepts
- Designed and implemented experiments to validate statistical software models
- Designed science to forecast nanomaterial transformations in complex real world conditions, such as the body or the environment
- Development and Writing of SOPs & Quality Manual Documentation
- *h*-index rose from 4 to 15 in 4.5 years; published 20 peer-reviewed manuscripts on nanoEHS issues and characterization methods; presented 11 invited talks
- Numerous media interviews as scientific expert, or media coverage of publications

Air Force Research Lab Wright-Patterson AFB (Dayton), OH 2006-2008

- NRC Postdoctoral Research Associate
Materials & Manufacturing Directorate, Nanostructured & Biological Materials Branch
- Basic research on multifunctional nanoparticle interfaces
- Developed asymmetrical functionalization of gold nanorods for self-assembly of rod-pairs.
- Developed scalable, high-purity synthesis of liquid-like nanoparticle conductive lubricants
- Enabled RF-MEMS device relay switch lifetime increase by >1000X.
- Supervised three student and junior military researchers.

Graduate School Employment:

Research Foundation – City Univ. of N.Y. New York, NY 2002-2006

- Research Assistant, Hunter College, Department of Chemistry
- Developed Impedance AFM for studying the electrical properties of single virus particles.
- Performed surface modification chemistry, purification, and materials characterization of nanotubes.
- Led technical aspects of procurement of new instruments, developed technical requirements, coordinated vendor demonstrations, evaluated vendor bids, negotiated prices.

Food & Drug Administration Bethesda, MD 2004-2006

- Guest worker, CBER/OVRR/DVP
- Developed and evaluated high-throughput, multifunctional peptide nanotube-based pathogen assay.
- 4 months total work in intermittent residence at FDA/NIH campus during 20 month period.

Hunter College New York, NY 2003-2004

- Graduate Teaching Assistant, Department of Chemistry
- Introduction to Organic Chemistry Lab

University of Central Florida Orlando, FL 2000-2002

- Class Facilitator, College of Business, Management Department
- LEAD Scholars Business Leadership (Freshman & Sophomore levels, 4 sections)
- Research Assistant, College of Arts & Sciences, Chemistry Department
- Raman microscopy of photochemical reactions
- Synthesis & characterization of porphyrin-coated self-assembling peptide nanotubes

Education:

2002 – 2006 The Graduate Center of the City Univ. of N.Y. New York, NY

Doctor of Philosophy, Nanotechnology and Materials Chemistry

“Pathogen Identification Using Peptide Nanotube Biosensors and Impedance AFM.” - Thesis Title

Master of Philosophy, Chemistry

1998 – 2002 University of Central Florida Orlando, FL

Bachelor of Science, Molecular Biology & Microbiology

Bachelor of Science, Chemistry

President’s Leadership Council, LEAD Scholars, Consultants for Effective Leadership

Awards:

- Awards for individual publications can be found in the publication list.
- Two “spot” awards for exceptional performance on specific NIST mission tasks.
- Sigma Xi member, NIST Chapter, since 2009

- Team Member – AFRL Charles J. Cleary Scientific Award Finalist – Nano-MEMS Team
- Team Member – AFOSR Star Team Status 2008-2010
- National Research Council Postdoctoral Fellowship 2006-2008
- Hunter College Gene Center Doctoral Fellowship
- NSF IGERT Fellowship - Integrative Graduate Education Research Traineeship program
- ORISE/IRTA - Postgraduate Research Participation at the U.S. Food & Drug Administration, NIH campus
- Florida Bright Futures 100% Scholarship

Professional Affiliations:

- American Chemical Society
- Materials Research Society
- ASTM International
- American Association for the Advancement of Science
- Sigma Xi – Scientific Honor Society, NIST Chapter

Mentoring of Undergraduate Students:

- NIST SURF Program (Summer Undergraduate Research Fellowship):
 - 3 years of mentoring experience (2009 – 2013)
 - 4 students formally mentored, 8 others indirectly mentored.
 - Students' research contributed to:
 - 3 accepted peer-reviewed publications (2 with students as first author).
 - 3 publications currently in prep (1 with students as first author).
 - 2 conference presentations by the students.
 - 2 honors undergraduate thesis projects.
 - Student Outcomes:
 - 3 students now enrolled in Ph.D. programs or entering in Fall 2012 (Ga Tech, Princeton, Duke).
 - 1 student employed as patent reviewer at USPTO.
 - 1 student earned a fellowship to continue research at NIST for 2 semesters of honors thesis research.
 - 2 students returned for multiple summer programs.
 - Served as application review panel member, reviewing all materials science track applicants (typically about 100 applications per summer).
 - Teaching Impact: University of New Haven Chemistry Department exploring adaptation of an honors thesis project into a physical chemistry teaching lab module
- AFRL Summer Undergraduate Interns:
 - 2 years of mentoring experience (2006 – 2008)
 - 2 students formally mentored, 5 others indirectly.
 - Student research contributed to 1 accepted peer-reviewed publication.
 - Student outcomes: 1 student currently enrolled in Ph.D. (Carnegie Mellon).

Software packages with basic proficiency or higher:

MATLAB, SigmaPlot, Origin, IgorPro, ChemBioOffice, EndNote, Reference Manager, ZetaSizer (DLS), Nanoscope (AFM), Gwyddion (AFM), Casa (XPS), Microsoft Office, Microsoft Word, Microsoft Excel, Microsoft Outlook, Microsoft Powerpoint

Training:

- XPS Instrument installation training, Kratos Analytical, onsite in Gaithersburg, MD (6/11 - 12/11, 64 hours)
- XPS/ESCA Surface Analysis Course, Dayton, OH (4/10, 24 hrs)
- National Management Association - Management Principles, Dayton, OH (5/07, 24 hrs)
- Advanced AFM training at Asylum Research Headquarters, Santa Barbara, CA (9/05, 45hrs)
- Nanolithography training at Veeco Instruments East Coast Applications Lab, Chadds Ford, PA (10/03, 4hrs)

Service-Community:

- Florida Polytechnic University Board of Trustees, 2013
- Homes for Our Troops, 2011
- Salvation Army Angel Tree, 2008 – 2010
- Habitat for Humanity, 2005 – 2008
- Relay for Life, 2000 – 2002
- LEAD Scholars Habitat for Humanity Alternative Spring Break, 2000
- JDF Walk for the Cure, 1992 – 2000
- Circle K Club, 1998 – 2001
- Key Club, 1994 – 1998, President 1997 -1998 (grew membership by 200% in one year)
- Builder's Club, 1993 - 1994
- Second Harvest Food Bank, 1992 – 1994

Publication Statistics: (as of Nov 22, 2013, data from Google Scholar)

Total Citations: 724

Papers: 33 (7 as corresponding author)

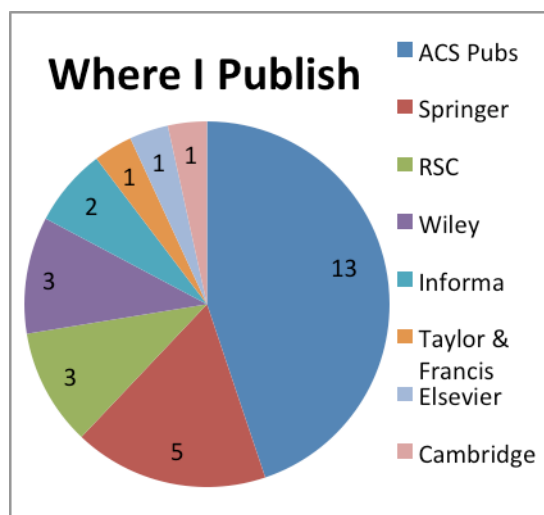
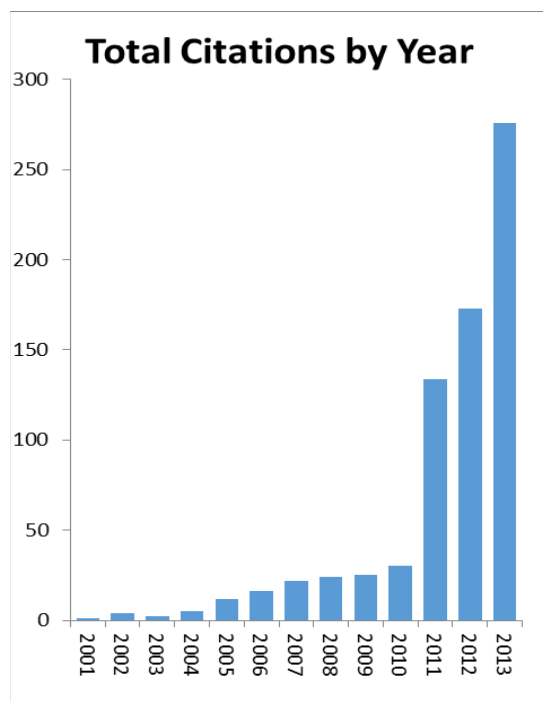
Avg. Cites/Paper: 21.9

h -Index: 17 (h papers each with h citations)

g -Index: 22 (g papers with a total of g^2 citations)

m -Index: 1.31 (h -Index / # years since first publication)

Most Cited Paper: 75 citations – Langmuir (2011), 27(6), 2464-2477. doi: 10.1021/la104124d



Peer-Reviewed Publications:

- “Just Add Water – reproducible singly dispersed silver nanoparticle suspensions.”
R.I. MacCuspie, A.J. Allen, M.N. Martin, V.A. Hackley.
Journal of Nanoparticle Research, (2013), 15, 1760.
DOI: [10.1007/s-11051-013-1760-9](https://doi.org/10.1007/s-11051-013-1760-9)

- “Interplay of surface functionalization and water chemistry on the disinfection action of silver nanoparticles.”
E.K. Fauss, R.I. MacCuspie, V. Oyanedel-Craver, J.A. Smith, N.S. Swami.
Colloids and Surfaces B: Biointerfaces, (2014), 113(1), 77-84.
DOI: [10.1016/j.colsurfb.2013.08.027](https://doi.org/10.1016/j.colsurfb.2013.08.027)
- “Refining the Statistical Model for Quantitative AFM Immunostaining of Surface-Functionalized Nanoparticles.”
R.I. MacCuspie, D.E. Gorka.
Analytical and Bioanalytical Chemistry, (2013), 405(25), 8197-8206.
DOI: [10.1007/s00216-013-7233-2](https://doi.org/10.1007/s00216-013-7233-2)
- “Pulmonary and Cardiovascular Responses of Rats to Inhalation of Silver Nanoparticles.”
J.R. Roberts, W. McKinney, H. Kan, K. Krajnak, D.G. Frazer, T.A. Thomas, S. Waugh, R.I. MacCuspie, V.A. Hackley, V. Castranova.
Journal of Toxicology and Environmental Health Part A: Current Issues, (2013), 76(11), 651-658.
DOI: [10.1080/15287394.2013.792024](https://doi.org/10.1080/15287394.2013.792024)
- “Gold Nanorod Shape Characterization by Asymmetrical Flow Field-Flow Fractionation.”
J.C. Gigault, T.J. Cho, R.I. MacCuspie, V.A. Hackley.
Analytical Bioanalytical Chemistry, (2013), 405(4), 1191-1202.
DOI: [10.1007/s00216-012-6547-9](https://doi.org/10.1007/s00216-012-6547-9)
- “Colorimetric Detection with Aptamer-Gold Nanoparticle Conjugates: Effect of Aptamer Length on Response.”
J. Chavez, R.I. MacCuspie, N. Kelley-Loughnane, M.O. Stone.
Journal of Nanoparticle Research, (2012), 14(10), 1166.
DOI: [10.1007/s11051-012-1166-0](https://doi.org/10.1007/s11051-012-1166-0)
- “UV-induced photochemical transformations of citrate-capped silver nanoparticles.”
J.M. Gorham, R.I. MacCuspie, K.L. Klein, D.H. Fairbrother, R.D. Holbrook.
Journal of Nanoparticle Research, (2012), 14(10), 1139.
DOI: [10.1007/s11051-012-1139-3](https://doi.org/10.1007/s11051-012-1139-3)
- “Tumor Necrosis Factor Interaction with Gold Nanoparticles”
D.-H. Tsai, S.R. Elzey, F.W. DelRio, R.I. MacCuspie, S. Guha, M.R. Zachariah, A.M. Keene, K.M. Tyner, J.D. Clogston, V.A. Hackley.
Nanoscale, (2012), 4(10), 3208-3217.
DOI: [10.1039/C2NR30415E](https://doi.org/10.1039/C2NR30415E)
- “Nucleation kinetics and mechanical property characterization of polyethylene glycol brushes on bare gold substrates.”
G. Stan, F.W. DelRio, R.I. MacCuspie, R.F. Cook.
Journal of Physical Chemistry B, (2012), 116(10), 3138-3147.
DOI: [10.1021/jp211256f](https://doi.org/10.1021/jp211256f)
- “*In-situ* UV/Vis, SAXS and TEM study of single phase Au Nanoparticle Growth.”
H. Koerner, R.I. MacCuspie, K. Park, R.A. Vaia.
Chemistry of Materials, (2012), 24(6), 981-995.
DOI: [10.1021/cm202633v](https://doi.org/10.1021/cm202633v)

- “Does Shape Matter? Bioeffects of Gold Nanomaterials in a Human Skin Cell Model.”
N.M. Schaeublin, L.K. Bradyich-Stolle, E.I. Maurer, K. Park, R.I. MacCuspie, A.R.M.N. Afrooz, N.B. Saleh, R.A. Vaia, S.M. Hussain.
Langmuir, (2012), 28(6), 3248-3258.
DOI: [10.1021/la204081m](https://doi.org/10.1021/la204081m)
- “Measuring gold nanoparticle agglomerate size distribution and dependence of localized surface plasmon resonance absorbance on agglomerate size using analytical ultracentrifugation.”
J.M. Zook, V. Rastogi, A.M. Keene, J. Fagan, R.I. MacCuspie.
ACS Nano, (2011), 5(10), 8070-8079.
DOI: [10.1021/nn202645b](https://doi.org/10.1021/nn202645b)
***Selected for NIST Tech Beat research highlight.**
<http://www.nist.gov/mml/biochemical/cluster-102511.cfm>
- “Measuring silver nanoparticle dissolution in complex biological and environmental matrices using UV-Visible absorbance.”
J.M. Zook, S.E. Long, D. Cleveland, C.L.A. Geronimo, R.I. MacCuspie.
Analytical and Bioanalytical Chemistry, (2011), 401(6), 1993-2002.
DOI: [10.1007/s00216-011-5266-y](https://doi.org/10.1007/s00216-011-5266-y)
- “Challenges for Physical Characterization of Silver Nanoparticles Under Pristine and Environmentally Relevant Conditions.”
R.I. MacCuspie, K. Rogers, M. Patra, Z. Suo, A.J. Allen, M.N. Martin, V.A. Hackley.
Journal of Environmental Monitoring, (2011), 13(5), 1212-1226.
DOI: [10.1039/C1EM10024F](https://doi.org/10.1039/C1EM10024F)
***HOT Article**
<http://blogs.rsc.org/em/2011/04/14/hot-article-the-silver-standard-challenges-in-characterising-the-environmental-impact-of-silver-nanomaterials/>
***Invited article for special issue on Environmental Nanotechnology.**
<http://blogs.rsc.org/em/2011/05/06/issue-5-now-online-themed-issue-on-environmental-nanotechnology/>
***Top 10 Most Downloaded Article in May & June 2011**
<http://blogs.rsc.org/em/2011/06/>
<http://blogs.rsc.org/em/2011/08/>
- “Persistence of Singly Dispersed Silver Nanoparticles in Natural Freshwaters, Synthetic Seawater, and Simulated Estuarine Waters.”
S.L. Chinnapongse, R.I. MacCuspie, V.A. Hackley.
Science of the Total Environment, (2011), 409(12), 2443-2450.
DOI: [10.1016/j.scitotenv.2011.03.020](https://doi.org/10.1016/j.scitotenv.2011.03.020)
- “Humic Acid-Mediated Silver Nanoparticle Formation Under Environmentally Relevant Conditions.”
N. Akaighe, R.I. MacCuspie, D.A. Navarro, D.S. Aga, S. Banerjee, M. Sohn, V.K. Sharma.
Environmental Science & Technology, (2011), 45(9), 3895-3901.
DOI: [10.1021/es103946g](https://doi.org/10.1021/es103946g)
***NIST Homepage News’ Top Article 5/10/11.**
***Selected for NIST Tech Beat research highlight.**
<http://www.nist.gov/mml/ceramics/silver-051011.cfm>

- “Antibody-Mediated Self-Limiting Self-Assembly for Quantitative Analysis of Nanoparticle Surfaces by Atomic Force Microscopy.”
C.L.A. Geronimo, R.I. MacCuspie.
Microscopy and Microanalysis, (2011), 17(2), 206-214.
DOI: [10.1017/S1431927610094559](https://doi.org/10.1017/S1431927610094559)
- “Newkome type dendron stabilized gold nanoparticles: Syntheses, reactivity, and stability.”
T.J. Cho, R.A. Zangmeister, R.I. MacCuspie, A.K. Patri, V.A. Hackley.
Chemistry of Materials, (2011), 23(10), 2665-2676.
DOI: [10.1021/cm200591h](https://doi.org/10.1021/cm200591h)
***NIST Homepage News’ Top Article 6/21/11.**
***Selected for NIST Tech Beat research highlight.**
<http://www.nist.gov/mml/ceramics/nanoparticle-062111.cfm>
- “Adsorption and Conformation of Serum Albumin Protein on Gold Nanoparticles Investigated using Dimensional Measurements and *In Situ* Spectroscopic Methods.”
D.-H. Tsai, F.W. DelRio, A.M. Keene, K.M. Tyner, R.I. MacCuspie, T.J. Cho, M.R. Zachariah, V.A. Hackley.
Langmuir, (2011), 27(6), 2464-2477.
DOI: [10.1021/la104124d](https://doi.org/10.1021/la104124d)
- “Colloidal Stability of Silver Nanoparticles Under Biologically Relevant Conditions.”
R.I. MacCuspie.
Journal of Nanoparticle Research, (2011), 13(7), 2893-2908.
DOI: [10.1007/s11051-010-0178-x](https://doi.org/10.1007/s11051-010-0178-x)
- “Stable nanoparticle aggregates / agglomerates of different sizes and the effect of their size on hemolytic cytotoxicity.”
J.M. Zook, R.I. MacCuspie, L.E. Locassio, M.D. Halter, J.T. Elliot.
Nanotoxicology, (2011), 5(4), 517-530.
DOI: [10.3109/17435390.2010.536615](https://doi.org/10.3109/17435390.2010.536615)
***Selected for NIST Tech Beat research highlight.**
<http://www.nist.gov/mml/biochemical/nanoparticles-020111.cfm>
- “Dispersion Stabilization of Silver Nanoparticles in Synthetic Lung Fluid Studied Under *In Situ* Conditions.”
R.I. MacCuspie, A.J. Allen, V.A. Hackley.
Nanotoxicology, (2011), 5(2), 141-157.
DOI: [10.3109/17435390.2010.504311](https://doi.org/10.3109/17435390.2010.504311)
- “Competitive Adsorption of Thiolated Polyethylene Glycol and Mercaptopropionic acid on Gold Nanoparticles Measured by Physical Characterization Methods.”
D.-H. Tsai, F.W. DelRio, R.I. MacCuspie, T.J. Cho, M.R. Zachariah, V.A. Hackley.
Langmuir, (2010), 26(12), 10325-10333.
DOI: [10.1021/la100484a](https://doi.org/10.1021/la100484a)
- “Purification – Chemical Structure – Electrical Property Relationship in Gold Nanoparticle Liquids.”
R.I. MacCuspie, A.M. Elsen, S.J. Diamanti, S.T. Patton, I. Altfeder, J.D. Jacobs, , A.A. Voevodin, R.A. Vaia.
Applied Organometallic Chemistry, (2010), 24(8), 590-599.
DOI: [10.1002/aoc.1632](https://doi.org/10.1002/aoc.1632)

- “Optical Properties of Rodlike Metallic Nanostructures: Insight from Theory and Experiment.”
J. Duan, K. Park, R.I. MacCuspie, R.A. Vaia, R. Pachter.
Journal of Physical Chemistry C, (2009), 113(35), 15524-15532.
DOI: [10.1021/jp902448f](https://doi.org/10.1021/jp902448f)
- “Comparison of Electrical Properties of Viruses Studied by AC Capacitance Scanning Probe Microscopy.”
R.I. MacCuspie, N. Nuraje, S.-Y. Lee, A. Runge, H. Matsui.
Journal of the American Chemical Society, (2008), 130(3), 887-891.
DOI: [10.1021/ja075244z](https://doi.org/10.1021/ja075244z)
- “Virus Assay Using Antibody-Functionalized Peptide Nanotubes.”
R.I. MacCuspie, I.A. Banerjee, C. Pejoux, H.S. Mostowski, S. Gummalla, P.R. Krause, H. Matsui.
Soft Matter, (2008), 4, 833-839.
DOI: [10.1039/b714470a](https://doi.org/10.1039/b714470a)
- “Nanoparticle-Wetted Surfaces for Relays and Energy Transmission Contacts.”
A.A.Voevodin, R.A. Vaia, S.T. Patton, S. Diamanti, M. Pender, M. Yoonessi, J. Brubaker, J.J. Hu, J.H. Sanders, B.S. Phillips, R.I. MacCuspie.
Small, (2007), 3(11), 1957-1963.
DOI: [10.1002/smll.200700500](https://doi.org/10.1002/smll.200700500)
- “Self-Assembly of Au Nanoparticle-containing Peptide Nano-rings on Surfaces.”
N. Nuraje, K. Su, J. Samson, A. Haboosheh, R.I. MacCuspie, H. Matsui.
Supramolecular Chemistry, (2006), 18(5), 429-434.
DOI: [10.1080/1061580060059196](https://doi.org/10.1080/1061580060059196)
***Invited article.**
***9th Most Downloaded Article in Supramolecular Chemistry for 2006.**
- “Controlled Growth of Se Nanoparticles on Ag Nanoparticles in Different Ratios.”
X. Gao, L. Yu, R. MacCuspie, H. Matsui.
Advanced Materials, (2005), 17(4), 426-429.
DOI: [10.1002/adma.200400898](https://doi.org/10.1002/adma.200400898)
- “Thiolated Peptide Nanotube Assembly as Arrays on Patterned Au Substrates.”
I.A. Banerjee, L. Yu, R.I. MacCuspie, H. Matsui.
Nano Letters, (2004), 4(12), 2437-2440.
DOI: [10.1021/nl0484503](https://doi.org/10.1021/nl0484503)
- “Biological bottom-up assembly of antibody nanotubes on patterned antigen arrays.”
N. Nuraje, I.A. Banerjee, R.I. MacCuspie, L. Yu, H. Matsui.
Journal of the American Chemical Society, (2004), 126(26), 8088-8089.
DOI: [10.1021/ja048617u](https://doi.org/10.1021/ja048617u)
***1st Most Accessed Article in JACS for calendar year 2007.**
***7th Most Accessed Article in JACS for 3rd quarter 2007.**
- “Metalloporphyrin Nanotube Fabrication Using Peptide Nanotubes as Templates.”
H. Matsui, R. MacCuspie.
Nano Letters, (2001), 1(12), 671-675.
DOI: [10.1021/nl0156080](https://doi.org/10.1021/nl0156080)

Publications submitted and in prep:

- “Storage Wars: The effect of storage conditions on the shelf life of citrate capped silver nanoparticle suspensions - Guidelines towards best practices.”
J.M. Gorham, A. Rolhfig, [R.I. MacCuspie](#), R.D. Holbrook.
Journal of Nanoparticle Research, submitted.
- “Characterization of Nanomaterials for Environmental, Health & Safety Risk Assessment.”
[R.I. MacCuspie](#)
Chapter 4 in 2nd edition of *Nanotechnology, Environmental Health and Safety: Risks, Regulation and Management*, eds. M. Hull & D. Bowman, in prep for 2014 release
- “Quantifying the persistence of noble metallic nanoparticles (MetNPs) in aqueous matrices.”
M.S. Hull, [R.I. MacCuspie](#), P.J. Vikesland.
Environmental Science & Technology, submitted.
- “Capabilities of Single Particle Inductively Coupled Plasma Mass Spectrometry for the Size Measurement of Nanoparticles: A Case Study on Gold Nanoparticles”
J. Liu, K.E. Murphy, [R.I. MacCuspie](#), M.R. Winchester.
Analytical Chemistry, submitted
- “Quantitative Analysis of Enzyme-Functionalized Gold Nanoparticles: Towards Determining Nanomedicine Efficacy by Comparing Enzymatic Activity and Antibody Recognition.”
D.E. Gorka, N.O. Savage, [R.I. MacCuspie](#).
Journal of Nanoparticle Research, In prep.

U.S. Patent:

- #7,768,366. “Nanoparticles and Corona Enhanced MEMS Switch Apparatus.”
S.T. Patton, J.H. Sanders, A.A. Voevodin, M. Pender, R.A. Vaia, R.I. MacCuspie, S.J. Diamanti.
Application Submitted October 29, 2007, Issued Aug 3, 2010.

Conference Sessions & Workshops Organized:

- [Environmental Safety and Occupational Health Issues for Nanomaterials](#)
2011 NT4D, Bellevue, WA, Oct 24-27, 2011.
Lead Symposium Organizer
- [RR-Interdisciplinary Approaches to Safe Nanotechnologies](#)
Fall 2010 Materials Research Society Meeting, Boston, MA, Nov 29-Dec2, 2010.
Lead Symposium Organizer
- *NIST-US Army Corp ERDC Nano Silver Workshop*, Vicksburg, MS, Apr 7-8, 2009.
Workshop Co-Organizer
- Hierachically Ordered Materials
Fall 2007 American Chemical Society National Meeting, Boston, MA.
Session Chair

Invited Talks:

- “Silver nanoparticle metrology for predicting environmental transformations”
Mid-Atlantic Regional Meeting of the American Chemical Society, Baltimore, MD (May 31, 2012)
R.I. MacCuspie
- “Silver Nanoparticle Structure-Property Relationships for Environmental Health and Safety Studies”
University of New Haven, New Haven, CT (Apr 18, 2012)
R.I. MacCuspie
[*New Haven Independent NanoBlog article about this talk](#)
- “Silver Nanoparticle Structure-Property Relationships for Environmental Health and Safety Studies”
Brown University, Providence, RI (Apr 17, 2012)
R.I. MacCuspie
- “Metrology’s role in enabling greener nanotechnologies: The case of silver nanoparticles”
American Chemical Society 2012 Spring National Meeting, San Diego, CA (Mar 28, 2012)
R.I. MacCuspie, *et al.*
- “Measuring n-Ag in complex media and inter-comparison of results”
[NanoRelease Workshop, ILSI Research Foundation](#), US EPA Potomac Yard, Arlington, VA (May 10, 2011)
R.I. MacCuspie
- “Advanced techniques for the characterization and risk assessment of silver nanoparticles”
Virginia Commonwealth University, Richmond, VA (Nov 18, 2010)
R.I. MacCuspie
- “Physico-chemical characterization of nanoparticles in relevant conditions” – Rapid Fire Talk & Discussion Panel
[Greener Nano 2010](#), Portland, OR (Jun 17, 2010)
R.I. MacCuspie
- “Silver Nanoparticles”
NIST NanoBioTox Symposium Series, Gaithersburg, MD (Jun 15, 2010)
R.I. MacCuspie.
- “Measurement Needs and Research Progress Towards Removing Barriers for Environmental, Health, and Safety Assessment of Silver Nanoparticles”
University of Virginia, Charlottesville, VA (Apr 2, 2010)
R.I. MacCuspie
- “Barriers to the Environmental, Health, and Safety Assessment of Silver Nanoparticles”
American Chemical Society 2010 Spring National Meeting, San Francisco, CA (Mar 21, 2010)
V.A. Hackley, R.I. MacCuspie
- “Barriers to the Environmental, Health, and Safety Assessment of Silver Nanoparticles”
Environmental Protection Agency, Office of Pesticide Products, Arlington, VA (Sep 29, 2009)
R.I. MacCuspie, V.A. Hackley

Media Coverage:

- NIST Press Releases / Tech Beat coverage on 4 journal articles:
<http://www.nist.gov/mml/biochemical/nanoparticles-020111.cfm>

<http://www.nist.gov/mml/ceramics/nanoparticle-062111.cfm>

<http://www.nist.gov/mml/ceramics/silver-051011.cfm>

<http://www.nist.gov/mml/biochemical/cluster-102511.cfm>

- Quoted in C&EN for expert opinion
<http://cen.acs.org/articles/89/i43/Shedding-Nanoparticles.html>
<http://cen.acs.org/articles/90/i30/Nanosilver-Zaps-Germs0.html>
- Blog Coverage
[New Haven Independent NanoBlog about University of New Haven invited talk](#)
[Royal Society of Chemistry Hot Article Blog](#)
[Journal of Environmental Monitoring Blog – Special Issue on Environmental Nanotechnology](#)
[Journal of Environmental Monitoring Blog – Top Ten Viewed Articles May 2011](#)
[Journal of Environmental Monitoring Blog – Top Ten Viewed Articles June 2011](#)

Susan LeFrancois, PhD

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Lakeland, FL 33803
863-398-4672

slefrancois@me.com

SUMMARY OF QUALIFICATIONS

Ambitious and multifaceted professional with experience in education and the quality and regulatory field. Creative and technology driven teacher. Proven experience in establishing and maintaining a quality system that is FDA and ISO compliant. Strong background in science and the healthcare industry. Effective communicator with individuals at every organizational level and outside regulatory agencies.

EXPERIENCE

AP Chemistry, Honors Chemistry and Chemistry Teacher, All Saints' Academy, Winter Haven, Florida

July 2013 – Present

All Saints' Academy is an independent private school that spans grades PreK- 12th grade. Primary responsibilities include:

- Creating a curriculum for AP Chemistry, Honors Chemistry and Chemistry classes.
- Creating laboratories for AP Chemistry, Honors Chemistry and Chemistry classes.
- Contributed to the All Saints' Academy Summer Science Program, MERIT, by providing lecture, lab and organization of on-site industry visits.

Associate Professor, Florida Polytechnic University, Lakeland, Florida Present

Florida Polytechnic University is the newest Florida University with experiential learning based curriculum in Engineering and Applied Sciences.

- Establishing the curriculum for the Science Program at FPU. This program includes a Logistics concentration and a Materials and Supply Chain Management concentration.
- Creating industry ties with Florida Polytechnic University.

Director of Quality Assurance and Regulatory Affairs, FTSI, Mulberry, Florida February 2005 – July 2013

FTSI is a contract gamma sterilizer that focuses on the sterilization of medical devices and tissue. I was the first individual to occupy this position at FTSI. Primary responsibilities include:

- Acted as the Management Representative in three FDA audits conducted at FTSI in 2006 and 2010
- ISO audits, I was the main auditor in 7 ISO 13485 audits conducted by third party auditor SGS
- Radiation Safety Officer
- Document Control Manager
- Direct management of Operators and Material handlers
- Establishment and Management of Shipping
- Main Technical Assistance to Customers; assistance with materials compatibility, assistance with validation, assistance with research projects that requires special handling
- Main Customer Contact; customer service, quotes, requesting payment, adjusting POs
- Creation of the Risk Management program
- Calibration of Instrumentation
- Project manager for updating Access software program

**University of South Florida Adjunct Instructor, Tampa, Florida
January 2008 - Present**

- Adjunct instructor for University of South Florida's Industrial and Management Systems Engineering Department. This program provides a graduate certificate in medical device and regulatory affairs. I have taught the Regulatory Products Approval Process class which encompasses the steps to prepare and submit a 510K and PMA submission and International regulations for medical devices.

**Interdisciplinary Core Course Teaching Assistant, Gainesville,
Florida August 2003 - December 2003**

- As a teaching assistant, during my graduate school work, I taught a journal club course to incoming graduate students. This journal club would assign a scientific article in a peer reviewed journal, the students would read through the article and explain the findings as well as criticize the work. My role was to help the students understand the experiments and information that was presented in the article.

Education

**University of Florida, Gainesville, Florida - PhD (Pharmacology/Physiology),
2004**

University of South Florida, Tampa, Florida - BA (Chemistry), 1999

PROFESSIONAL SOCIETIES

- Member of AAMI (Association for the Advancement of Medical Instrumentation), 2005- Present
- Member of the International Society on Toxinology, 2001-2004
- Member of the Society for Neuroscience, 2002-2004

INTERNSHIPS AND AWARDS

Graduate Research Assistant for University of Florida, Gainesville, Florida August 2000 - December 2004

- Presented gathered research using Powerpoint to fellow students and professors, performed radio-ligand binding assays, cell culture, High Performance Liquid Chromatography and spectrophotometry. This experience has enabled me to gain knowledge in calibrating and maintaining equipment for use in a laboratory and industrial environment.

Laboratory Assistant for Saint Joseph's Hospital, Tampa, Florida August 1999- July 2000

- Prepared blood, serum, fecal, sputum and urine samples for further testing in the laboratory facility. At this position I interacted with laboratory staff, nurses, doctors and patients. I entered patient information into the computer system and communicated test results to hospital employees. This experience enabled me to be involved in the inner workings of a hospital and to learn how to communicate with clinical personnel.

Medical Guild Research Incentive Award, University of Florida, Gainesville, Florida December 2001

- This award required creation of an abstract which detailed an original experiment to be attempted in the laboratory. This experiment was centered around the dissertation material of the student which in my case was the use of derivatives of a marine worm toxin. These derivatives were used to alter a particular receptor in the brain which effected Alzheimer's disease.

Alumni Fellowship Award for the University of Florida, Gainesville, Florida August 2000

- This award was given to students entering the University of Florida Interdisciplinary Sciences Graduate program with above average GRE scores. This award paid for all student fees and salary during the course of the graduate program.

Anas Salah Eddin

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Miami, FL 33193
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EDUCATION

Ph.D. Electrical Engineering, Florida International University, December 2013

GPA: 3.81/4.00

Dissertation: *Network construction and graph theoretical analysis of functional language networks in pediatric epilepsy*

M.S. Biomedical Engineering, Florida International University, April 2009

GPA: 3.89/4.00

Thesis: *Text entry using language modeling with eye tracking as an assistive tool for persons with motor disability*

B.S. Biomedical Engineering, Damascus University, October 2005

ACADEMIC EXPERIENCE

Assistant Professor (January 2014, Florida Polytechnic University; College of Innovation and Technology – Lakeland, FL)

- Developed electrical engineering, computer engineering and advanced technology curricula for undergraduate and graduate concentrations including Digital & Hybrid Systems, Control Systems, Electrodynamics and Health Informatics
- Established an interdisciplinary and collaborative research environment in the electrical engineering and advanced technology departments
- Supported collaborative educational and research grant development for external funding opportunities

Invited Lecturer (Spring 2012 – 2013, Florida International University; Department of Electrical and Computer Engineering – Miami, FL)

- Lectured at the EEL 6821 Computer Vision graduate class

Graduate Research Trainee (Summer 2011, McGill University; Montreal Neurological Institute and Hospital – Montréal, QC, Canada)

- Wrote scripts to improve an automatic brain masking algorithm
- Tested the improved brain masking algorithm and analyzed the results

Research Assistant (2009-2013, Florida International University; Center for Advanced Technology and Education – Miami, FL)

- Conducted functional brain network research in pediatric epilepsy, a collaborative studies with several hospitals across the US and Canada
- Conducted Independent Component Analysis Research
- Administered a multi-site pediatric network for fMRI in childhood Epilepsy (mri-cate.fiu.edu)
- Reviewed scientific papers
- Transferred the lab's website (cate.fiu.edu) to a content management system (Drupal)

AWARDS, SCHOLARSHIPS

1. **Best Paper Award (2013)** – The 6th International IEEE EMBS Neural Engineering Conference
2. **Cyberinfrastructure Partnerships for International Research and Education Fellowship (2011)** - Florida International University, College of Engineering and Computing
3. **1st place poster winner (2011)** – Yearly Scholarly Forum, Biomedical Studies Category, Florida International University
4. **Outstanding Graduate Award (2009)** - Florida International University, College of Engineering and Computing
5. **The Fulbright Scholarship (2007-2009)** –United States Department of State, Bureau of Educational and Cultural Affairs

CERTIFICATES & PROFESSIONAL TRAININGS

1. Teaching Assistant Training, Florida International University, Miami, FL – USA, August 2008
2. Professional Selling Training, Alliance Human Performance Development, Damascus - Syria, June 2006
3. Symposium on Breastfeeding Knowledge (Medela), Amman – Jordan, May 2006
4. Suction Technology Product Training (Medela), Baar – Switzerland, February 2006
5. Neonatology Product Training (Medela), Baar – Switzerland, February 2006
6. Breastfeeding Product Training (Medela), Baar – Switzerland, February 2006
7. Neonatology Product Training (Medela) Baar – Switzerland, February 2006
8. Cardiac and Monitoring Systems Training (Philips Medical Systems), Amman – Jordan, August 2005
9. Marketing & Advertising Certificate, Damascus – Syria, March 2005
10. International Computer Driving License, UNESCO Cairo Office, February 2005

REVIEWER

1. Abstracts sub review for the 19th Annual Meeting of the Organization for Human Brain Mapping
2. Article sub review for IEEE Transactions on Information Technology in Biomedicine
3. Articles sub review for The 23rd International Conference on Software Engineering and Knowledge Engineering
4. Articles sub review for the 9th International Conference on Service Oriented Computing
5. Articles sub review for the 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing

PROFESSIONAL EXPERIENCE

Sales Support Engineer (2005-2006, SINANCO – Damascus, Syria)

- Prepared all tender documents for Philips's Cardiac and Monitoring Systems (CMS), Medela's Suction pumps, Breastfeeding devices, and Phototherapy units
- Priced products
- Answered technical inquiries
- Designed computer database to manage SINANCO contracts and maintenance schedules
- Trained medical staffs to operate cardiac systems

Intern (Engineer) (Summer 2004, Medical Engineering Office – Damascus, Syria)

- Estimated the cost of installing new Medical Gas Systems in hospitals
- Translated technical datasheets (English-Arabic)

LEADERSHIP EXPERIENCE

Graduate Student Senator at Florida International University (2012-2013)

- Oversaw the budget (\$280,000)
- Administered university-wide graduate research and conference funding

- Organized academic / non-academic events for graduate students
- Planned the Graduate Week of Welcome and Graduate Student Appreciation Week
- Served as a Liaison between GPSC and National Association of Graduate-Professional Students (NAGPS)

President of The Outdoors Graduate Students Club (TOGSC) at Florida International University (TOGSC, 2011-2013)

- Founded the club, established its rules and procedures
- Collaborated with other schools and departments
- Planned non-academic activities for graduate students
- Managed financial documents (\$3,000 budget)

CSO Representative for the Modern Languages Graduate Student Organization at Florida International University (MLGSO, 2009-2013)

- Represented MLGSO at Council for Student Organizations (CSO)
- Planned Research Field Trips (Tampa, FL; St. Augustine, FL; Key West, FL; Savannah, GA)
- Managed financial documents (\$5,000 budget)

Secretary for the Graduate Students Association at Florida International University (GSA/FIU, 2008-2009)

- Fostered academic and social interaction among FIU Graduate Student population (6,000)
- Developed cooperative programming plans with over 20 Graduate Student Organizations and departments of the University
- Helped managing the organization's budget (\$120,000)
- Organized and planned monthly socials for graduate students, field trips, executive boards travels
- Participated in the planning of Yearly Scholarly Forum (Graduate Students)

PUBLICATIONS

1. Sargolzaei, S., Cabrerizo, M., Goryawala, M., **Salah Eddin, A.**, Adjouadi, M., 2013. Functional Connectivity Network based on Graph Analysis of Scalp EEG for Epileptic Classification. To be presented at the IEEE Signal Processing in Medicine and Biology Symposium (SPMB13).
2. **Salah Eddin, A.**, Wang, J., Wensong, W., Sargolzaei, S., Bjornson, B., Jones, R.A., Gaillard, W.D., Adjouadi, M., 2013. The Effects of Pediatric Epilepsy on a Language Connectome. Submitted
3. **Salah Eddin, A.**, Wang, J., Sargolzaei, S., Gaillard, W.D., Adjouadi, M., 2013. ICA-based connectivity on Brain Networks using fMRI. In Proceedings of the 6th International IEEE EMBS Conference on Neural Engineering, pp. 391-394, November 6-8, 2013, San Diego, CA.
4. Sargolzaei, S., **Salah Eddin, A.**, Cabrerizo, M., Adjouadi, M., 2013. Resting State Functional Connectivity Based on Principal Component Transformation of Cortical fMRI Measurements. In Proceedings of the 6th International IEEE EMBS Conference on Neural Engineering, pp. 1501-1504, November 6-8, 2013, San Diego, CA.
5. Wang, J., **Salah Eddin, A.**, Zhou, Q., Gaillard, W.D., Adjouadi, M., 2013. Discriminating regional functional networks in pediatric epilepsy. In Proceedings of the 6th International IEEE EMBS Conference on Neural Engineering, pp. 1513-1516, November 6-8, 2013, San Diego, CA.
6. **Salah Eddin, A.**, Sargolzaei, S., Wang, J., Gaillard, W.D., Adjouadi, M., 2013. Small-world connectivity in FMRI based functional language networks using ICA in pediatric epilepsy. Presented at the 19th Annual Meeting of the Organization for Human Brain Mapping. June 16, 2013. Seattle, WA.

7. Tarquinio, D., **Salah Eddin, A.**, Diaz, M., Stewart, T. 2012. Retrospective subdural EEG source localization of the ictal onset zone in pediatric epilepsy surgery”. Presented at the 2012 Annual Meeting of the American Epilepsy Society. December 3, 2012. San Diego, CA.
8. **Salah Eddin, A.**, Wang, J., Adjouadi. M., 2012. Rest state fMRI extraction from task-driven data using independent component analysis. Presented at the 2012 SACNAS National Conference. October 11-14, 2012. Seattle, WA.
9. Delgado, J., **Salah Eddin, A.**, Sadjadi, S.M., Adjouadi. M., 2012. Deadline-Driven Medical Job Scheduling on Virtualized Systems. Presented at the 2012 SACNAS National Conference. October 11-14, 2012. Seattle, WA.
10. **Salah Eddin, A.**, Adjouadi, M., 2011. Improvement of Automatic Brain Masking by Machine Learning. Presented at the 2011 Latin American Grid Summit. Nov. 4, 2011. Boca Raton, FL.
11. Delgado, J., **Salah Eddin, A.**, Adjouadi, M., Sadjadi, S.M., 2011. Paravirtualization for Scientific Computing: Performance Analysis and Prediction”. In Proceedings of the 2011 IEEE International Conference on High Performance Computing and Communications (HPCC '11), pp. 536-543, Banff, AB, Canada, 2011.
12. **Salah Eddin, A.**, Adjouadi, M., 2010. An Assistive Technology Tool for Text Entry Based on N-gram Statistical Language Modeling. Presented at CAHSI, Fourth Annual Poster Session. April 5, 2010, Redmond, WA.

OTHER CONFERENCE & SEMINAR PRESENTATIONS

1. **NAGPS Regional Conference (2012)** - National Association of Graduate-Professional Students, Duke University, Durham, NC; “Fostering Interdisciplinary Collaboration Through Academic and Non-Academic Events”
2. **Computing Alliance of Hispanic-Serving Institutions (CAHSI) Fourth Annual Meeting (2010)** – Graduate student panelist on “How to Prepare and Make Yourself Marketable”, Microsoft - Redmond, Washington
3. **NAGPS Regional Conference (2010)** - National Association of Graduate-Professional Students, Florida International University, Miami, FL; “NAGPS: Representing Graduate and Professional Students since 1987”
4. **NAGPS Regional Conference (2009)** - National Association of Graduate-Professional Students, University of Alabama, Tuscaloosa, AL; “Fostering Collaboration Between Graduate Student Organizations and Graduate Student Association”
5. **SHAM Technical Fair (2005)** – “Calculation of Shielding Material in X-Ray Rooms” (senior design project), Damascus University section, Damascus, Syria

ORGANIZATIONS

1. Member, Institute of Electrical and Electronics Engineers (IEEE) (2013-present)
2. Member, IEEE Engineering in Medicine & Biology Society (EMBS) (2013-present)
3. Member, Organization for Human Brain Mapping (OHBM) (2013-present)
4. Member of Student Senate, Florida International University (2012-2013)
5. Member, Order of the Engineer, Florida International University (2009- present)
6. Member, Order of Damascus Engineers, Damascus Syria (2005-present)

SESHA S. SRINIVASAN, Ph.D.

204 Harmon Drive, Auburn, AL 36832

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OBJECTIVES AND BACKGROUND

A proven researcher, educator and dynamic team leader, an expert in solid state materials' development, will provide technical leadership through innovative and new directions in various areas of inorganic complexes, alloys, hard and soft materials, non-crystalline systems, composites, hydrides and nanoparticles for clean energy, environmental and biomedical applications. Experienced educator has taught all levels of undergraduate and graduate courses in Physical Sciences, Fundamental/ Applied Physics, Materials' Physics, Nanotechnology and Engineering Ethics. A self motivated individual, capable to work on multiple projects and deadlines, competent to meet the workplace challenges and complex tasks with positive and friendly attitude.

AREAS OF EXPERTISE / INTERESTS

<input type="radio"/> Solid State Physics	<input type="radio"/> Renewable Energy	<input type="radio"/> Photocatalysis
<input type="radio"/> Materials Science	<input type="radio"/> Intermetallic Alloys	<input type="radio"/> DFT/ab-initio Studies
<input type="radio"/> Inorganic Chemistry	<input type="radio"/> Hydrogen Storage	<input type="radio"/> Nanotechnology
<input type="radio"/> Multifunctional Materials	<input type="radio"/> Solar Thermal	<input type="radio"/> Biomedical/Nano-bio

PROFESSIONAL EXPERIENCE

August 2014	Assistant Professor, College of Innovation & Technology, FL Poly Univ FL
Jan-Aug 2014	Adjunct Professor, College of Innovation & Technology, FL Poly Univ. FL
2009 – 2014	Assistant Professor Department of Physics, Tuskegee University, AL
2010 - Present	Visiting Res. Associate Clean Energy Research Center, USF, Tampa, FL
2008 – 2009	Associate Director Florida Energy Systems Consortium, USF, Tampa
2007 – 2009	Research Asst. Prof. Clean Energy Research Center, USF, Tampa, FL
2008 – 2009	Adjunct Instructor ITT Technical Institute Clearwater, FL
2004 – 2007	Sr. Research Scientist Clean Energy Research Center, USF, Tampa, FL
2002 – 2004	Post Doctoral Fellow Department of Chemistry, U. of Hawaii, Honolulu
2000 – 2001	Senior Research Fellow (CSIR), Department of Physics, BHU, India

EDUCATION

2008	University of South Florida, USA Certification in Materials Science & Characterization
2000	Banaras Hindu University, India Ph.D. Solid State and Condensed Matter Physics
1993	Bharathidasan University, India M.S. Physics (Solid State Electronics)
1991	Bharathidasan University, India B.S. Physics (Major), Chemistry (Ancillary)
1996	Aptech Computer Education, India Honors Diploma in Software Engineering

ACCOMPLISHMENTS:

Oct. 2013	<i>Innovation for Patent Disclosure</i> on “Universal Tune-in Photocatalytic Reactor for Fuel Generation and Air Detoxification” approved by the Intellectual Property Committee of Tuskegee University and forwarded for provisional patent application by the attorney (October 18, 2013).
Sept. 2013	Principal Investigator from Tuskegee University with other partner institutions University of Central Florida and University of Hawaii <i>won a University Transportation Center</i> proposal of \$1.5M/year for four years (2013-2017).
May 2013	<i>USPTO Patent Awarded</i> , Patent # 8,440,100 – Title: Method of Generating Hydrogen-Storing Hydride Complexes, Sessa Srinivasan, Michael Niemann,

- Yogi Goswami, Elias Stefanakos, University of S. Florida, Tampa, FL – May 14, 2013.
- 2013-2014 Faculty Mentor for *Undergraduate Research Grants* awarded from American Institute of Physics (Sigma Pi Sigma) and Alabama Academy of Science (\$5K)
- 2012-2016 Research Investigator and Faculty Mentor for the \$25M *USAID-HED project* (PI: Dr. Nosa Egiebor, Tuskegee University), for the Tuskegee University-2iE Burkina Faso international collaborative project.
- 2012-2013 Co PI – Visible light photocatalysis for the production of hydrocarbon fuel from Sunlight assiste CO₂ Photo-reduction – *National Science Foundation* - \$95K
- April 2012 *USPTO Patent Awarded*, Patent # 8,153,020 – Title: Hydrogen Storing Hydride Complexes, Sesha Srinivasan, Michael Niemann, Yogi Goswami, Elias Stefanakos, University of South Florida, Tampa, FL, USA – April 10, 2012.
- 2011-2012 Principal Investigator - *Small Grant for Exploratory Research* (SGER) - \$15K BP Oil Spill proposal funded by Dauphin Island Sea Lab
- 2011-2012 Principal Investigator - Marine Environment Systems Consortium (MESC) seed grant \$23K for the *BP Oil Spill* proposal funded by Dauphin Island Sea Lab
- 2010-2011 Principal Investigator - *Office of Naval Research – DURIP* acquisitions grant of \$250K to establish a state-of-the-art laboratory at the Tuskegee University
- 2010–2012 Project Consultant - *Florida Hydrogen Initiative* (FHI) grant of \$20K as a consultation from University of South Florida, Tampa, FL (PI: Elias Stefanakos)
- 2009-2012 Faculty Mentor and PI – *Undergraduate Research Grant* awarded \$1000 by Alabama Academy of Science to support students for innovative research
- 2007-2009 Co-Principal Investigator - *Post Doctoral research grant* of \$150K from QuantumSphere Inc.- Project Title: QSI nanocatalysts for reversible hydrogen storage
- 2004-2009 Associate Director and Team Lead to manage and implement \$15M research grants – US DOE and *Florida Energy Systems Consortium* (FESC)

PROFESSIONAL ACTIVITIES (COMMITTEES, REVIEWER, PANELIST (2008-2012))

- 2013- Faculty Liaison for Tuskegee Center for Academic Excellence and Innovative Learning
- 2013- Panel Reviewer to evaluate the proposal for *Qatar National Research Fund* (Q NRF)
- 2013- Panelist to evaluate the proposals for *NDSEG and SMART* grants funded by DOD.
- 2013- Editorial Board Member - *Open J. of Functional Materials Research, Open J. of Advanced Materials Research, Physics and Technical Sciences, J. of Condensed Matter Physics.*
- 2012- Book Reviewer – Energy, Environment and Sustainability by Saeed Moaveni, *Cengage Publications*
- 2012- Editorial Board Member *Datasets International in Materials Science* (On Invitation)
- 2012 Online Panel Reviewer for the *SMART Graduate Fellowship* for the Office of Science, Department of Energy,
- 2010- Co-Director *Tuskegee University Energy and Environmental Research Unit* (TUE2RU)
- 2011- Advisor, Tuskegee University Center for Academic Excellence and Innovative Learning
- 2011 Book Reviewer: Chapter 10 – Physical Sciences by Bill Tillary, 10th Edition – *McGraw Hill Publications* – (Special Invitation from the Publisher),
- 2010 Proposal Reviewer and Panelist – *National Science Foundation* – Catalysis and biocatalysis division (CBET).
- 2010- Member *Six Sigma Quality Committee*, College of Engineering, Tuskegee University
- 2009- *Web Content Editor* Physics Department Website, Tuskegee University
- 2010 *Vice Chair* Physics Section of the Alabama Academy of Sciences
- 2009 Proposal reviewer for University of Wyoming *Clean Coal Technologies Research*, Wyoming.
- 2008 Associate Director Univ. South Florida's *Florida Energy Systems Consortium* (FESC)

2008 Reviewer and Evaluator of an invention for *Tampa Bay News 10 Channel*: Evaluated the project on perpetual power with self-regenerating hydrogen reactor, Tampa, FL.
2008– Editorial Board *Bentham Open Access Journal “Renewable Energy”* (Invited)

CONTRACTS, GRANTS AND CONSULTATION EXPERIENCE

2013-2017 *Department of Transportation* (DOT), PI - \$600,000.00 EV Transportation Center
2012-2014 *National Science Foundation* (NSF-EAGER), Co-PI - \$110,000.00 Photocatalysis
2010-2012 *Office of Naval Research* (ONR), PI - \$250,000.00 – Acquisition Grant
2010-2012 *National Science Foundation* (NSF)-HBCU-UP: Investigator & Mentor
2010-2012 *Department of Energy* (DOE), Florida Hydrogen Initiative Grant: H2 Storage
2011-2014 *National Institute of Health, Minority Access for Research Careers* (NIH-MARC)
2011-2014 *Alabama Alliance for Students with Disabilities* (AASD-STEM): Faculty Mentor
2010-2014 *Alabama Academy of Science Undergraduate Research Award* (AAS): Mentor
2011-2015 *US Agencies for International Development* (USAID) – Investigator & Mentor
2010-2012 *BP/Dauphin Island Sea Lab*, PI - \$40,000.00 – Gulf Oil Spill Projects
2007-2009 *Florida Energy Systems Consortium* (FESC): Co-Director \$9M – Clean Energy
2008-2010 *QuantumSphere Inc.* (QSI) – Co-PI - \$150,000 – Nanocatalyst doped H₂ Storage
2004-2009 *Department of Energy* (DOE) – Investigator - \$5M - Hydrogen and Fuel Cells
2004-2006 *Center for Biological Defense* (CBD) – Investigator, TiO₂ Photocatalysis
2002-2004 *Japan WE-NET*, Development of novel complex hydrides for reversible H storage

RESEARCH PROPOSALS UNDER REVIEW (2013 Onwards)

1. **TU Principal Investigator:** Project/Proposal Title: Electric Vehicle Transportation Center, Source of Support: Department Of Transportation, Total Award Amount: \$600,000 Total Award Period Covered: 08/01/13 – 07/30/17 (PI: Dr. David Block; Lead Institution: U Central Florida)
2. **TU Principal Investigator:** Project/Proposal Title: NSMDS: Network to design catalysts and to identify molecular pathways for carbon dioxide conversion to sustainable fuels and chemicals, Source of Support: National Science Foundation, Total Award Amount: \$600,000 Total Award Period Covered: 01/01/14 – 12/31/17 (PI: Dr. John Kuhn, Lead Institution: U. South Florida).
3. **TU Principal investigator:** Project/Proposal Title: Low cost high temperature metal hydride thermochemical storage system for concentrating solar power: Department of Energy (CSP-Elements), Total Award Amount: \$1,013,335.00; Total Award Period Covered: 10/01/13 – 09/30/2015 (PI: Sarada Kuravi, Lead Institution: Florida Institute of Technology).
4. **Principal Investigator:** Project/Proposal Title: APS-IUSSTF Professorship Award in Physics: American Institute of Physics, Total Award Amount: (International Proposal) \$4,000.00; Total Award Period Covered: 01/01/2014-12/31/2014.
5. **TU Principal Investigator:** (Concept Paper) Project/Proposal Title: Innovative polymer encapsulated complex nanocrystalline hydrides for reversible hydrogen storage applications, US Department of Energy, Total Award Amount: \$1,000,000.00; Total Award Period Covered: 01/01/2014 – 12/31/2015 (PI: Elias Stefanakos, Lead Institution: University of South Florida).
6. **Principal Investigator:** (International Proposal) Project/Proposal Title: US-India OSI Partnership on Sustainable Energy Education, Research and Outreach, Obama-Singh 21st Century Knowledge Initiative, Total Award Amount: \$245,595.00; Total Award period Covered: 08/01/2014-07/31/2017 (Partner Institution: Dr. SMA Shibli, University of Kerala, India).
7. **Project Consultant/Sub-Contractor:** (Undergraduate Research) Project/Proposal Title: Nanotechnology University Education (NUE), National Science Foundation, Total Award

Amount: (Varied and Negotiable); Total Award Period Covered: (at least 3 years); (Principal Investigators from Penn State University)

8. **Co-Principal Investigator:** Project/Proposal Title: Enhancing the number of STEM graduates in the Alabama Black Belt Region; National Science Foundation (S-STEM); Total Award Amount: \$625,966.00; Total Award Period Covered: 01/01/2014-12/31/2017; (Principal Investigator: Dr. Gerald Griffin, Biology Department, Tuskegee University).
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OTHER SPONSORED ACTIVITIES

2013 DOE-LED{-Laboratory Equipment Donation Program – 3 Chemical/Acid Cabinets - \$5K
2013 DOE-LEDP-Laboratory Equipment Donation Program – Microbalance - \$2,500
2012 USAID-HED International Travel support to attend the summer school at 2iE, Burkina Faso, Ouagadougou, West Africa (06/09/12-06/21/12).
2012 DOE-LEDP – Laboratory Equipment Donation Program – Microspatula - \$100.00
2012 DOE-LEDP – Laboratory Equipment Donation Program – Ultrasonicator - \$1,000
2011 NSF QEM Travel Support to attend the CAREER workshop, Las Vegas, Nevada.
2011 Travel Support to attend the INCREASE workshop at CFN-Brookhaven National Laboratory.
2010 Tuskegee University’s Title III travel grant to attend and present a poster at the ECCDR’10 Toolbox workshop at the University of Idaho.
2010 Ocean Optics Higher Education Grant - Cost Share to procure UV-Vis Spectrometer - \$2,500
2009 DOE-LEDP - Nicolet FTIR Spectrometer with Analytical Microscope –\$65,000.00- Honeywell Corp

UNDERGRADUATE STUDENTS’ RESEARCH GRANTS AWARDED/UNDER REVIEW

1. **Faculty Advisor:** (Undergraduate Research) Project/Proposal Title: High Throughput Synthesis and Characterization Studies of Novel Nanoscale Hydrogen Storage Systems; Total Award Amount: \$2,000.00; American Institute of Physics (SPS-ΣΠΣ), Total Award Period Covered: 01/01/2014-12/31/2014 (Principal Investigators: 6 Undergraduate Research Students from Tuskegee University).
2. **Faculty Advisor:** (Undergraduate Research) Project/Proposal Title: TU-SPS-K-12 Outreach Demonstration Program on Renewable Energy; Marsh W. White Award, Total Award Amount: \$300.00; Total Award Period Covered: 01/01/2014-12/31/2014 (Principal Investigators: 8 Undergraduate Research Students from Tuskegee University).
3. THE SIGMA PI SIGMA UNDERGRADUATE RESEARCH AWARD – American Institute of Physics (SPS-AIP); Title: Design and Development of Novel Nanocomposite Materials and Reactor Systems for Photocatalysis; Proposed by Physics Undergraduate Students: Jeremiah F. Wilson, Sammie Ely III, Bria Moore and Lamont Henderson; **Faculty Mentors:** Dr. Sessa S. Srinivasan and Dr. P.C. Sharma; Amount Requested: \$2,000 (One Calendar Year); Date Awarded: 01/01/2013-12/31/2013.
4. Project Title: Combinatorial Synthesis and Characterization of Zinc Iron Oxide Nanoparticles for Biomedical Applications, Bria Moore (Undergraduate Senior Student), Sessa Srinivasan, PC. Sharma (**Faculty Mentors**) – Funding Agency: Alabama Academy of Sciences, Amount granted: \$250 (2013 – 2014).
5. Project Title: Design and Optimization of Photocatalytic Disinfection System for Biological and Environmental Health Applications, Jeremiah Wilson (Undergraduate Junior Student), Sessa Srinivasan, PC. Sharma (**Faculty Mentors**) – Funding Agency: Alabama Academy of Sciences, Amount granted: \$250 (2013 – 2014).

6. Project Title: Reversible Solid State Hydrides for Fuel Cell Vehicles, Lamont Henderson (Undergraduate Junior Student), Sesha Srinivasan, PC. Sharma (**Faculty Mentors**) – Funding Agency: Alabama Academy of Sciences, Amount granted: \$250 (2013 – 2014).
 7. Project Title: Physico-chemical characterization Studies of Deepwater Oil Spill Materials (Tar Mats, Water/Oil Mixtures), Sammie Ely III (Undergraduate Student) Sesha Srinivasan, PC. Sharma (**Faculty Mentors**) – Funding Agency: Alabama Academy of Sciences, Amount granted: \$250 (2012 – 2013).
 8. Project Title: Synergistic Effects of Zn-doping and High Energy Ball Milling on the TiO₂ Photocatalytic Nanoparticles, Bria M. Moore (Undergraduate Student) Sesha Srinivasan, PC Sharma (**Faculty Mentors**) – Funding Agency: Alabama Academy of Sciences, Amount granted: \$250 (2011 – 2012).
 9. Project Title: Development of Heterogeneous Semiconductor Nanoparticles for Visible Light Photocatalytic Applications, Edward G. Arthur (Undergraduate Student) Sesha Srinivasan, PC. Sharma (**Faculty Mentors**) – Funding Agency: Alabama Academy of Sciences, Amount granted: \$200 (2010 – 2011).
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HONORS / AWARDS / SCHOLARSHIPS / RECOGNITIONS (2007-2014)

2013 **Best Research Paper Presentation** at the International Conference on Nanomaterials at Western University, London, Canada, July 2013.

2012 **NSF- Certified Science Messenger** for the completion of two days workshop conducted by the National Science Foundation (AL-EPSCoR), November 27-28, 2012.

2012 **USAID-HED-TU-2iE Summer School Lecturer** to deliver two invited talks at the 2iE, Burkina Faso, Honorarium Awarded (\$3,000)

2010 **ECCDR'10 Travel Scholarship** (\$400) to present a poster at the ECCDR'10 Cross Disciplinary Communication Workshop (Toolbox) at the University of Idaho.

2010 **Summer NRC Scholarship** (\$1,000) to attend the STEM Nuclear Engineering Workshop at Howard University.

2010 **Best Paper Presentation** – International Conference on Engineering and Meta-Engineering (ICEME'10), Orlando, FL.

2010 Tuskegee University Business Engineering (TUBE) Conferene, **Guest Speaker**

2009 **NSF Mentoring Certification** – Summer REU program, University of South Florida, 2009 Interviewed by **Tampa Tribune** to validate the Hydrogen production technology.

2008 **Best Paper Award** – for the paper published in Journal of Physical Chemistry A, 2003.

2008 Interviewed by The **USF's Oracle Newspaper**: Interviewed on the Current Energy

2008 **Certificate of Excellence** – for paper presentation at the NanoFlorida 2008, UCF,

2008 **NSF Mentoring Certification** – Summer REU program, University of South Florida,

2007 Special Article published about my research contributions and activities in the **CERC news letter** Energy Research Center, College of Engineering, Univ. of South Florida.

OTHER SERVICE ACTIVITIES – JOURNAL PAPER AND PROCEEDINGS REVIEWER

Datasets in Materials Science • Materials Science and Engineering B • Catalysis Communication • International Journal of Hydrogen Energy • Journal Alloys and Compounds • Catalysis Letters • Applied Catalysis B: Environmental • Journal of Physical Chemistry B • Journal of Physics and Chemistry of Solids • Materials Chemistry and Physics • Optical Materials • Thin Solid Films • Materials Letters • Journal of Nanomaterials • Materials Research Society Proceedings • International Journal of Physical Sciences • Energies – An Open Access Journal • SciKinow Publications • Physical and Technical Sciences • Open Journal of Advances in Materials Research • Journal of Applied Physics • Open Journal of Functional Material Research • Journal of Condensed Matter

MEMBERSHIPS IN SOCIETIES AND ORGANIZATIONS

Member, **American Physical Society**, APS (2013-)
Member, **Society for Physics Students**, SPS (2013-)
Member, **National Society for Black Physicist**, NSBP (2010-)
Member, **The Math and Science Partnership** (MSP) NanoBio Materials (2012-)
Member, **International Association for Hydrogen Energy**; IAHE, YIAHE, IAHEEM (2010-)
Affiliate **INCREASE Member – Center for Functional Nanomaterials** CFN, BNL, USA (2010-)
Member, **Council of Energy Research and Education Leaders**, CEREL (2008-)
Member, **Florida Energy Systems Consortium**, FESC (2007-)
Member, **Materials Research Society**, MRS (2009-)
Member, **Alabama Academy of Sciences**, AAS (2009-)
Member, **Marine Environmental Systems Consortium**, MESC (2009-)

TEACHING: COURSES TAUGHT / DEVELOPED / PROPOSED (2008-Present)

PHYS 201 *Principles of Energy* – SP'10
PHYS 210/211 *Physical Sciences Part I and Part II* – Fall'09, '10 & '11, Spring'10 & '11
PHYS 301/302 *General Elementary Physics, Part I and Part II* – Spring'10 & '12, Fall'10, Fall'12, Spring'13, Fall'13, Spring'14
PHYS 303/313 *General Physics Laboratory Part I* - Fall'09 & '11, Spring'11 & '12, Spring'13, Fall'13, Spring'14
PHYS 304/314 *General Physics Laboratory Part II* –Fall & Spring'10, Spring'13, Fall'13, Spring'14
PHYS 305/306 *Applied physics Part I and Part II* – Fall'11, Spring'11 & '12, Spring'13
PHYS 307/308 *Applied Physics Laboratory Part I and Part II* - Fall'11, Spring'12, Spring 13
PHYS 310 *General Elementary Physics for Engineering Majors Part I* – Fall'12
PHYS 390 *Engineering Ethics* – ethics behind Chernobyl nuclear explosion – Fall'10 & 11
PHYS 410 *Wave Phenomena* – Spring 2010
PHYS 411 *Electricity and Magnetism* – Fall'09, 10 & '12
PHYS 502 *Modern Physics Laboratory* – Spring 2012, Spring'13, Spring'14
PHYS 550 *Solid State and Condensed Matter Physics* – Fall'10 & '11
PHYS 551/552 *Research Seminar Course* – Fall'13, Spring'14
PHYS 300 *Proposed Biophysics and Renewable Energy course* (Under Review)
BS Minor Physics – *Proposed BS minor Physics course for science/non-science, engineering and architecture/construction science majors* at Tuskegee University.
PHYS 301 (Blended/Online Course) – summer'14

RESEARCH & SCHOLARLY ACTIVITIES: (PUBLICATIONS & PRESENTATIONS: 2007-14)

Patents:

1. **Sesha Srinivasan**, Michael Niemann, D.Yogi Goswami, and Elias K. Stefanakos, *Hydrogen-storing hydride complexes*, U.S. Patent # 8,153,020, April 10, 2012.
2. **Sesha Srinivasan**, Michael Niemann, D.Yogi Goswami, and Elias K. Stefanakos, *Method of Generating Hydrogen-storing hydride complexes*, US Patent # 8,440,100, May 14, 2013.
3. **Sesha S. Srinivasan**, Prakash C. Sharma, Jeremiah F. Wilson, Sammie Ely III, *Universal Tune-in Photocatalytic Reactor for Fuel Generation and Air Detoxification*, Approved by Tuskegee University Intellectual Property Committee, Approved Date: October 18, 2013; Under Review and Processing by the University Attorney's Office.

Text Book:

1. **Sesha Srinivasan** and Prakash Sharma, *Physics for Architecture and Construction Science*, Linus Publications, Spring - Summer 2014 (Agreement Contract Signed)

E-Book, Book Chapters and Review Articles:

1. **Sesha Srinivasan** and Prakash Sharma, Application of Bulk and Nanostructured Polyaniline in Hydrogen Storage, *Springer Verlag Book* on “Electrospun Fibers for Energy and Environmental Applications” By Bin Ding (Scheduled for Publication in 2013).
 2. Reversibility in $\text{LiMn}(\text{BH}_4)_3$ systems by nanocrystalline MgH_2 destabilization and nanoadditive doping, P. Choudhury, S.S. Srinivasan, V. Bhethanabotla, D.Y. Goswami, E.K. Stefanakos, *Int. J. Hydrogen Energy*, (Manuscript under preparation, 2013).
 3. **S.S. Srinivasan**, Ghazi Darkazalli, Elias Stefanakos, Yogi Goswami, Advances in Hydrogen Storage, e-Book by Invitation from the *Bentham Publisher* Inc. (Manuscript under preparation and scheduled for 2014).
 4. SA Sherif, F. Barbir, TN. Veziroglu, M. Mahishi, and **SS. Srinivasan**, Chapter 27, Hydrogen Energy Technologies, *Handbook of energy Efficiency and Renewable Energy*, Kreith and Goswami (Ed.), *CRC Press 2nd Edition*, Boca Raton, Florida, 2013.
 5. E.K. Stefanakos, D.Y. Goswami, **S.S. Srinivasan**, Hydrogen Energy, *John Wiley & Sons in Environmentally Conscious Power Generation, Second Edition*, Edited by Myer Kutz,
 6. **Sesha Srinivasan** and P.C. Sharma, Development of Novel Nanostructures and Nanoscale Complex Hydrides for Reversible Hydrogen Storage, *InTech Publications*, <http://dx.doi.org/10.5772/50171>, 25 pages, 2012.
 7. V. Renugopalakrishnan, A M. Kannan, **S.S. Srinivasan**, V. Thavasi, S. Ramakrishna, P. Li, A. Mershin, S. Filipek, A. Kumar, J. Dutta, A. Jaya, L. Munukutla, S. Velumani and G.F. Audette, Nanomaterials for Energy Conversion Applications, Chapter 5, *J. Nanoscience and Nanotechnology*, Ed. By Hari Singh Nalwa, American Scientific Publishers, 2008, In Press.2009, ISBN: 1-58883-120-5, 155-178.
 8. E.K. Stefanakos, D.Y. Goswami, **S.S. Srinivasan**, J. Wolan, Hydrogen Energy, *John Wiley & Sons series in Environmentally Conscious Power Generation*, Edited by Myer Kutz, 2007, 4, 165-206, ISBN: 978-0-471-73911-1.
 9. SA Sherif, F. Barbir, TN. Veziroglu, M. Mahishi, and **SS. Srinivasan**, Chapter 27, Hydrogen Energy Technologies, *Handbook of energy Efficiency and Renewable Energy*, Kreith and Goswami (Ed.), *CRC Press*, Boca Raton, Florida, 2007.
 10. M.U. Niemann, **S.S. Srinivasan**, A. Kumar, D.Y. Goswami and E.K. Stefanakos Nanomaterials for Hydrogen Energy Storage Applications–A Review, *J Nanomaterials*, Hindawi Publishing Corporation, Vol. 2008, Article ID: 950967, 9 Pages, DOI:10.1155/2008/950967.
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Refereed Journal Publications (Over 200 citations till date):

(Sesha Srinivasan = S.S. Srinivasan = S. Srinivasan – S.S. Sai Raman = S.S.S. Raman)

1. Photoreduction of saturated CO_2 to produce hydrocarbon using visible light photocatalytic nanocomposites TiO_2 -Xwt.% InVO_4 , Jeremiah F. Wilson, **Sesha S. Srinivasan**, Sammie Ely III, Prakash C. Sharma, *J. Photochemistry and Photobiology*, (Under Preparation 2013).
2. Synergistic Effects of MWCNT and Nb_2O_5 on the Hydrogen Storage Characteristics of Li-nMg-B-N-H System, D.E. Demirocak, S.S. Srinivasan, D.Y. Goswami, E.K. Stefanakos, *J. Alloys Comp.*, (Manuscript under Preparation, 2013).
3. Physico-chemical characteristics oil spill sediments collected from the Gulf of Mexico, **Sesha Srinivasan**, Jeremiah F. Wilson, Sammie Ely III, Prakash C. Sharma, Manuscript Under Review, *J. Soils and Sediments* (2013).
4. Reversible hydrogen storage in the Li-Mg-N-H system: Ammonia suppression by addition of Ru doped single walled carbon nanotubes, D. Emre Demirocak, **Sesha S. Srinivasan**, Manoj K. Ram, John N. Kuhn, Ranjani Muralidharan, Xiao Li, D. Yogi Goswami and Elias K. Stefanakos, *International Journal of Hydrogen Energy*, Volume 38, Issue 24, 12 August 2013, Pages 10039-10049

5. Hydrogen Production Using Solar Energy, Jeremiah F. Wilson, Sammie Ely III, Bria M. Moore, **Sesha S. Srinivasan**, Prakash C. Sharma, *J. Undergraduate Research in Physics* (JURP), (Under Review 2013)
6. A novel nitrogen rich porous aromatic framework for hydrogen and carbon dioxide storage, D.E. Demirocak, M.K.Ram, **S.S. Srinivasan**, D.Y. Goswami, E.K. Stefanakos, *Journal of Materials Chemistry A*, DOI: 10.1039/c3ta13194g (2013).
7. Low temperature polymer electrolyte fuel cell performance degradation, John A. Fedock, Sesha S. Srinivasan, D. Yogi Goswami and Elias K. Stefanakos, *Physics and Technical Sciences*, 1(2) 15-27 (2013), DOI: 10:12966/pts.07.03.2013.
8. Volumetric hydrogen sorption measurements – Uncertainty error analysis and the importance of thermal equilibration time, Dervis Emre Demirocak, **Sesha S. Srinivasan**, Manoj K. Ram, D. Yogi Goswami, Elias K. Stefanakos, *International Journal of Hydrogen Energy*, Volume 38, Issue 3, 6 February 2013, Pages 1469-1477.
9. Development of High Storage Capacity Complex Hydrides for Reversible Hydrogen Storage, Biagwoul B. Christelle, **Sesha S. Srinivasan**, Nosa O. Egiebor, Dervis E. Demirocak, Xi-Sen Wang, Shengqian Ma, *Open Journal of Advanced Materials Research*, 1 (3) 42-47 (2013); DOI: 10:12966/ojamr.11.02.2013.
10. Study of the growth of PANI nanofibers by various methods and its effect on Hydrogen Storage, **S.S. Srinivasan**, R. Ratnadurai, A.R. Phani, P.C. Sharma, D.Y. Goswami, E.K. Stefanakos, *Tatvanveshan*, Volume 1, Issue 1, May-October 2012, Page 12-19, ISSN: 2319-5827
11. **Sesha Srinivasan** and Prakash Sharma, Enhancement of Hydrogen Storage Behavior of Complex Hydrides by Bimetallic Nanocatalysts Doping, *Catalysts*, 2, 434-446; doi:10.3390/catal2040434, 2012.
12. Spillover enhancement for hydrogen storage by Pt doped hypercrosslinked polystyrene, DE Demirocak, MK Ram, **SS Srinivasan**, A Kumar, DY Goswami, EK Stefanakos, *Int. J. Hydrogen Energy*, 37, 12202-12410, 2012.
13. Investigation of Polyaniline Nanocomposites and Cross-Linked Polyaniline for Hydrogen Storage, Emre Demirocak, Sarada Kuravi, Manoj Ram, Chand K. Jotshi, **Sesha S. Srinivasan**, Ashok, Kumar, D. Yogi Goswami, Elias K. Stefanakos, D., *Advanced Materials Research*, Vol. 445 (2012) pp 571-576, *Adv. Materials Research: Trans Tech Publications*, Switzerland, doi:10.4028/www.scientific.net/AMR.445.571
14. Optical cell for combinatorial in situ Raman spectroscopic measurements of hydrogen storage materials at high pressures and high temperatures, Jason Hattrick-Simpers, Wilbur S. Hurst, **Sesha S. Srinivasan**, James E. Maslar, *Rev. Sci. Instr.*, 82, 033103 (2011).
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16. Effect of RuO₂-CoS₂ anode nanostructured performance H₂S electrolytic splitting system, J. Mbah, S.S. Srinivasan, B. Krakos, J. Wolan, D.Y. Goswami, E.K. Stefanakos, N. Appathurai, *Int. J. Hydrogen Energy*, 35(19), 2010, 10094-10101.
17. Effects of nano additives on hydrogen storage behavior of the complex hydride LiBH₄/LiNH₂/MgH₂, **S.S. Srinivasan**, M.U. Niemann, J.R. Hattrick-Simpers, K. McGrath, P.C.Sharma, D.Y. Goswami, E.K. Stefanakos, *Int. J. Hydrogen Energy*, 35. 2010, 9646-9652.
18. Raman spectroscopic observation of dehydrogenation in ball-milled LiNH₂-LiBH₄-MgH₂ nanoparticles, J.R. Hattrick-Simpers, M.U. Niemann, J.E. Maslar, **S.S. Srinivasan**, E.K. Stefanakos, L. A. Bendersky, *Int. J. Hydrogen Energy*, 35, 2010, 6323-6331.
19. Reversible hydrogen storage in electrospun polyaniline fibers, **S.S. Srinivasan**, M.U. Niemann, R. Ratnadurai, A.R. Phani, D.Y. Goswami, E.K. Stefanakos, *Int. J. Hydrogen Energy*, 35, 2010, 225-230.

20. Room temperature hydrogen storage in Polyaniline (PANI) nanofibers, M.U. Niemann, **S.S. Srinivasan**, A.R. Phani, A. Kumar, D.Y. Goswami, E.K. Stefanakos, *J. Nanoscience and Nanotechnology*, 9, 2009, 1-5.
21. NanoNi doped Li-Mn-B-H system as a new hydrogen storage candidate, P. Choudhury, **S.S. Srinivasan**, V. Bhethanabotla, D.Y. Goswami, K. McGrath, E.K. Stefanakos, *Int. J. Hydrogen Energy*, 34, 15 (2009) 6325-6334.
22. Destabilization of LiAlH₄ by nanocrystalline MgH₂, Andrew W. Vittetoe, Michael U. Niemann, **Sesha S. Srinivasan**, Kimberly McGrath, Ashok Kumar, D. Yogi Goswami, Elias K. Stefanakos, Sylvia Thomas, *International Journal of Hydrogen Energy*, 34, 5 (2009) 2333-2339.
23. Nanocrystalline effects in complex composite hydrides, M. Niemann, **S. Srinivasan**, K. McGrath, A. Kumar, Y. Goswami, E. Stefanakos, *Ceramic Transactions*, volume 202 (2009) 111-117.
24. Optical absorption red and blue shifts in ZnFe₂O₄ nanoparticles, N. Kislov, **S.S. Srinivasan**, Yu. Emirov, E.K. Stefanakos, *Materials Science and Engineering B*, 153 (2008) 70-77.
25. Effects of catalysts doping on the thermal decomposition behavior of Zn(BH₄)₂, **S. Srinivasan**, D. Escobar, Y. Goswami, E. Stefanakos, *International Journal of Hydrogen Energy* (2008), 33(9), 2268-2272.
26. Nanocatalyst doping of Zn(BH₄)₂ for on-board hydrogen storage, **S. Srinivasan**, D. Escobar, M. Jurczyk, Y. Goswami, E. Stefanakos, *Journal of Alloys and Compounds* (2008), 462(1-2), 294-302.
27. Hydrogen storage behavior of ZrNi 70/30 and ZrNi 30/70 composites, D. Escobar, **S. Srinivasan**, Y. Goswami, E. Stefanakos, *Journal of Alloys and Compounds*, (2008), 458(1-2), 223-230.
28. Magnetization and magnetocaloric effect in ball-milled zinc ferrite powder, J. Gass, H. Srikanth, H.; N. Kislov, **S.S. Srinivasan**, Y. Emirov, *Journal of Applied Physics* (2008), 103(7, Pt. 2), 07B309/1-07B309/3.
29. Polyaniline-based nanocomposite materials for hydrogen storage, M. Jurczyk, A. Kumar, **S. Srinivasan**, E. Stefanakos, *International Journal of Hydrogen Energy* (2007), 32(8), 1010-1015.
30. Visible light photocatalysis via nanocomposite CdS/TiO₂ materials, **S. Srinivasan**, J. Wade, E. Stefanakos, *J. Nanomaterials*, DOI 10.1155/JNM/2006/87326 (2006).
31. Synthesis and characterization of photocatalytic TiO₂-ZnFe₂O₄ nanoparticles, **S. Srinivasan**, J. Wade, E. Stefanakos, *J. Nanomaterials*, DOI 10.1155/JNM/2006/45712 (2006).
32. Synergistic effects of sulfation and co-doping on the visible light photocatalysis of TiO₂, **S.S. Srinivasan**, J. Wade, E. K. Stefanakos, D.Y. Goswami, *J. Alloys and Compounds*, 424, 1-2, 322-326, 2005.
33. Motion of point defects and monitoring of chemical reactions in sodium aluminum hydride, O. Palumbo, R. Cantelli, A. Paolone, CM Jensen, **SS. Srinivasan**, *J. Alloys and Compounds*, 404-406, 748-751, 2005.
34. Synchrotron x-ray studies of Al_{1-y}Ti_y formation and re-hydriding inhibition in Ti-enhanced NaAlH₄, H.W. Brinks, B.C. Hauback, **S.S. Srinivasan**, C.M. Jensen, *J. Phys. Chem. B*, 109(33) 15780-15785, 2005.
35. Electron microscopy studies of NaAlH₄ with TiF₃ additive: hydrogen cycling effects, C.M. Andrei, J.C. Walmsley, H.W. Brinks, R. Holmestad, **S.S. Srinivasan**, C.M. Jensen, B.C. Hauback, *Appl. Phys. A*, 80, 709, 2005.
36. Point defect dynamics and evolution of chemical reactions in alanates by anelastic spectroscopy, O. Palumbo, R. Cantelli, A. Paolone, C.M. Jensen, **S.S. Srinivasan**, *J. Phys Chem. B*, 109, 1168-1173, 2005.

37. Long term cycling behavior of Titanium doped NaAlH₄ prepared through solvent mediated milling of Titanium ad-mixed NaH and Al, **S.S. Srinivasan**, D. Sun, H.W. Brinks, T. Kiyobayashi and C.M. Jensen, *J. Alloys and Compounds*¹, 377, 283-289, 2004.
38. Synchrotron X-ray and Neutron diffraction studies of Ti- doped NaAlH₄, H.W. Brinks, C.M. Jensen, **S.S. Srinivasan**, D. Sun, B.C. Hauback, D. Blanchard, K. Murphy, *J. Alloys and Compounds*, 376, 215-221, 2004.
39. Rehydrogenation and cycling studies of dehydrogenated NaAlH₄, D. Sun, **S.S. Srinivasan**, Guorong Chen and Craig M. Jensen, *J. Alloys and Compounds*, 373, 265-269, 2004.
40. Kinetic study and determination of the enthalpies of activation of the dehydrogenation of Titanium and Zirconium doped NaAlH₄ and Na₃AlH₆, T. Kiyobayashi, **S.S. Srinivasan**, D. Sun and C.M. Jensen, *J. Phys. Chem. A*², 107(39), 7671-7674, 2003.
41. Rehydrogenation of dehydrogenation NaAlH₄ at low temperature and pressure, D. Sun, **S.S. Srinivasan**, T. Kiyobayashi, N. Kuriyama and C.M. Jensen, *J. Phys. Chem. B*, 107(37), 10176-10179, 2003.
42. On the Computer Simulation of the isotherms of ZrFe₂ type hydrogen storage materials, D.J. Davidson, **S.S. Sai Raman**, M.V. Lototsky and O.N. Srivastava, *Int. J. Hydrogen Energy*, 28, 12 1425-1431, 2003.
43. Investigations on the synthesis, structural and microstructural characterizations of Mg-based K₂PtCl₆ type (Mg₂FeH₆) hydrogen storage material prepared by mechanical alloying, **S.S. Sai Raman**, D.J. Davidson, J.L. Bobet and O.N. Srivastava, *J. Alloys and Compounds*³, 333, 282–290, 2002.
44. On the development of AB₄.9 – type alloys (A = Mm, La, Ti; B = Ni, Co, Al, Mn, Mo) for Ni – MH batteries, D.J. Davidson, S. Srivastava, **S.S. Sai Raman**, P.K. Shukla and O.N. Srivastava, *Trans. of the SAEEST*, 36 (1x2) 59-63, 2001.
45. On the Mechanically Pulverized MmNi_{4.6}Fe_{0.4} as a viable hydrogen storage material, V. Venkateswara Sarma, **S.S. Sai Raman**, D.J. Davidson and O.N. Srivastava, *Int. J. Hydrogen Energy*, 26, 231-236, 2001.
46. On the synthesis and characterization of some new AB₅ type MmNi_{4.3}Al_{0.3}Mn_{0.4}, LaNi_{5-x}Si_x (x=0.1,0.3,0.5) and Mg-xwt.% CFMmNi₅-ywt% Si hydrogen storage materials, Sumita Srivastava, **S.S. Sai Raman**, B.K. Singh and O.N. Srivastava, *Int. J. Hydrogen Energy*, 25(5) 431-440, 2000.
47. On the synthesis, characterization and hydrogenation behavior of Mg-based composite materials Mg-xwt.% CFMmNi₅ prepared through mechanical alloying, **S.S. Sai Raman**, D.J. Davidson and O.N. Srivastava, *J. Alloys and Compounds*, 292 (1-2) 202-211, 1999.
48. Investigation on the synthesis, characterization and hydrogenation behavior of new Mg-based composite materials Mg-xwt.% MmNi_{4.6}Fe_{0.4} prepared through mechanical alloying, D.J. Davidson, **S.S. Sai Raman** and O.N. Srivastava, *J. Alloys and Compounds*, 292 (1-2) 194-201, 1999.
49. Hydrogenation behavior of the new composite storage materials, **S.S. Sai Raman** and O. N. Srivastava, *J. Alloys and Compounds*, 241 (1-2) 167-174, 1996.
50. Investigation on the synthesis and hydrogenation /dehydrogenation characteristics of the composite material Mg-xwt. % CFMmNi₅, **S.S. Sai Raman** and O.N. Srivastava, *Int. J. Hydrogen Energy*, 21, 3, 207-211, 1996.

¹ The X-ray diffraction pattern published in this paper was nominated for International Crystallographic Diffraction Database (ICDD). Manufacture of NaAlH₄ from my method is claimed superior than the Ashby's commercial process followed by Albamarle Corp.

² This paper is recently received an award from the journal publishers (Best Paper Award, 2008)

³ First ever reported 63% yield of Mg₂FeH₆ phase from our single step mechanochemical process was widely cited by other research groups

Peer Reviewed Conference Proceeding Papers:

1. Nanomaterials Driven Energy, Environmental and Biomedical Research, Prakash C. Sharma, **Sesha S. Srinivasan**, Jeremiah F. Wilson, *Proceedings of the International Conference on Nanomaterials, American Institute of Physics Publications*, (Under Review, 2013).
2. Development of High Storage Capacity Complex Hydrides for Reversible Hydrogen Storage, B.C. Biagwoul, **S.S. Srinivasan**, N.O. Egiebor, D.E. Demirocak, E.K. Stefanakos, D.Y. Goswami, *Proceedings of the 2iE International Conference on Energy, Environment and Water Resources*, Ougadougou, Burkina Faso, 1-5, April 2013.
3. My memories and associations with Professor O.N. Srivastava, **Sesha Srinivasan**, *Proceedings of the National Seminar on Materials and Energy Security*, India, December 31, 2012.
4. Enhancement of TiO₂ Photocatalytic Activity by N- Doping Using the Gas Phase Impregnation Method, Chennan Li, **Sesha S. Srinivasan**, Nikolai Kislov, Mark Schmidt, Elias K. Stefanakos, D. Yogi Goswami, *Mater. Res. Soc. Symp. Proc.* Vol. 1217-Y03-35, 2010.
5. Increasing the Photocatalytic Activity by Mechano-chemically Milling on Zn- Doped TiO₂, Li Chennan, **Sesha Srinivasan**, Paula Algarin, Nikolai Kislov, Ayala Phani, Elias Stefanakos, Yogi Goswami, *Mater. Res. Soc. Symp. Proc.* Vol. 1217-Y03-34, 2010.
6. Effect of Nb₂O₅ on the Hydrogen Storage Characteristics of Li-nMg-B-N-H Complex Hydrides, Anthony D'Angelo, Sarada Kuravi, Michael Niemann, Yogi Goswami, Elias Stefanakos, **Sesha Srinivasan**, *Proceedings of the international Conference on Engineering and Meta Engineering (ICEME-2010)*⁴.
7. Investigation of ZnFe₂O₄ nanoparticles prepared by high energy milling, **S.S. Srinivasan**, N. Kislov, Yu. Emirov, D.Y. Goswami and E.K. Stefanakos, *Proceedings of the American Society for Mechanical Engineers (ASME)* 2010.
8. Polyaniline Nanostructures for Hydrogen Storage Applications, Michael U. Niemann, **S.S. Srinivasan**, Ayala R. Phani, Ashok Kumar, D. Yogi Goswami and Elias K. Stefanakos, *Proceedings of the ASME- International Mechanical Engineering Congress and Exposition (IMECE2009-11554)*, Vol. 6, 2010, P7.
9. Processing Analysis of the Ternary LiNH₂-MgH₂-LiBH₄ System for Hydrogen Storage, Michael U. Niemann, **S.S. Srinivasan**, Ashok Kumar, Elias K. Stefanakos, D. Yogi Goswami, Kimberly McGrath, *Proceedings of the ASME- International Mechanical Engineering Congress and Exposition (IMECE2009-11520)*, Vol. 6, 2010, P35.
10. Effect of nanoadditives on the hydrogen storage behavior of multinary hydrides Li-Mg-B-N-H, M.U. Niemann, **S.S. Srinivasan**, K. McGrath, D.Y. Goswami, E.K. Stefanakos, A. Kumar *Proceedings of the World Hydrogen Technology Convention (WHTC)*, 2009.
11. Electrospun polyaniline nanofibers for hydrogen storage, **S.S. Srinivasan**, R. Rathnadurai, M.U. Niemann, A.R. Phani, D.Y. Goswami, E.K. Stefanakos, *Proceedings of the World Hydrogen Technology Convention (WHTC)*, 2009.
12. Magnetization and magneto-caloric effect in ball milled Zinc Ferrite powder, J. Gass, H. Srikant, N. Kislov, **S.S. Srinivasan**, *Proceedings of the 52nd Annual Conference on Magnetism and Magnetic Materials*, Nov. 5-9, 2007, Tampa, FL, USA.
13. Hydrogen storage in nanocatalyzed Zn(BH₄)₂, **S. Srinivasan**, D. Escobar, M. Jurczyk, P. Choudhury, Y. Goswami and E. Stefanakos *Proceedings of the International Hydrogen Energy Conferene'07*, Istanbul, Turkey, 2007.
14. Effects of nanocatalyst doping on the hydrogen storage behavior of new complex borohydrides, **S. Srinivasan**, D. Escobar, L. Rivera, M. Jurczyk, P. Choudhury, Y. Goswami

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15. Investigation of $\text{LiBH}_4/\text{LiNH}_2$ system, M. Jurczyk, **S. Srinivasan**, A. Kumar, E. Stefanakos, TMS Annual Meeting and Exhibition, Orlando, FL, USA, *TMS Soc. Proc.*, 2006.
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 17. Mechano-chemical synthesis and characterization of new complex hydrides for hydrogen storage, **S. Srinivasan**, L. Rivera, E. Stefanakos, Y. Goswami, MRS Spring Meeting, San Francisco, CA, USA, *Mater. Res. Soc. Symp. Proc.*, 2006.
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 20. Synthesis and characterization of new complex borohydrides for hydrogen storage, **S.S. Srinivasan**, Elias K. Stefanakos, Advanced Materials for Energy Conversion III, TMS (The Thermal and volumetric studies of light weight hydrogen storage materials, **S. S. Srinivasan**, Michael Jurczyk, Matthew Smith, Elias Stefanakos, Yogi Goswami, Lisa McElwee White, Craig Jensen, MRS Fall meeting, Boston, MA, USA, *Mater. Res. Soc. Symp. Proc.*, 2005.
 21. Mechanochemical synthesis, structural characterization and visible light photocatalysis of $\text{TiO}_2/\text{ZnFe}_2\text{O}_4$ nanocomposites, **S.S. Srinivasan**, Jeremy Wade, Nikolai Kisolv, Matthew T. Smith, Elias K. Stefanakos, Yogi Goswami, Materials Research Society Fall'05 Meeting, Boston, MA, USA, *Mater. Res. Soc. Symp. Proc.*, 2005.
 22. Study of Effect of Temperature and Pressure on the Hydrogen Sorption Capabilities of a Polyaniline-CNT Nanocomposite Material, M. Jurczyk, A. Kumar, E. Stefanakos, A. Kumar, **S. Srinivasan**, Materials Research Society Fall'05 Meeting, Boston, MA, USA, *Mater. Res. Soc. Symp. Proc.*, 2005.
 23. Doped sodium aluminum hydride: Fundamental studies of a promising new hydrogen storage material, C.M. Jensen, **S.S. Srinivasan**, R. Cantelli, O. Palumbo, A. Paolone, C.M. Andrei, R. Holmstad, C.J. Walmsley, B.C. Hauback, H.W. Brinks, M.Kuba, S. Eaton, D. Sun, K. Murphy, P. Wang, Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry, 50(2), *ACS Proceedings*, 2005.
 24. Synthesis and characterization of nanoscale transition metal complex for hydrogen storage, **S.S. Srinivasan**, M.T. Smith, D. Deshpande, E. K. Stefanakos, Y. Goswami, M. Jurczyk, A. Kumar, A. Kumar, Vol. 884E, Warandale, PA, GG 3.7, *Mater. Res. Soc. Symp. Proc.*, 2005.
 25. Visible light photocatalysis via nanocomposite CdS/TiO_2 materials, **S.S. Srinivasan**, J. Wade, E.K. Stefanakos, Vol. 876E, Warandale, PA, R 5.2, *Mater Res. Soc. Symp. Proc.*, 2005.
 26. Synthesis and characterization of photocatalytic $\text{TiO}_2\text{-ZnFe}_2\text{O}_4$ nanoparticles, **S. Srinivasan**, J. Wade, E.K. Stefanakos, *Sesha* Vol. 876E, Warandale, PA, R 5.9, *Mater. Res. Soc. Symp. Proc.*, 2005.
 27. Transmission electron microscopy studies of 5-cycled Na alanate with Ti based additive, C.M. Andrei, J.C. Walmsley, R. Holmestad, G.A. Botton, **S.S. Srinivasan**, C.M. Jensen, B.C. Hauback, Vol. 884E, San Francisco, CA, GG24.1, *Mater Res. Soc. Symp. Proc.*, 2005.
 28. Dehydrogenation kinetics and long term cycling behavior of Titanium doped NaAlH_4 , **S.S. Srinivasan**, Craig M. Jensen, Vol. 837, Boston, MA, N3.24.1, *Mater. Res. Soc. Symp. Proc.*, 2005.
 29. Development of Light weight hydrogen storage materials – magnesium and sodium based complex hydrides, **S.S. Srinivasan**, *International conference on solid state hydrogen*

- storage – materials and applications, International Advanced Research Center, Hyderabad, India, 2005.
30. Characterization and mechanistic studies of the active species in the reversible dehydrogenation of Ti-doped NaAlH₄, C.M. Jensen, **S.S. Srinivasan**, M. Sulic, M. Kuba, S. Eaton, K. Yvon, H. Hageman, S. Gomes, A. Albinati, MRS Fall Meeting, Boston, Massachusetts, USA, Mater. Res. Soc. Symp. Proc., 2004.
 31. Characterization of the Titanium catalyst in the Sodium Aluminum Hydride, J. Rijssenbeek, Y. Gao, ST Taylor, MJ Banholzer, **SS Srinivasan**, CM Jensen, J. Hanson, X. Wang, MRS Fall Meeting, Boston, Massachusetts, USA, Mater. Res. Soc. Symp. Proc., 2004.
 32. Polymeric carbon nanocomposites for hydrogen storage, A. Kumar, M. U. Jurczyk, A. Kumar, **S.S. Srinivasan**, Lee Stefanakos, MRS Fall Meeting, Boston, Massachusetts, USA, 2004.
 33. Characterization and mechanistic studies of the active titanium species in the reversible dehydrogenation of Ti- doped NaAlH₄, CM Jensen, M. Sulic, M. Kuba, **SS. Srinivasan**, S. Eaton, JT. Rijssenbeek, Y. Gao, H. Brinks, B. Hauback, K. Yvon, H. Hans, DS. Gomes ASM Materials Solutions Conference and Show, October 18-21, 2004, Ohio, USA
 34. Investigations on the Ti doped and ball milled sodium aluminum hydride materials, B.K. Gupta, **SS Sai Raman**, ON Srivastava, Proceedings of the 15th World Hydrogen Energy Conference, Yokohoma, Japan, WHEC Proc., 2004.
 35. Dehydrogenation process of titanium and zirconium doped alanates T. Kiyobayashi, A. Tomoki, **S.S. Srinivasan**, D. Sun, S. Shinji, H.T. Takeshita, C.M. Jensen, N. Kuriyama, Advanced Materials for Energy Conversion II Proceedings of a symposium held during the TMS Annual Meeting, 2nd, Charlotte, NC, United States, Mar 14-18 (2004) 157-164, TMS Proc.
 36. studies and Development of related hydride materials, C.M. Jensen, **S.S. Srinivasan**, D. Sun, P. Wang, M. Sulic, M. Kuba, Doped Sodium Aluminum hydride: Fundamental US-DOE Annual Review Meeting on Hydrogen Fuel Cell and infrastructure technologies program⁵, May 24-27, 2004, Philadelphia, Pennsylvania, USA
 37. Characterization and mechanistic studies of the active titanium species in the reversible dehydrogenation of Ti-doped NaAlH₄ C.M. Jensen, **S.S. Srinivasan**, M. Sulic, M. Kuba, S. Eaton, H. Brinks, B.Hauback, K. Yvon, H. Hageman, S. Gomes, A. Albinati, 205th Meeting of the Electrochemical society: Materials for hydrogen storage, May 9-14, 2004, San Antonio, Texas, USA
 38. Characterization of Ti Catalyst in NaAlH₄ doped with TiF₃ Hydrogen storage: media, measurement and modeling , JT Rijssenbeek, Y. Gao, **SS Srinivasan**, CM Jensen, J. Hanson, X. Wang 2004, Annual American Physical Society meeting, March 22-26, 2004, Montreal, Quebec, Canada, Am. Phys. Soc. Proc.
 39. Synchrotron techniques for in-situ characterization of hydrogen storage materials and their applications to NaAlH₄, Y. Gao, JT Rijssenbeek, W. Morris, W. Heward, V. Smentkowski, J. Hanson, X. Wang, **SS. Srinivasan**, CM Jensen, P. Chupas, P. Lee, Hydrogen storage: media, measurement and modeling – 2004 Annual American Physical Society meeting, March 22-26, 2004, Montreal, Quebec, Canada, Am. Phys. Soc. Proc.
 40. On the development of Mg-xwt.% AB₅ [A=Mm, B=Ni, Fe] type and mechanically pulverized AB₅ type, ON Srivastava, DJ Davidson, **SS Sai Raman**, Akanksha Singh, Proceedings of 14th World Hydrogen Energy Conference, Montreal, Canada, WHEC Proceedings, 2002.
 41. On the development of composite hydrogen storage materials prepared through mechanical alloying, **SS Sai Raman**, DJ Davidson, BB Bansal, ON Srivastava, Proceedings of

⁵ This presentation was broadcasted by the International Clearinghouse for Hydrogen Commerce and available at <http://hydrogencommerce.com/indexa1a.htm>

International conference in Trends in Mechanical Alloying: Science, Technology and Applications, MREC, Jaipur, India, 2001.

42. synthesis, characterization and hydrogenation behavior of Mg based composite materials, **SS Sai Raman**, DJ Davidson, ON Srivastava, Investigations on the Hydrogen Material Science and Chemistry of Metal Hydrides: Katsiveli, Yalta, Ukraine, 2-8 Sept'99: NATO Science Series II: Mathematics, Physics and Chemistry, Vol. 71, Proceedings of the NATO advanced Research workshop, 1999.
 43. On the development of new hydrogen storage materials FeTi (Zr), Mg-xwt.% CFMmNi₅, nanoparticle Mg₂Ni, BK Singh, **SS Sai Raman**, AK Singh, BB Bansal, ON Srivastava, Hydrogen Power: Theoretical and Engineering Solutions, Proceedings of the, Grimstad, Norway, HYPOTHESIS Symp. Proc., 1997.
 44. Investigation on the synthesis and hydrogenation/dehydrogenation characteristics of the composite material Mg-xwt.% CFMmNi₅, **SS Sai Raman** and ON Srivastava, Proceedings of the 11th World Hydrogen Energy Conference, Stuttgart, Hydrogen Energy Progress XI, 1996.
-

Research Reports (Submitted to funding agencies as part of Final Project Report):

1. EAGER: Development of Visible Light Driven Photocatalytic Nanocomposites for the Reduction of CO₂ to Hydrocarbon Fuel, National Science Foundation Annual Report, (Project Period: 08/01/2012-07/31/2013).
 2. Design and Development of Novel Nanocomposite Materials and Reactor Systems for Photocatalysis, Interim Reports of Society for Physics Students (Project Period: 01/01/2013-05/31/2013).
 3. Bio, nano, Renewable Energy for Undergraduate Research, National Science Foundation NSF-HBCU-UP Interim and Annual Reports for the project period 2010-2012.
 4. Physico-Chemical Sorption Studies on Oil Sediments, BP GRI Code: T4-016-TuU, Final BP Gulf of Mexico Oil Spill project period 2010-2012 (Scheduled to submit by June 30, 2012).
 5. Visible Light Activated Photocatalysis for the Chemical Evaluation, Photodegradation of Oil-Dispersant Interaction in Deepwater Horizon Oil-Spill, BP GRI Code: SGER-004-TuU Final BP Gulf of Mexico Oil Spill project period 2010-2012 (Scheduled to submit by June 30, 2012).
 6. Fuel Cell and Hydrogen Storage Research, Sessa Srinivasan, Yogi Goswami, Lee Stefanakos, US DOE Project Code: DE-FG36-04GO14224, Final DOE Report for project period 2004-2010.
 7. QSI-nano Additives for the Reversible Enhancement of Hydrogen Storage Characteristics in Complex Hydrides, Final Project Report – Whitepaper submitted to QuantumSphere Inc., CA, 2009.
-

Selected Presentations (Invited / Contributed):

1. Advanced Materials for Energy, Environmental and Biomedical Applications, Florida Polytechnic University, Lakeland, FL, November 25, 2013 **(Invited)**.
2. Advanced Materials for Energy, Environmental and Biomedical Applications, Alabama A&M University, Huntsville, AL, September 26, 2013 **(Invited)**.
3. Nanomaterials Driven Energy, Environmental and Biomedical Research, International Conference on Nanomaterials (ICN), August 2013, at Western University, London, Canada **(Invited)**.
4. Advanced (nano) Materials Research for Clean Energy, Environment and Health Applications, Indian Institute of Technology, Chennai, India and Banaras Hindu University, Varanasi, India, June 2013 **(Invited)**.

5. Reversible Hydrogen Storage Characteristics of Catalytically Enhanced Ca-Li-nMg-B-N-H System, American Physical Society's (APS) April 2013 meeting in Colorado State.
6. Development of high storage capacity complex hydrides for reversible hydrogen storage, Chirstelle Biagwoul, Sessa Srinivasan et. al., 2iE Science Week, Burkina Faso, March, 2013.
7. Physicochemical characterizations of oil spill samples collected from Gulf of Mexico, 90th Annual Meeting of Alabama Academy of Science, Samford University, Birmingham, AL, March 21, 2013.
8. Water/air detoxification and disinfection via solar assisted photocatalysis, 1st TU-2iE Summer School, Burkina Faso, Ouagadougou, June 11-20, 2012 **(Invited)**.
9. Hydrogen (Energy) storage challenges for On-board Fuel Cell Vehicles, 1st TU-2iE Summer School, Burkina Faso, Ouagadougou, June 11-20, 2012 **(Invited)**.
10. Physico-chemical characteristics of Gulf of Mexico Oil-Spill samples, 2nd Gulf Oil Spill and Alternative Energy Symposium – 89th Annual Meeting of the Alabama Academy of Science Meeting, Tuskegee University, Tuskegee, AL, February 2012 (Oral Presentation).
11. Novel and exotic materials development, Sigma Aldrich Corporation, October 03, 2011 **(Invited)**.
12. Investigation of catalytic effects and compositional variations in desorption characteristics of LiNH₂-nanoMgH₂, 2011 Southeast and Southwest Regional Meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE), Auburn University, Auburn, AL, November 2011 (Oral Presentation).
13. Physico-chemical characteristics of soil and liquid samples collected from Gulf of Mexico and Deepwater Horizon Oil Spill Sites, 2011 Joint Annual Conference of National Society for Black Physicist and the National Society for Hispanic Physicist, Austin, TX, Sept. 2011 (Oral Presentation).
14. Visible light photocatalysis for the chemical evaluation and photodegradation of oil dispersant interaction in deepwater horizon oil spill, 1st Gulf Oil Spill Symposium at the 88th Annual Meeting of the Alabama Academy of Science Meeting, Jacksonville State University, Jacksonville, AL, March 2011 (Oral Presentation).
15. Nanostructured Polymer Fibers for Hydrogen Storage, 87th Annual Meeting of the Alabama Academy of Science, Alabama A&M University, Huntsville, AL, Mar-April 2010 (Oral Presentation).
16. Hydrogen Energy Technologies, Invited presentation cum demonstration, Tuskegee University Engineers and Business (TUBE) students conference, Kellogg Conference Center, Tuskegee University, October, 2010 & 2011 **(Invited)**.
17. Electrospun polyaniline nanofibers and nanoscale complex hydrides for reversible hydrogen storage, 2010 ONR S&T Partnership Meeting–November 08-10, 2010, Hyatt Regency International, Arlington, Washington DC, (Poster Presentation).
18. Thermal gravimetric and volumetric hydrogen desorption in LiNH₂-nano MgH₂, Florida Energy Systems Consortium (FESC), September 30, 2010, University of Central Florida, Orlando, FL (Poster Presentation).
19. A paradigm shift towards cross disciplinary research – Authors perspectives towards hydrogen energy storage, Enhancing Communication in Cross Disciplinary Research (ECCDR), September 30 – October 2, Coeur d'Alene, University of Idaho, Idaho (Poster Presentation).
20. Light weight high capacity hydrogen storage systems for portable clean energy applications, Hydrogen Production+Storage (H2PS) –IntertechPira's 15th International Fuels Conference, October 02, 2009, Marriott Washington, Washington DC **(Invited)**.
21. Development of light weight, high capacity reversible hydrogen storage systems, HHO Games and Exposition, July 18, 2009, St. Petersburg, FL **(Invited+ Guest Speaker)**.

22. Clean Energy and Environmental Research at USF, *Sustainability and ARRA Seminar for Florida Municipalities*, June 18, 2009, University of South Florida Downtown Center, Tampa, FL **(Invited)**.
 23. Reversible hydrogen storage in polyaniline nanostructures and complex hydrides, June 22, 2009, *Florida International University, University of Miami*, Miami, FL **(Invited)**.
 24. Nanomaterials for energy and environmental applications, *Florida Energy Systems Consortium (FESC) Small Molecule Chemistry to Energy Team Meeting*, June 15, 2009, University of Florida, Gainesville, FL **(Invited)**.
 25. Hydrogen storage in complex metal hydrides, *National Institute of Standards Technology*, May 20, 2009, Maryland, Washington DC **(Invited)**.
 26. Clean Energy and Environment for the Sustainable Earth, *Rotary Club of Zephyrhills*, Florida, July 2008 **(Invited)**.
 27. Clean Energy and Environment for the Sustainable Earth, *NSF STARS Summer Camp*, University of South Florida, Tampa, FL, June 2008 **(Invited)**.
 28. Advanced Materials Based Technologies for On-board Hydrogen Storage, *Florida Solar Energy Center*, Cocoa, FL, 2007 **(Invited)**.
 29. Materials discovery for the sustainable energy and environment, *Wildcat Discovery Technologies Inc.*, San Diego, CA, USA, 2007 **(Invited)**.
 30. Nanoclusters and nanocatalysts for environmental and energy storage applications, National Center for Catalysis Research, Department of Chemistry, *Indian Institute of Technology, Chennai, India*, 2007 **(Invited)**.
 31. Clean Energy and Environment for the Sustainable Earth, *94th Indian Science Congress, Genesis Symposium*, Annamalai University, Chidambaram, India, 2007 **(Invited)**.
 32. Chemical synthesis of conducting polymer nanofibers for hydrogen storage applications, *H3-2009 International Conference*, Hyderabad, India (Oral Presentation).
 33. Hydrogen Storage, Production and Fuel Cell Research, *2009 DOE Merit Review Meeting*, June 2009, Washington DC, USA (Poster Presentation).
 34. Hydrogen Storage in ZrNi intermetallic alloys, *Fall'08 Materials Research Society Meeting*, Boston, MA (Oral Presentation).
 35. Transition metal complex borohydrides for hydrogen storage, *AIChE Fall Meeting*, Philadelphia, 2008 (Oral Presentation).
 36. Nanomaterials for Energy and Environment Applications, *NanoFlorida 2008*, University of Central Florida, FL, 2008, (Oral Presentation).
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Participations in Workshops/Expositions/Summer Camp/Tech Meet

1. *Plato On-site Training Workshop* organized by the Tuskegee University Center for Academic Excellence and Innovative Learning (T-CAEIL), September 19, 2013.
2. *Virtual Training of Plato Software Workshop* organized by the Tuskegee University Center for Academic Excellence and Innovative Learning (T-CAEIL), August 28, 2013.
3. Becoming a Science Messenger workshop organized by *NSF and AL-EPSCoR* at Tuskegee University, November 27-28, 2012.
4. Principal Investigator *Workshop on Deepwater Horizon Oil Spill (SOST)*, University of South Florida, Tampa, FL, Oct. 25-26, 2011.
5. *Interdisciplinary Consortium for Research and Education Access in Science and Engineering (INCREASE) 2011 Workshop*, Center for Functional Nanomaterials (CFN), Brookhaven National Laboratory, New York, January 10-11, 2011.
6. BP-Oil Spill project team forming meeting, *Dauphin Island Sea Lab and the Marine Engineering Systems Consortium (MESOC) meeting*, Mobile, AL, September 10, 2010.
7. A *Workshop on Introduction to Nuclear Engineering* (NRC)3, Howard University, Washington DC, July 26-30, 2010.

8. CEREL Spring Conference, University-Federal Dialogue on Environment and Energy Research and Education, April 21, 2009, Madison Hotel, Washington DC.
 9. NCMC-14 Workshop, Combinatorial synthesis and characterization of hydrogen storage materials, National Institute of Standard Technology (NIST), Maryland, 2008.
 10. Engineering EXPO 2009 – University of South Florida, February 2009 (CERC Booth Coordinator).
 11. Sustain Bull Expo – University of South Florida, April 2008 (Co-coordinator of CERC event)
 12. NSF STARS Summer Camp – University of South Florida, 120 school kids from Hillsborough County (Co-coordinator of the CERC demonstration research)
 13. Governor's (Charlie Christ) Climate Summit; Serve to Preserve, Miami, April 2008 (CERC Exposition coordinator)
 14. USF-TECO Forum (Meet with Senator Mel Martinez) October 2008 (CERC-FESC Expo coordinator).
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UNIVERSITY AND PUBLIC/PROFESSIONAL SERVICE

1. Demonstration of Clean Energy and Environmental projects at the 4th Joint Annual Research Symposium, Tuskegee University, Tuskegee, AL, March 14, 2013.
 2. Exposition of Clean Energy and Environment demonstration projects to Tuskegee Public Elementary School as part of the Tuskegee university Service Day activities, Nov. 9, 2012.
 3. Gulf Oil Spill and Alternative Energy Symposium Organizer – AAS 89th Annual Meeting, Tuskegee University, Tuskegee, AL, February 24, 2012.
 4. Mathematica 8 Workshop Organizer, Sean McDonald (Invited Speaker), Wolfram Research, Tuskegee University, 2011.
 5. Session Chair and organizer: International Conference on Engineering and Meta Engineering symposia – Thermal storage, Hydrogen storage, Batteries and Ultracapacitors, International Conference on Engineering and Meta Engineering (ICEME) 2010, Orlando, FL.
 6. Session Chair: Hydrogen Production and Storage, World Hydrogen Technology Convention 2009, New Delhi, India
 7. Session Chair: Complex Borohydrides, World Hydrogen Technology Convention, 2007, Italy.
 8. Organizer - USF-CERC and Industry meet (Rohm and Haas, Sigma Aldrich) 2006,
-

STUDENT ADVISING / MENTORING (THESIS EXAMINER / COMMITTEE / TECH SUPORT)

Doctor of Philosophy (Ph.D.)

2013

1. David Baah, Chemical Engineering, Tuskegee University, (Technical Support), Nanofluids and Nanostructures
2. D.E. Demirocak, Mechanical Engineering, University of South Florida, (Technical Support), Hydrogen Storage.
3. R. Rethnadurai, Electrical Engineering, University of South Florida, (Technical Support). Polyaniline Nanofibers

2009

1. T. Krishnakumar, SRMV College of Arts and Science, Coimbatore, India, SnO2 nanostructures Sensor applications, (External Thesis Examiner).
2. M.U. Niemann, Mechanical Engineering, University of South Florida, Tampa, FL, Hydrogen Storage, (Committee).
3. P. Choudhury, Chemical Engineering, University of South Florida, Hydrogen Storage, (Committee).

2008

1. J. Mbah, Chemical Engineering, University South Florida, H₂S Electrolysis, (Technical Support)

Master of Science (M.S.)

2013

1. Christelle Biagwol, International Institute for Water and Environmental Engineering (2iE), Burkina Faso, W. Africa (Student Advisor) – Hydrogen Storage

2011

1. S. Modathar, Electrical Engineering, Tuskegee University, Tuskegee, AL, Smart Grids and Renewable Energy, (Technical Support).

2010

1. D. Latchman, Chemical Engineering, University of South Florida, Carbon Sequestration, (Technical Support).

2007

1. D. Escobar, Electrical Engineering, University of South Florida, Hydrogen Storage, (Committee Member).
2. L. Rivera, Chemical Engineering, University of South Florida, Hydrogen Storage, (Committee Member).
3. P. Algarin, Electrical Engineering, University of South Florida, Photocatalysis, (Technical support).

Research Experience for Undergraduates (REU)

1. Summer 2009 Anthony Angelo, Hydrogen Storage in Hydrides, University of S Florida, (Mentor)
2. Summer 2008 W. Andrew, University of South Florida, Tampa, FL, Hydrogen Storage, (Mentor)
3. Summer 2007 R. Nicole, University of Puerto Rico, Tampa, FL, Hydrogen Storage, (Mentor)

UNDERGRADUATE STUDENTS (B.S.) MENTORED FOR RESEARCH

Fall 2013

1. Mr. Lamont Henderson – Junior (Physics) – Photocatalytic reduction of CO₂ and water for fuel generation – NSF(EAGER)
2. Mr. Jeremiah Wilson – Junior (Physics) – Bacterial disinfection using visible light assisted photocatalysis – NIH (MARC)
3. Mr. Freddie Eskeridge – Senior (Chemical Engineering) – Reversible hydrogen storage materials development – (DOE, USAID)
4. Mr. Timothy Powell – Senior (Physics) – Photocatalytic air disinfection radiation modeling – AASD-STEM
5. Ms. Leah Sanks – Junior (Physics) – Alternative electric vehicles for transportation – DOT

Spring 2013

1. Ms. Bria Moore – Senior (Physics) – Magnetic nanoparticles for bio-medical applications, NSF-MARC.
2. Mr. Jeremiah Wilson – Junior (Physics / Chemical Engineering) - Hydrocarbon fuel production by CO₂+H₂O photocatalysis – Funded to Dr. P.C. Sharma by the National Science Foundation.
3. Mr. Lamont Henders – Junior (Physics / Electrical Engineering) – Reversible Hydrogen Storage for Fuel Cell Applications.

Fall 2012

1. Mr. Jeremiah Wilson – Sophomore (Physics / Chemical Engineering) – Hydrocarbon fuel production by CO₂+H₂O photocatalysis – Funded to Dr. P.C. Sharma by the National Science Foundation.

2. Mr. Sammie Ely III – Junior (Physics / Aerospace Engineering) – Hydrocarbon fuel production by CO₂+H₂O photocatalysis – Funded to Dr. P.C. Sharma by the National Science Foundation.
3. Ms. Bria M. Moore – Junior (Physics)– Magnetic Nanoparticles for Biomedical applications – NSF-MARC Program

Spring 2012

1. Mr. Jeremiah Wilson, Mr. Sammie Ely III – Sophomore (Physics / Aerospace Engineering) – Oil Spill project funded by Dauphin Island Sea Lab.
2. Mr. Sammie Ely III – Sophomore (Physics / Aerospace Engineering) – Oil Spill project funded by Dauphin Island Sea Lab.
3. Ms. Bria M. Moore – Junior (Physics / Biology) – Nanoparticles for Biomedical applications – MARC Program.

Summer 2012

1. Mr. Michael Carter – sophomore (Physics / Aerospace Engineering) – Oil Spill Project funded by Dauphin Island Sea Lab.
2. Mr. Brown Darius – Senior (Physics / Biology) - Oil Spill Project funded by Dauphin Island Sea Lab.

Fall 2011

1. Sammie Ely III, Physics/Aerospace Eng., Tuskegee University – BP Oil Spill

Summer 2011

1. Jeremiah Wilson, Physics/Aerospace Eng., Tuskegee University – BP Oil Spill

Fall 2010

1. Timothy Powell, Physics/Electrical Eng., Tuskegee University, - AASD-STEM

Spring 2010

1. Edward Arthur, Physics, Tuskegee University, - Bandgap Engineering.
-

UNDERGRADUATE STUDENTS' AWARDS AND CONFERENCE PARTICIPATION

1. Poster Title: Bandgap Engineered Zinc Iron Oxide Magnetic Nanoparticles for Biomedical Applications, Lamont Henderson, Sessa Srinivasan et. al, NanoBio Summit 2013, Alabama State University, Montgomery, Alabama, October 17, 2013.
2. Poster Title: Combinatorial Synthesis and Characterization of Zinc Iron Oxide Nanoparticles for Biomedical Applications, Bria Moore, Sessa Srinivasan (2nd Prize winner) of the 90th Annual Meeting of AAS, Samford University, March 21, 2013.
3. Poster Title: Design and Optimization of Photocatalytic Disinfection System for Biological and Environmental Health Applications, Jeremiah Wilson, Sessa Srinivasan, P.C. Sharma, 90th Annual Meeting of AAS, Samford University, March 21, 2013.
4. Poster Title: Reversible Solid State Hydrides for Fuel Cell Vehicles, Lamont Henderson, Sessa Srinivasan, P.C. Sharma, 90th Annual Meeting of AAS, Samford University, March 21, 2013.
5. Poster Title: Combinatorial Synthesis and Characterization of Zinc Iron Oxide Nanoparticles for Biomedical Applications, Bria Moore, Sessa Srinivasan (2nd Prize winner) of the 4th Joint Annual Research Symposium (JARS), March 15, 2013.
6. Poster Title: Design and Optimization of Photocatalytic Disinfection System for Biological and Environmental Health Applications, Jeremiah Wilson, Sessa Srinivasan, P.C. Sharma, 4th Joint Annual Research Symposium (JARS), March 15, 2013.
7. Oral Presentation Title: Reversible Solid State Hydrides for Fuel Cell Vehicles, Lamont Henderson, Sessa Srinivasan, P.C. Sharma, 4th Joint Annual Research Symposium (JARS), March 15, 2013.
8. Mr. Sammie Ely III, 1st Prize Winner (\$60) – Undergraduate students poster competition – 89th Annual Meeting of Alabama Academy of Science, Tuskegee University, Tuskegee, February 22-24, 2012, Title of Poster Presentation: Physico-chemical characteristics of soil

and liquid samples collected from Gulf of Mexico and Deep Horizon Oil Spill Site, Authors: Sammie Ely III, Jeremiah F. Wilson, P.C. Sharma, Sessa S. Srinivasan

9. Mr. Jeremiah F. Wilson, 2nd Prize Winner (\$40) - Undergraduate students poster competition – 89th Annual Meeting of Alabama Academy of Science, Tuskegee University, Tuskegee, February 22-24, 2012, Title of Poster Presentation: Oxidation of organic contaminants via UV-Vis photocatalysis, Authors: Jeremiah F. Wilson, Sammie Ely III, P.C. Sharma, Sessa S. Srinivasan.
10. Mr. Sammie Ely III, Travel Award to attend 2012 Quadrennial Physics Congress, NASA Kennedy Space Center, November 8-10, 2012, Title of Poster Presentation: Ball milling of $\text{TiO}_2/\text{InVO}_4$ nanocomposites for the visible light photocatalysis, Authors: Sammie Ely III, Jeremiah F. Wilson, Sessa Srinivasan, P.C. Sharma
11. Mr. Lamont Henderson, Travel Award to attend 2012 Quadrennial Physics Congress, NASA Kennedy Space Center, November 8-10, 2012, Title of Poster Presentation: Custom Design and Demonstration of UV-Vis Photocatalytic Reactors, Authors: Lamont Henderson, Jeremiah F. Wilson, Sammie Ely III, Sessa Srinivasan, P.C. Sharma.

Willy R. Wriggers - Curriculum Vitae and Publications

Prepared for Florida Polytechnic University and SACS on the occasion of employment offer. Date of preparation: December 10, 2013.

A. GENERAL INFORMATION

1. Name: Willy R. Wriggers
2. Laboratory Web Site: <http://www.biomachina.org>
3. Home address, telephone:
72 Young Ave
Croton on Hudson, NY 10520,
USA
Tel: +1-914-595-6901
4. Mobile phone: +1-917-828-3865
5. Personal email: wriggers@biomachina.org

B. EDUCATION (DEGREES)

Ph.D., 1998, Physics, University of Illinois at Urbana-Champaign 1992-97 (thesis adviser: Prof. Klaus Schulten, Computational Biophysics)

Vordiplom, 1991, Physics, Universität Regensburg, Germany 1989-92

C. PROFESSIONAL POSITIONS AND EMPLOYMENT

1. Post-Doctoral Training (concurrent):

University of California, San Diego, CA, 1997-1999 (supervisor: Prof. J. Andrew McCammon, Theoretical Chemistry)

The Scripps Research Institute, La Jolla, CA, 1998-1999 (supervisor: Prof. Ronald A. Milligan, Cell Biology)

2. Position and Employment

Professor of Advanced Technology, Florida Polytechnic University, February 2014

3. Past Positions

Member, D. E. Shaw Research, 2007-2014

Associate Professor of Computational Biomedicine, Weill Medical College of Cornell University, 2007-2014

Associate Professor of Biophysics, Weill Medical College of Cornell University, 2007-2014

Associate Professor (with Tenure), School of Biomedical Informatics, University of Texas Health Science Center at Houston, 2003-2007. (Tenure awarded 2006; from 2003-2006 the title was: Assistant Professor, Tenure Track).

Adjunct Faculty Positions in Houston 2003-2007:

- Institute of Molecular Medicine for the Prevention of Human Diseases, University of Texas Health Science Center at Houston
- The University of Texas Graduate School of Biomedical Sciences at Houston
- The W. M. Keck Center for Computational and Structural Biology, Rice U.
- Graduate School of Biomedical Sciences, Baylor College of Medicine
- Ph.D. Program in Structural Computational Biology and Molecular Biophysics, Baylor College of Medicine
- Houston Area Molecular Biophysics Program, Baylor College of Medicine

Assistant Professor, Tenure Track, Department of Molecular Biology, The Scripps Research Institute, La Jolla, CA, 1999-2003

D. PROFESSIONAL MEMBERSHIPS

Member	American Chemical Society	2003-present
Member	American Crystallographic Association	2002-present
Member	IEEE Computer Society	2001-present
Member	Biophysical Society	1994-present

E. HONORS AND AWARDS

Science Magazine Breakthrough of the Year, Runner Up (for *Shaw, et al.*, Atomic-Level Characterization of the Structural Dynamics of Proteins. *Science* 2010, 330:341-346), 2010

John P. McGovern Outstanding Teaching Award, UTHSCH, 2007

National Institutes of Health R01 grant application ranked at top 0.9 percentile, 2005

John P. McGovern Outstanding Teaching Award, UTHSCH, 2004

Alfred P. Sloan Fellow, Computational and Evolutionary Molecular Biology, 2003

Principal Investigator, Human Frontier Science Program project grant, ranked 7th out of 549 applications, 2003

Paper of the Year Award, Journal of Structural Biology, 2001

National Institutes of Health R01 grant application ranked at top 1.8 percentile, 2001

Postdoctoral Fellow, La Jolla Interfaces in Science program (Burroughs Wellcome Fund), 1998-1999.

Fellow, German Academic Exchange Service (DAAD), 1992-1993

Fellow, Friedrich Ebert Foundation (Germany), 1991-1994

F. CURRENT AND PAST INSTITUTIONAL RESPONSIBILITIES

1. Teaching

At New York Structural Biology Center:

- **Cryoelectron Microscopy of Macromolecular Assemblies** (2011-2013; graduate course shared with David Stokes, Hernando Sosa, Joachim Frank et al.)

At UTHSCH:

- **Biomolecular Modeling and Simulation** (award winning graduate course, 2003-2007)
- **Image Analysis and Pattern Recognition** (award winning graduate course, 2004-2006)
- **Computational Structural Biology** (graduate course, 2004-2006)

2. Administrative Service

School of Biomedical Informatics, UTHSCH (2003-2007)

- **Curriculum Committee**
- **Space Committee**
- **Academic Advisory Committee**
- **High Performance Computing Committee**
- **Lectureship Organizer**: John P. McGovern Lectures and Town Hall Meetings in Biomedical Computing and Imaging
- **Workshop Organizer: *Innovations in Nanoscale Modeling and Imaging of Biological Systems***. April 17-23, 2006, Houston. Organized by Willy Wriggers and research group (20 invited speakers and 90 participants)

Texas Medical Center (2003-2007)

- W. M. Keck Center for Computational and Structural Biology, **Nanobiology Committee**: UTHSCH Representative
- W. M. Keck Center for Computational and Structural Biology, **Undergraduate Research Training Program**: UTHSCH Representative
- Ph.D. Program in Structural Computational Biology and Molecular Biophysics (Baylor College of Medicine): **Student Recruitment**
- University of Texas Health Science Center at Houston, **Faculty Research Advisory Panel**

- The Brown Foundation Institute of Molecular Medicine for the Prevention of Human Diseases, **Academic Advisory Committee**
- **Cryo-Microtomy Workshop**, organized at the The Brown Foundation Institute of Molecular Medicine for the Prevention of Human Diseases with *Boeckeler Instruments* and *Atomic Spectroscopy Instruments*, November 10-11, 2004

The Scripps Research Institute (2003)

- **Workshop Organizer: *Situs* EM/X-tal Fitting and Modeling**. February 3-5, 2003, San Diego. Organized by Willy Wriggers and research group (6 invited speakers and 29 participants)

G. RESEARCH SUPPORT

Willy R. Wriggers (PI). Multi-Resolution Fitting Tools for Electron Microscopy (\$3,000,000). R01, National Institutes of Health. (2000-2011). The overall goal of the proposed work is the development and dissemination of macromolecular fitting tools for structural data from a variety of biophysical sources. Neural network based methods provide a stringent criterion to eliminate spurious fits. This approach is successful mainly in the rigid-body and flexible docking of single molecules. We will also explore complementary correlation-based approaches that are likely to be advantageous in the integrated modeling of large systems such as the ribosome, virus capsids, and cytoskeletal filaments. This grant is renewable.

Willy R. Wriggers (PI). Fast Rotational Matching Methods for the Structure Determination of Mega-Dalton Subcellular Machines (\$400,000). Human Frontier Science Program. (2003-2007). The major aims of this international collaboration are the development, application, and dissemination of fast rotational matching techniques in structural biology. The methods developed include Fast-Fourier-accelerated techniques for the registration of 2D images and 3D objects. In collaboration with the co-PIs Jorge Navaza (X-ray crystallography, France), Takeyuki Wakabayashi (image processing, Japan), and Herwig Zilken (computer graphics, Germany), we develop algorithms that promise to speed up traditional search methods by several orders of magnitude, enabling challenging refinement techniques in biophysics and structural biology.

Willy R. Wriggers (PI). Sloan Research Fellow, Computational and Evolutionary Molecular Biology (\$40,000). Alfred P. Sloan Foundation. (2003-2007). The Alfred P. Sloan Foundation through the fellowships seeks to support young scientists in the USA and Canada who have demonstrated special creative ability in chemistry, computational and evolutionary molecular biology, computer science, mathematics, neuroscience, and physics. Nominated by Charles Brooks, III and David A. Case.

Charles Brooks, III (PI), & **Willy R. Wriggers** et al. (Co-Is): Multiscale Modeling Tools for Structural Biology (\$360,000). NCCR, National Institutes of Health (2000-2003).

H. EXTRAMURAL PROFESSIONAL RESPONSIBILITIES

Mentor

- **SMART** (Students Modeling a Research Topic) program student mentor, National Institutes of Health, NCRR Center for Biomolecular Modeling (2010-present)

Advisory Board Memberships

- **Advisory Board member, Zementis, Inc, San Diego** (risk management and cloud computing), 2005-present
- **Advisory Service / Funding provided for former lab in Houston**, 2007-2012.
- **Member, EM Validation Task Force, The Protein Data Bank, Rutgers University**, 2010-present.

Journal Editor (ad-hoc)

PLoS Computational Biology

Journal Reviewer

- Biochemistry
- Biophysical Journal
- Biophysical Reviews
- Biopolymers
- BMC Structural Biology
- IEEE Transactions on Medical Imaging
- IEEE Transactions on Signal Processing
- Journal of the American Chemical Society
- Journal of Chemical Theory and Computation
- Journal of Biomolecular Structure and Dynamics
- Journal of Molecular Biology
- Journal of Physical Chemistry
- Journal of Structural Biology
- Methods
- Molecules
- Microscopy Research and Technique
- Nature Structure and Molecular Biology
- Proceedings of the National Academies of Sciences, USA
- Pure and Applied Chemistry
- Proteins: Structure, Function, and Bioinformatics
- Structure
- Ultramicroscopy

Proposal Reviewer

- Academic Press (book proposal)
- National Institutes of Health (grant)

- National Science Foundation (grant)
- University of Houston GEAR Program (grant)
- American Chemical Society / Petroleum Research Fund (grant)
- Katholieke Universiteit Leuven, Belgium (grant)
- Research Corporation (grant)
- The Wellcome Trust (grant)

Study Sections and Consulting

- September 28-29, 2010: Workshop on Cryo-Electron Microscopy Structure Validation. Rutgers University, Piscataway, New Jersey. Expert panel member on electron microscopy structure validation in the PDB / EMDB databases.
- June 14, 2008: NSF proposal review, Theoretical Biology Program. Several proposals reviewed for this program since 2004.
- March 9-10, 2009: NIH Study Section ZRG1 BST-D.
- March 16-17, 2005: NIH Study Section ZRG1 F04B.
- July 19-22, 2005: NIH Study Section, "Centers of Cancer Nanotechnology Excellence".
- October 23-24, 2004: Workshop on Cryo-Electron Microscopy Structure Deposition. Rutgers University, Piscataway, New Jersey. Expert panel member on electron microscopy structure deposition.
- July 12-15, 2004: Howard Hughes Medical Institute and the Max-Planck Society, Germany: "Workshop on the Future of Imaging" in Munich, Germany. Expert panel member on the role of molecular modeling in imaging and biocomputing.
- May 15-18, 2004: Human Frontier Science Program Fourth Annual Awardees Meeting, Hakone, Japan. Coordination of research of an international team of HFSP funded investigators.
- August 30, 2002: Consultation for Genetic Applications Corp. San Diego, CA.
- February 07, 2002: Consultation for Integrated Discovery Sciences Corporation, San Diego, CA.

I. SPEAKING ENGAGEMENTS

1994-present: 118 invited talks and tutorials in Europe, Asia, and North America. Highlights include:

- Gordon Research Conference: Computational Aspects of Biomolecular NMR, Mount Snow Resort, VT, June 2-7, 2013.
- Laufer Center for Physical and Quantitative Biology, Stony Brook University, April 24, 2012. (host K. Dill).
- Center for Structural Biology, Tsinghua University, Beijing, China. November 4, 2011. (host: N. Gao)
- High Performance Computing Symposium. Lehigh University, Bethlehem, PA. April 15, 2011.
- CCP4 Study Weekend: Model Building and Refinement and Validation, January 6, 2011, U Warwick, UK
- EMBO Practical Course, The Combination of Electron Microscopy and X-Ray Crystallography for the Structure Determination of Large Biological Complexes, Grenoble, France, October 21, 2009.
- Symposium on Molecular Approaches in Molecular Biophysics, Max-Planck Institute for Biophysics, Frankfurt, Germany. July 2, 2004

- Karolinska Institutet, Stockholm, Sweden, June 14, 2002 (host U. Skoglund).
- The 8th European Commission Summer School on Electron Crystallography, Tampere, Finland, June 12, 2002.
- Division of Experimental Medicine, Brigham and Women's Hospital, Harvard U, Boston, MA. August 2, 1996 (host P. Janmey).

J. OPEN SOURCE SOFTWARE DEVELOPMENT

- *TimeScapes*: Molecular Dynamics trajectory analysis (data mining and pattern recognition) tools (Python).
- *ModeHunter*: Elastic network modeling and coarse graining tools (Python)
- *Hingefind*. Domain motion analysis (geometric/statistical) tools (TCL).
- *Situs*: Award winning UNIX-based multi-scale docking suite which I developed since 1999 (C/C++, 50,000 lines of code).
- *Sculptor*: 3D visualization and modeling program (C++, 250,000 lines of code developed by a team under my supervision).

K. BIBLIOGRAPHY

My h-index is 33 with a total of 4484 citations (source: Google Scholar 12/10/13).

Published articles (peer-reviewed):

- 1) Zbigniew Starosolski, Marek Szczepanski, Manuel Wahle, Mirabela Rusu, and **Willy Wriggers**. Developing a Denoising Filter for Electron Microscopy and Tomography Data in the Cloud. *Biophysical Reviews*. 2012, 4:223-229.
- 2) **Willy Wriggers**, Wilma K. Olson, Cristobal G. dos Remedios. Computational Opportunities for Remote Collaboration and Capacity Building Afforded by Web 2.0 and Cloud Computing. *Biophysical Reviews* 2012, 4:153-160.
- 3) Mirabela Rusu, Richard Bonneau, Michael R. Holbrook, Stanley J. Watowich, Stefan Birmanns, **Willy Wriggers** and Alexander N. Freiberg. An assembly model of Rift Valley fever virus. *Frontiers in Microbiology*, 2012, 3: 00254.
- 4) Mirabela Rusu, Zbigniew Starosolski, Manuel Wahle, Alexander Rigort, and **Willy Wriggers**, Automated Tracing of Filaments in 3D Electron Tomography Reconstructions using Sculptor and Situs, *J. Struct. Biol.*, 2012, 178:121-128.
- 5) **Willy Wriggers**. Conventions and Work Flows for using Situs. *Acta Cryst. D*, 2012, 68: 344-351.
- 6) Richard Henderson, Andrej Sali, Matthew L. Baker, Bridget Carragher, Batsal Devkota, Kenneth H. Downing, Edward H. Egelman, Zukang Feng, Joachim Frank, Nikolaus Grigorieff, Wen Jiang, Steven J. Ludtke, Ohad Medalia, Pawel A. Penczek, Peter B. Rosenthal, Michael G. Rossmann, Michael F. Schmid, Gunnar F. Schroder, Alasdair C. Steven, David L. Stokes, John D. Westbrook, **Willy Wriggers**, Huanwang Yang, Jasmine Young, Helen M. Berman, Wah Chiu, Gerard J. Kleywegt, and Catherine L. Lawson. Outcome of the First Electron Microscopy Validation Task Force Meeting. *Structure*. 2012, 20:205-214.
- 7) Mirabela Rusu, and **Willy Wriggers**. Evolutionary Bidirectional Expansion for the Tracing of Alpha Helices in Cryo-Electron Microscopy Reconstructions. *J. Struct. Biol.* 2012, 177:410-419
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- 11) David E Shaw, Paul Maragakis, Kresten Lindorff-Larsen, Stefano Piana, Ron O Dror, Michael P Eastwood, Joseph A Bank, John M Jumper, John K Salmon, Yibing Shan and **Willy Wriggers**. Atomic-level characterization of the structural dynamics of proteins. *Science* 2010, 330(6002):341-346.
- 12) **Willy Wriggers**. Using *Situs* for the Integration of Multi-Resolution Structures. *Biophysical Reviews* 2010, 2:21-27.
- 13) **Willy Wriggers**, Kate A. Stafford, Yibing Shan, Stefano Piana, Paul Maragakis, Kresten Lindorff-Larsen, Patrick J. Miller, Justin Gullingsrud, Charles A. Rendleman, Michael P. Eastwood, Ron O. Dror, and David E. Shaw. Automated Event Detection and Activity Monitoring in Long Molecular Dynamics Simulations. *Journal of Chemical Theory and Computation* 2009, 5:2595-2605.
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- 16) Zhiyong Zhang and **Willy Wriggers**. Coarse-Graining Protein Structures With Local Multivariate Features from Molecular Dynamics. *J. Phys. Chem. B* 2008, 112:14026-14035.
- 17) Mirabela Rusu, Stefan Birmanns, and **Willy Wriggers**. Biomolecular Pleiomorphism Probed by Spatial Interpolation of Coarse Models. *Bioinformatics* 2008, 24:2460-2466.
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- 2) **Willy Wriggers**. Deterministisches Chaos und Himmelsmechanik: Teil 1 (Deterministic Chaos and Celestial Mechanics: Part 1). *Rosa Ursina* (Quarterly Magazine of the *Astronomischer Arbeitskreis Ingolstadt*, Germany) 1991, Issue 03 (July), pp. 8-16.
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