

College of Engineering and Computing

Executive Dean and Distinguished

<i>Professor</i>	Vish Prasad
<i>Associate Dean for Academic Programs</i>	L. David Shen
<i>Associate Dean for Outreach</i>	Gustavo Roig
<i>Associate Dean for Graduate Studies and Research</i>	Norman Munroe
<i>Acting Director, Corporate and Global Programs</i>	Shih-Ming Lee

The College of Engineering and Computing is committed to educate professionals who can serve industry and the community at large in a wide variety of fields, as well as conduct innovative basic and applied research that meets the technical needs of industry and government, improves the quality of life, and contributes to the economic viability of Florida, the Nation, and the world.

The College of Engineering and Computing consists of six academic departments: Biomedical Engineering, Civil and Environmental Engineering, Construction Management, Electrical and Computer Engineering, Industrial and Systems Engineering, and Mechanical and Materials Engineering. These academic departments offer programs leading to the Bachelor of Science, Master of Science and Doctor of Philosophy degrees.

The College has two institutes and nine centers supporting its academic and research programs. The institutes are the Advanced Materials Engineering Research Institute (AMERI) and the Telecommunications and Information Technology Institute (IT2). The centers are the Applied Research in Industrial and Systems Engineering (ARISE), Cardiovascular Engineering Center (CVEC), Center for Advanced Technology and Education (CATE), Center for Diversity in Engineering (CDE), Center for Energy and Technology of the Americas (CETA), Center for the Study of Matter at Extreme Conditions (CeSMEC), Engineering Manufacturing Center (EMC), Future Aerospace Science and Technology Center (FAST), and the Lehman Center for Transportation Research (LCTR). Two major university centers, Hemispheric Center for Environmental Technologies (HCET) and International Hurricane Research Center (IHRC) work very closely with the College of Engineering with many joint appointments at the faculty level.

The College has recently created an open-access Motorola Nanofabrication Research Facility to conduct research in nanoelectronics, bio/nanosensors and nanomaterials. In addition, the FIU College of Engineering has developed many collaborations with the industry and hospitals in Florida and across the nation.

The programs of the College are directed towards the practical use of scientific, engineering, and technical principles to meet the objectives of industry, business, government and the public.

The College provides each student with the opportunity to develop a high level of technical skills and to obtain an education, which will prepare him or her for a rewarding career and personal growth.

Underlying the programs of the College is a recognition that the growing impact of technology upon the quality of life is increasing and that the proper application of technology is critical to meeting current and emerging human needs. The College faculty is actively engaged with business, industry and government. Faculty members

also participate in a variety of basic and applied research projects in areas such as energy, transportation, solid waste disposal, biotechnology, biomedical devices and instrumentation, computer engineering, artificial intelligence, manufacturing, robotics telecommunications, micro-electronics, nano-electronics, nanotechnology, neuro-sciences/engineering, modeling and simulation, construction engineering, materials, structural systems, virtual prototyping, systems modeling, information technology, environmental sciences and engineering, image processing, engineering education, etc.

Doctor of Philosophy

The College offers Doctor of Philosophy degrees in Biomedical Engineering, Civil Engineering, Industrial and Systems Engineering, Electrical Engineering and Mechanical Engineering.

Areas of study in Biomedical Engineering include:

- Biomechanics, Biomaterials, and Medical Devices
- Bioinstrumentation, and Biomedical Image/Signal Processing
- Drug Delivery and Tissue Engineering
- Medical Physics and Nuclear Medicine
- Bio-nanotechnology and Systems Biology

Areas of study in Civil Engineering include:

- Transportation Engineering
- Environmental Sciences and Engineering
- Structural Engineering
- Geotechnical Engineering
- Construction Engineering and Management

Areas of study in Electrical Engineering include:

- Biomedical Sciences and Engineering
- Micro-Electronics, Nano-Electronics and Photonics
- Computer Engineering
- Systems and Controls
- Electromagnetics and Nanomagnetism
- Power Systems
- Telecommunications and Networking
- Digital Signal and Image Processing

Areas of study in Industrial and Systems Engineering are:

- Enterprise Systems Engineering
- Technology Entrepreneurship
- Information Systems for ISE

Areas of study in Mechanical and Materials Engineering include:

- Thermo/Fluids Sciences
- Biomedical Engineering
- Mechanics of Materials
- Nanostructured Materials
- Ceramics and Electronic Materials
- CAD/CAM
- Manufacturing
- Modeling and Simulation
- Nano Devices

Master of Science Degree Programs

The College offers Master of Science degrees in:

- Biomedical Engineering
- Civil Engineering
- Computer Engineering
- Construction Management
- Electrical Engineering
- Engineering Management
- Environmental Engineering
- Environmental and Urban Systems
- Industrial and Systems Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Technology Management
- Telecommunications and Networking

Corporate and Global Programs

In partnership with national and international corporations and universities, along with the College of Continuing and Professional Studies, the College of Engineering and Computing offers several of its graduate programs off-campus. These programs are offered at the partner's site both in the USA and abroad, particularly Latin America, the Caribbean and China.

Current Global Programs offered include MS in Engineering Management with specializations in Biomedical Technology, Information Systems, and Manufacturing, MS in Computer Engineering, MS in Technology Management, MS in Construction Management, and MS in Telecommunications and Networking.

Students enrolled in these programs are considered regular FIU students; hence, they must meet university admission requirements and are given full access to the university's facilities.

Distance Learning Education

Florida Engineering Education Delivery Systems (FEEDS) provides graduate engineering courses to place-bound professionals via CD, videotape, ITFS, and web-based asynchronous learning modules.

Research Centers and Institutes

Research spans from single discipline to multidisciplinary research in the College of Engineering. Thus, the College, through its research centers and institutes, has established many collaborative and cooperative partnerships with other units in the university as well as with local industry.

The research units involved in these efforts include:

- Advanced Materials Engineering Research Institute (AMERI)
- Applied Research in Industrial and Systems Engineering (ARISE)
- Cardiovascular Engineering Center (CVEC)
- Center for Advanced Technology and Education (CATE)
- Center for Energy and Technology of the Americas (CETA)
- Center for Diversity in Engineering (CDE)
- Center for the Study of Matter at Extreme Conditions (CeSMEC)
- Engineering Manufacturing Center (EMC)
- Future Aerospace Science and Technology Center (FAST)
- Hemispheric Center for Environmental Technologies (HCET)

- International Hurricane Research Center (IHRC)
- Lehman Center for Transportation Research (LCTR)
- Motorola NanoFabrication Research Facility
- Telecommunications and Information Technology Institute (IT2).

Academic Support Services

The area of academic support services is responsible for the coordination of academic advising and student services the College of Engineering. Students are informed on educational opportunities such as scholarships, tuition waivers, and campus resources. It serves as a liaison between the academic departments and the student support services university wide and facilitates the registration process in order to make sure that the students adhere to the College guidelines.

Admission Requirements

Prospective students seeking a graduate degree in the College must satisfy all university admission requirements as well as the specific program requirements. Each department evaluates candidates for admission to its programs. Prospective students should refer to the appropriate section of the catalog for specific admission requirements and for contact information of the Graduate Programs Directors.

Biomedical Engineering: (305) 348-1864
Dr. Eric Crumpler

Civil and Environmental Engineering: (305) 348-3055
Dr. Albert Gan, Civil Engineering
Dr. Shonali Laha, Environmental and Urban Systems
Dr. Berrin Tansel, Environmental Engineering

Construction Management: (305) 348-3172
Dr. Syed Ahmed

Electrical and Computer Engineering: (305) 348-2807
Dr. Jean Andrian

Industrial and Systems Engineering: (305) 348-3491
Dr. Shih-Ming Lee, Engineering Management
Dr. Chin-Sheng Chen, Industrial and Systems Engineering

Mechanical and Materials Engineering: (305) 348-1701
Dr. Arvind Agarwal

Telecommunications and Networking: (305) 348-3987
Dr. Nikki Pissinou

Admitted Student Procedures

A student who has been accepted to a degree program in the College must meet with the Department's Graduate Program Director prior to the enrollment in the first class.

Enrolled students must choose an advisor during their first semester in the program.

Continued contact (at least once per semester) with the advisor is required to review progress and select courses for each succeeding semester.

Courses taken without the required prerequisites and co-requisites, or without the consent of the advisor, will be dropped automatically before the end of the term, resulting in a grade of "DR" or "DF".

Scientific Laboratory Fees are assessed for certain courses where laboratory classes are part of the curriculum. Specific information on scientific laboratory fees may be obtained from the University Financial Services.

Fellowships, Assistantships, and Scholarships

The College of Engineering and Computing offers a variety of fellowships, assistantships, and scholarships to qualified students. These awards are highly competitive; hence, prospective students are urged to apply and submit all required records and scores as early as possible so they can be considered for these awards.

The amounts of these awards vary depending on the type of the award, but they may provide full tuition and a monthly stipend. Visit: www.eng.fiu.edu for additional information.

Policies, Requirements, and Regulations

The University, the Graduate School, and the College of Engineering and Computing have a set of guidelines to protect the student's rights and to ensure a timely graduation. Students must become familiar with all university, Graduate School, and College's graduate procedures. These procedures are described in the University's Student Handbook and this catalog.

The programs, policies, requirements and regulations listed in the catalog are continually subject to review to serve the needs of the University's various publics, and to respond to the mandates of the FIU Board of Trustees and the Florida Legislature. Changes may be made without advance notice.

Florida International University and the College adhere to opportunity practices, which conform to all laws against discrimination and are committed to non-discrimination with respect to race, color, creed, age, handicap, sex, marital status, or nationality. Additionally, the University is committed to the principle of taking positive steps necessary to achieve the equalization of educational and employment opportunities.

College of Engineering Dismissal Policy

A student who has been dismissed from the University for the first time may see the Graduate Program Director to begin the appeal procedure. The Director will determine if the student is eligible to appeal the dismissal or if there is a way to lift the dismissal. If the student is eligible, he or she must make an appointment to see the chairperson or associate chairperson. The student must bring a letter stating when he or she was dismissed the first time and what he or she is going to do to ensure that he or she is not dismissed a second time. If the chairperson determines that the student is worthy of reinstatement, he or she will prepare and sign a memo for the Dean's consideration stating the conditions for the student to be reinstated (the student will be readmitted on academic probation). If the student does not meet these conditions, he or she will be dismissed a second and final time from the program. The student must also sign an agreement stating that he or she understands that the department will not allow a second reinstatement if the student is dismissed again.

Any student who is dismissed a second time from FIU will not be readmitted under any circumstances. Only a first dismissal appeal is considered in the College of Engineering and Computing, a second dismissal appeal will not be accepted.

Department-Specific Information

For additional information refer to your selected department in this catalog, or call the graduate program director of each department. As listed above.

Other Important Contact Information

Website: <http://www.eng.fiu.edu>
Admissions: <http://gradschool.fiu.edu> (305) 348-7442

College of Engineering- Graduate Admissions	(305) 348-3526
Campus Resources	(305) 348-2973
Career Services	(305) 348-1281
Financial Aid	(305) 348-2489
Graduate School	(305) 348-2455
International Student Services	(305) 348-2421
Registrar's Office	(305) 348-2320
Scholarships	(305) 348-2713
Tuition Waivers	(305) 348-2713

Research, Development and Training Centers

Advanced Materials Engineering Research Institute (AMERI)

W. Kinzy Jones, *Director and Professor, Mechanical and Materials Engineering*

The Advanced Materials Engineering Research Institute provides an open access equipment infrastructure to support materials research and engineering over a broad range of technology and capabilities. The Institute provides analytical instrumentation, materials characterization, and process development laboratories to support faculty and industry in the development and characterization of new materials over the continuum from the nanoscale to bulk materials.

The analytical Instrumentation Laboratory contains a field emission scanning electron microscope (FESEM), a 200 keV Transmission Electron Microscope (TEM), Atomic Force Microscope (AFM), X-ray diffraction, thermal (DSC, TGA, DMA, dilatometer flush diffusion, and mechanical testing (uniaxial/biaxial Instron, creep). Process Development laboratories for ceramic processing (sol-gel, tape casting, milling), polymer processing, metal processing, and arc melting, thermal processing (air, vacuum, hydrogen, controlled atmosphere furnaces) are available to support faculty and student researchers.

The Institute consists of the Center for Nanofabrication and Devices, which is supported by a class 100 clean room and nanofabrication capabilities including e-beam lithography and optical photolithography. Fabrication of nano/micro electromechanical systems (N/MEMS) can be accomplished by a combination of nanolithography, focused ion beam (FIB), micro machining, reactive ion etching, and thin film deposition by a variety of techniques (e-beam, sputtering, filament evaporation, cvd).

In addition to supporting research within the graduate program in materials science within the Department of Mechanical and Materials Engineering, the Institute supports faculty across all departments (physics, chemistry, geology, biology, electrical and computer engineering and biomedical engineering) in materials based research.

Research and Support Staff

W. Kinzy Jones, *Director and Professor, Mechanical and Materials Engineering*

Arvind Agarwal, *Assistant Professor, Mechanical and Materials Engineering*

Wonbong Choi, Associate Professor, Mechanical and Materials Engineering
Eric Crumpler, Assistant Professor, Biomedical Engineering
Dennis Fan, Assistant Professor, Mechanical and Materials Engineering
Sakhrat Khizroev, Associate Professor, Electrical and Computer Engineering
Norman Munroe, Associate Professor, Mechanical and Materials Engineering
Roberto Panepucci, Assistant Professor, Electrical and Computer Engineering
Surendra Saxena, Professor, Mechanical and Materials Engineering
Yuriy Vlasov, Assistant Professor, Electrical and Computer Engineering
Kuang-Hsi Wu, Professor, Mechanical and Materials Engineering
Hexiong Yang, Associate Professor, Mechanical and Materials Engineering
Margaret Chadwick, Research Faculty, Mechanical and Materials Engineering
Yesim Darici, Associate Professor, Physics
Sukky Jun, Assistant Professor, Mechanical and Materials Engineering
Watson Lees, Associate Professor, Chemistry
Kevin O'Shea, Associate Professor, Chemistry
Jiandi Zhang, Assistant Professor, Physics
Yanqing Liu, Research Engineer
Carolyn Henderson, Program Assistant

Applied Research in Industrial and Systems Engineering (ARISE)

Martha Centeno, Director and Associate Professor, Industrial and Systems Engineering

The ARISE Center provides a state-of-the-art environment where industrial engineering students, and students from related disciplines, engage in the design and modeling of operational, organizational, and logistics processes for the service and manufacturing industries.

ARISE is involved in the research leading to the formulation of mathematical and computational models needed in the design and deployment of effective and efficient systems.

Students also work on projects for local industry, enabling the transfer of technology and providing a feedback channel from industry to academia.

The creative and research work of ARISE associates have contributed to a better understanding of the operational issues in health care systems, intelligent modeling of traffic systems, improved techniques for discrete simulation, integration of information systems and wireless technologies in space shuttle processing, logistics, space shuttle launch operations, and the integration of mathematical models and simulation.

Cardiovascular Engineering Center (CVEC)

Richard T. Schoepfoerster, Director and Chairperson, Biomedical Engineering
Eric Crumpler, Assistant Professor
Anthony J. McGoron, Assistant Professor
Nikolaos Toukias, Assistant Professor

Ofer Amit, Research Coordinator
James D. Byrne, Research Faculty

The Cardiovascular Engineering Center aims to accelerate the transfer of research to practical applications. It concentrates on design, development and enhanced implementation of diagnostic, interventional, therapeutic and replacement systems and devices associated with the cardiovascular and blood systems. Faculty from the College of Engineering, the College of Health Sciences, and the Department of Biological Sciences collaborate on research efforts in the Center. Scientists, physicians, and biomedical engineers from industry join FIU faculty in research projects.

The Cardiovascular Engineering Center has the distinct role of educating biomedical engineering professionals and preparing a work-force for the biomedical industry by contributing research opportunities for the students in the academic program. At CVEC students have the opportunity to participate in research assignments within a multidisciplinary environment with faculty, industry engineers, scientists, and clinicians.

The Cardiovascular Engineering Center supports applied research interests of industry and clinical sectors and operates in an industry environment. The students enrolled in the biomedical engineering program are exposed to this environment and are better equipped to succeed as professionals.

The CVEC conducts research in biofluid and biosolid mechanics; experimental, mathematical and computational modeling; biomaterials; artificial heart valves; vascular grafts; stents; cardiovascular devices and instrumentation; bioimaging, signal processing and diagnostic imaging.

Center for Advanced Technology and Education (CATE)

Malek Adjouadi, Director and Associate Professor, Joint Appointment with Biomedical Engineering and Electrical and Computer Engineering

The vision of the NSF-CATE center at FIU is to foster a cross-disciplinary research and educational program as a catalyst for our undergraduates and graduates alike to train and develop their creative thinking by bringing in synergy the fields of applied information (signal and image) processing, human/brain-computer interfaces, and neuroscience. The CATE center focuses on the development of new methodologies and scientific discovery that (1) will develop new algorithms in signal and image processing to enhance analysis and interpretation of signals and images in real-world applications; (2) will meet the impending needs in neuroscience as we elicit both the functional mapping of the brain, and the causality of key brain disorders; and (3) will design Human-Computer Interface (HCI) prototypes that address effectively the issue of *Universal Accessibility*, focusing on visual impairment and motor disability. Experimental results, as observed through clinical means or through system design evaluations and feasibility studies serve as means to redefine or re-evaluate our theoretical premises. The strong collaboration we have secured with our industry partners entails student internships, clinical rotations, joint faculty appointments, shared use of modern equipment and infrastructure, all serving in an integrated environment apt to secure the success of our students'

educational and research careers all the way to the Ph.D. level.

Research Areas

- Image and Signal Processing and Computer Vision
- Real-Time Assistive Systems and Human-Computer Interfaces
- Neuroscience: - EEG Brain Research – Functional Brain Mapping and Neurorehabilitation
- Biomedical Applications in Flow Cytometry and Confocal Microscopy
- Robotics for Motion Planning and Automated Guidance
- Parallel and Distributed Processing

Sponsors

- National Science Foundation (NSF)
- Office of Naval Research (ONR)
- Miami Children's Hospital
- Beckman-Coulter Inc.

Faculty

Malek Adjouadi, *Director and Associate Professor, Joint Appointment with Biomedical Engineering and Electrical and Computer Engineering*

Armando Barreto, *Director of the Digital Signal Processing Laboratory and Associate Professor, Joint Appointment with Biomedical Engineering and Electrical and Computer Engineering*

Ana Pasztor, *Professor, School of Computer Science*

Mark Weiss, *Professor, School of Computer Science*

Gustavo Roig, *Director, Center for Diversity in Engineering*

Bob Coatie, *Director of FIU Office of Multicultural Services, (Former Office of Minority Services)*

Faculty Research Associates: Melvin Ayala, Ilker Yaylali

Research Partners

Prasanna Jayakar, *Director, Neuroscience Center, Miami Children's Hospital*

Gualberto Cremades, *Assistant Professor at Barry University*

Rafael Delgado, *Executive Vice President and Director of Software Systems, Intelligent Hearing Systems, Miami*

Julie Jacko, *Director, Laboratory for Human-Computer Interaction, Georgia Tech University*

Clinical Support

Eva Capote, *Registered EEG Technologist, MCH*

Coordinator, Student Recruitment

Stephanie Strange, *College of Engineering, Assistant Director of Recruitment and Retention*

Research and Support Staff

Melvin Ayala, *Laboratory Manager*

Eduardo Caballero, *CATE Center*

Michael Valdes, *CATE Center*

Amado Gonzalez, *WEB Design Lab*

Oscar Silveira, *Interactive Design Lab*

Sheldon Silveira, *Computer Networking*

Industry Partners

- The Neuroscience Center at Miami Children's Hospital
- Beckman-Coulter Inc.
- Intelligent Hearing Systems

Related Laboratories and Facilities of the CATE Infrastructure

With the NSF and ONR continued support, the CATE center has helped in establishing the following laboratories: Interactive Design Laboratory for Undergraduates. *Funded by NSF-MII and Matching funds from the FIU Division of Sponsored Research and Training (DSRT)* – Housed with the ECE department facilities.

1. Human-Computer and Brain-Computer Interface Research Laboratory. *Funded by NSF-MRI* – Housed within the Neuroscience Center at Miami Children's Hospital.
2. Web-Design Laboratory. *Funded jointly by ONR and NSF-MII* – Housed within the Engineering Information Center Facility.
3. The Computer Training Laboratory – Housed in Graham Center with the Office of Multicultural Services.

Center for Energy and Technology of the Americas (CETA)

Harlan Sands, *HCET Executive Director*

Mariano Gurfinkel, *Assistant Director*

Eduardo Manrique, *Program Manager*

Industrialized and industrializing nations the world over need energy security now more than ever. Florida International University (FIU), through the University wide Center for Energy and Technology of the Americas--CETA--is working to enhance hemispheric energy security by building on the long-standing historical, commercial, social, and geopolitical ties it has with the region. The Center, as an affiliate of HCET, performs research and provides assistance on the formulation and adoption of economic, energy and related policies that increase energy supplies, improve energy efficiency in the Western Hemisphere and assists in the development and transfer of energy technologies that have a beneficial impact on world energy markets.

Reliable and adequately priced energy supplies are some of the most important building blocks for economic growth, job creation and hemispheric security. Most scenarios for world, and regional, energy demand predict strong increases in the coming decades and will likely be met, if no measures or policies are put in place, by increased oil and gas production from countries in the Persian Gulf and the former Soviet Union. This reliance on supplies from the Middle East amplifies the political and economic risks the world faces today.

Fortunately, there is great potential for increased energy supplies from the Western Hemisphere that could help mitigate these risks. However, many hurdles must first be overcome such as inadequate regulatory and tax frameworks, rights of way and permitting, access to capital markets, environmental, political and social issues and the obvious, and very relevant, technological challenges.

Given that one of the goals of CETA is to train and develop professional and technical personnel in energy technology and energy policy, students from the various colleges at FIU perform significant portions of the information gathering and preliminary analysis. This arrangement fosters a multidisciplinary view of the subject and provides a unique academic opportunity for students.

For additional information please visit <http://ceta.fiu.edu>.

Center for Diversity in Engineering

Gustavo Roig, *Director, Associate Dean of Engineering and Professor, Electrical and Computer Engineering*

South Florida's distinction as a multi-cultured, multi-lingual region has long been a diverse source of talent for FIU, particularly in the College of Engineering. In response to the challenge of attracting this diverse community to science and engineering, the College of Engineering has created a special center for Diversity in Engineering.

By building sound foundations in sciences and mathematics, the Center helps to prepare young students to deal with the rigors of higher-level education, and Engineering in particular. Currently the Center has several on-going programs targeting Elementary, Middle, and High School level students. These programs are offered throughout the school year and during the summer. GEAR UP! (Gaining Early Awareness and Readiness for Undergraduate Programs), ENLACE MIAMI (Engaging Latino Communities for Education), FLAME (Florida Action for Minorities in Engineering), Proyecto Access/Miami PREP (Pre-freshman Engineering Program), JETS, Junior Engineering Technical Society, as a local chapter, benefits include access to superior program materials (educational packages, self assessments, real-world problem-solving scenarios, team-oriented learning and competitions). The program is designed to increase the technical skills necessary to achieve in basic, engineering skills, applied mathematics, science, and reasoning.

Project MASTT Mathematics/Applied Sciences Teachers' Training – a pre service and in service teachers' training program, funded by NASA/KSC, designed to improve the quality of elementary and middle school science and mathematics education.

The Center also provides job and scholarship opportunities for FIU students. FGLSAMP (Florida-Georgia Louis Stokes' Alliance for Minority Participation) and SHPE Honores (Society for Hispanic Professional Engineers) provide many students with financial assistance. FGLSAMP and SHPE Honores scholarship recipients are assisted in acquiring internships. Many are offered Summer Research Internships at NASA Centers around the country.

The purpose of the Center is to recruit, retain, and graduate ethnically diverse student body that will increase the representation of traditionally underrepresented ethnic and gender groups in the field of engineering and will enrich the College of Engineering and the university as a whole.

Center for the Study of Matters at Extreme Conditions (CeSMEC)

Surendra Saxena, *Director and Professor, Mechanical and Materials Engineering*

Hexiong Yang, *Associate Professor, Mechanical and Materials Engineering and Earth Sciences*

The mission of CeSMEC is to study the behavior of materials at high pressures and temperatures. The range of activities includes study of the cores of planets and study of matter at extremes of industrial conditions.

CeSMEC is one of few facilities in the country where pressures are created to many million atmospheres and temperatures to several thousand degrees; the material is

studied under such condition with x-ray and spectroscopic techniques.

All materials are subject to three fundamental variables – the variables of temperatures, chemical composition, and pressure. Modern science has vigorously used only the first two variables in exploring nature and creating several amenities of modern civilization. Pressure, the third fundamental variable altering all states of matter, has been for years a relatively minor esoteric sub-field.

The creating of this center is providing FIU's graduate students and faculty the opportunity to perform fundamental and applied research in high-pressure physics, high-pressure chemistry, and materials science. The center is raising the infrastructure at FIU to the level required to initiate world-class research in an emerging area of science and engineering.

Division of Corporate and Global Programs

Shih-Ming Lee, *Acting Director and Chairperson, Industrial and Systems Engineering*

The Division of Corporate and Global Programs (DCGP) develops, promotes and manages academic programs offered under the rubric of Executive Engineering Education in the College of Engineering. These programs fall in the following categories:

- Global Programs
- Corporate Programs
- Certificate Programs
- Weekend Programs
- International Student Transfer Programs

Global Programs

Global programs are offered in a foreign country and focus on the demonstrated education and training needs of selected industrial sector(s) in the host country. The programs are offered in collaboration with a local institution that supports the delivery of the program by providing appropriate infrastructure facilities like classrooms, library and computer laboratories.

All participants in the program proceed as a cohort through a lock-step curriculum of the selected courses. The local faculty from the host country is also involved in teaching to enrich the program by integrating the economic, cultural, social, political and legal issues of the host country in the curriculum.

Corporate Programs

The Corporate Programs are designed for an individual corporation leading to an academic degree, certificate or short-term executive development program. The programs are delivered on site and the program delivery is supported by providing infrastructure facilities. Corporate programs are designed to meet the specific educational and training needs of the corporate clients.

Engineering Information Center (EIC)

Hernan Bormey, *Director*

Create a technology that will help save lives or create your own website, simulate an electronic circuit, design a bridge, or just browse the Internet. Possibilities are endless at Engineering Information Center

EIC helps faculty, scientists, researchers, and students to conduct cutting edge research and work on system designs, networking, scientific visualization, 3D Modeling,

simulations, virtual reality, computer animation, and other computer and software applications.

The Center manages an array of Novell, Windows, and UNIX network servers that provide faculty, staff and students with the capacity to share valuable resources; therefore, fostering an atmosphere where collaboration and instruction grow with a synergy that is unique. Beyond the college community, EIC participates in sponsoring special outreach programs for the Miami-Dade County Public Schools by exposing young minds to latest technologies.

EIC is also home to The Graphic Simulation Laboratory with focus on Scientific Visualization, 3D Computer Modeling, and Virtual Reality, which have helped researchers to develop a wide array of technologies, strategies, and information designs. GSL has collaborated with NASA, The Center for Super Computing Applications, National Science Foundation, Computational Science Institute, Shodor Organization, Macromedia, and Kellogg Foundation, just to mention a few. From hardware to software support to 3D modeling of a heart valve, EIC delivers exceptional services with a personal touch.

Engineering Manufacturing Center (EMC)

Norman Munroe, *Director, Associate Dean of Engineering and Associate Professor, Mechanical and Materials Engineering*

Mario Sanchez, *Senior Engineer and Manager*

The objective of the Engineering Manufacturing Center (EMC) is to prepare manufacturing engineers for an era where enterprises will be mostly information-based and international in nature. Its resources and equipment are available to the industrial community in need of technical expertise in its speciality areas, primarily rapid product design/development and manufacturing. It is divided into major labs and built to provide a seamless integration of computerized engineering tools for design (CAD), manufacturing (CAM), inspection and rapid prototyping (RP) for mechanical and electronic product design and fabrication.

Its *Rapid Product Realization Laboratory* consists of a design front end, an RP center for mechanical/electrical components, and computer driven manufacturing and inspection systems. The design center allows design intent to be modeled via Pro/Engineer and analyzed with finite element packages. Its RP facility includes three different techniques: stereolithography, fused deposition modeling and laminated object manufacturing. Mechanical parts are fabricated with a Vertical Machining Center, a CNC turning center, an EDM machine and a traveling wire EDM. Production capabilities are enhanced by an injection molding machine. A coordinate measuring machine provides dimensional analysis, verification and reverse engineering capabilities.

The EMC regularly schedules training courses in Pro/Engineer and other industry-specific software at substantial discounts. Course instructors typically come from industry, bringing real-life hands-on experiences to the class. Companies served by the EMC range from entrepreneurial to well-established, and include aerospace, automotive, marine, medical and consumer product manufacturers. For more information, call the EMC at (305) 348-6557, Mario Sanchez

(sanchem@fiu.edu), or refer to our website at www.eng.fiu.edu/MRC.

FEEDS Programs

Mercy Rueda Schott, *Director*

The Florida Engineering Education Delivery System (FEEDS) is a statewide distance learning system providing access to graduate and undergraduate level engineering courses and programs to individual students anywhere and anytime, whether it is at home or the workplace. Courses are delivered through one or more of the following methods: CD-Rom, streaming video over the Internet; and fully on-line.

FEEDS offers engineering students and professionals with work and family responsibilities the flexibility to take courses around their busy schedules. It also provides convenience to those who are not within driving distance of an academic institution. It allows them to continue their professional development, which plays an important role in the growth of high technology industries.

Currently, students can select the necessary courses from FIU via distance learning to obtain a Master's degree in Civil Engineering, Environmental Engineering, Construction Management and Engineering Management and a bachelor's degree in Construction Management.

A student taking a course through FEEDS must meet the same requirements as the student on campus and will earn the same credit as if he/she were to attend classes on campus. A student need not be enrolled in a graduate or undergraduate degree program in order to take a course. However, a student who intends to seek admission to a program should be aware that no more than six (6) graduate or fifteen (15) undergraduate credits are allowed to be transferred into a program.

Future Aerospace Science and Technology Center for Space Cryoelectronics (FAST)

Grover Larkins, *Director and Professor, Electrical and Computer Engineering*

FAST-SC is one of six centers created by the Air Force as part of its minority university enhancement program, providing research experience opportunities for undergraduate and graduate students.

The FAST Center evaluates novel applications of space-based cryo-electronics, initially studying new systems for reduction in losses of feed and phase shift networks in phased array transmitter systems. This involves development of low-loss active integrated low-noise phased array or post-processed phased array down-converter receiving systems, high gain-low loss, low noise micro and millimeter wave circuits and systems for space based applications. Of particular interest is the ability to design and fabricate integrated systems which could be used as "steerable" phased array antennas with, frequency-agility.

Current research is focused on issues relating to: Superconducting Micro-Electro-Mechanically switched filters and phase shifters.

Hemispheric Center for Environmental Technology (HCET)

Harlan Sands, *Executive Director*

George Philippidis, *Senior Research Program Manager*

Rob Rose, *Senior Program Manager*

HCET is an applied research and development (R&D) and technology deployment center that attracts funding not only for advancing academic research but also for supplying technical services. HCET's mission is to research, develop, and disseminate technologies and information for solving environmental and energy problems throughout the Western Hemisphere. To fulfill its mission HCET conducts research that creates new knowledge and understanding of challenging scientific and engineering problems and develops innovative solutions to complex real-world issues. Furthermore, HCET acts as a bridge among government, business, and academia for the transfer and utilization of knowledge and technologies that promote economic benefit, national security, and sustainable development.

A significant portion of HCET's R&D activities focuses on the safe and efficient remediation and deactivation of nuclear facilities, the characterization, management, and reduction of radioactive and hazardous waste, and the development and acquisition of environmental information technologies and systems. These technology development activities support U.S. Department of Energy-Environmental Management (DOE-EM) programs in various areas, such as applied instrumentation and monitoring development, alternatives to nuclear waste management and disposition, attenuation of soil and groundwater contamination, environmental risk assessment and regulatory compliance research, and engineering studies for contaminated soil removal. Furthermore, these technology development activities are of significant interest to domestic and international commercial interests.

The Country's new energy policy emphasizes the importance of combining cleaner use of fossil fuels with the development of alternative energy and the adoption of energy efficiency techniques. As a result, there is great demand for R&D covering the full spectrum of energy resources from natural gas to hydrogen utilization to fuel cell systems. Capitalizing on the national emphasis on clean and renewable energy HCET has enhanced its research and technology development activities in various energy fields and has created an affiliate center, the Center for Energy and Technology of the Americas (CETA). HCET is developing technologies for clean and high-efficiency combustion systems that reduce air emissions, hydrogen production, purification, and storage, cost-competitive high temperature PEM fuel cells and intermediate temperature solid oxide fuel cells serving as distributed energy systems, biomass thermochemical conversion, and energy-efficient and environmentally friendly heating and cooling systems.

HCET's employees are drawn from a wide segment of the commercial, government, and academic arenas to collectively utilize their combined experience and expertise to support the needs of HCET's clients. HCET operates within the FIU framework offering students opportunities to participate in hands-on research and application of technical and management solutions to real-world problems. HCET enhances the theoretical education of

FIU students by providing an environment where their knowledge can be put to immediate use in work for a variety of clients, including the U.S. Department of Energy (DOE), U.S. Department of Defense (DOD), the National Aeronautics and Space Administration (NASA), the Federal Aviation Administration (FAA), the Environmental Protection Agency (EPA), and a host of private companies, consortia, and government agencies, both locally and nationally.

For additional information please visit <http://www.hcet.fiu.edu>.

International Hurricane Research Center (IHRC)

Stephen P. Leatherman, *Director*

Hugh Willoughby, *Senior Research Scientist*

Kegi Zhang, *Laboratory for Coastal Research, Co-Director*

Shahid Hamid, *Laboratory for Insurance, Financial and Economic Research, Director*

Forrest Masters, *Laboratory for Structural Mitigation Research, Director, and Assistant Professor, Civil and Environmental Engineering*

Florida International University's International Hurricane Center has officially changed its name to the International Hurricane Research Center (IHRC), Director Stephen Leatherman announced today. The change was made to better reflect the Center's research initiatives.

Serving the state of Florida, the IHRC is a Type I interdisciplinary research center focused on the mitigation of hurricane damage to people, the economy, and the built and natural environments. This designation makes the IHRC Florida's official hurricane research center for 11 universities comprising the state university system.

The citizens of the U.S. East and Gulf Coasts and Caribbean Islands are severely impacted by hurricanes, and IHRC promotes and interdisciplinary, large-scale disaster research agenda to address this vulnerability. Disciplines such as architecture, business, economics, engineering, finance, geosciences, insurance, political science, sociology, and urban planning are involved in a long-term, integrated research program that helps Florida, the nation, and its regional neighbors to mitigate hurricane exposure.

The Center developed as a result of a public-private partnership between the We Will Rebuild Foundation, an organization formed to spearhead the rebuilding of Dade County in 1992 after Hurricane Andrew, and FIU. The IHRC works in conjunction with the National Hurricane Center, which is also located at the FIU University Park Campus in West Miami-Dade.

Lehman Center for Transportation Research (LCTR)

L. David Shen, *Director, Associate Dean of Engineering, and Professor, Civil and Environmental Engineering*

Fang Zhao, *Deputy Director and Associate Professor, Civil and Environmental Engineering*

Sylvan C. Jolibois, Jr., *Deputy Director and Associate Professor, Civil and Environmental Engineering*

Albert Gan, *Deputy Director and Associate Professor, Civil and Environmental Engineering*

The Lehman Center for Transportation Research (LCTR) at Florida International University was established in 1993 in honor of Congressman Bill Lehman and his tireless efforts to make South Florida a better place for all of us. The center's vision is to become a strong 'state-of-the-art' transportation research and training facility. LCTR is committed to serve and benefit our society by conducting research to improve mobility, hence the quality of life issues, develop partnerships in the transportation industry, and educate a multidisciplinary workforce to plan, manage and implement transportation systems.

Faculty, staff and students at LCTR are involved in research related to the design and operation of transportation systems, public policy, air pollution, and the application of geographic information systems and other advanced technologies such as artificial neural networks and scientific visualization in transportation. Future plans include networking with the public and private industry to collaborate on transportation related research. In addition, applied research will be conducted on, but not limited to intelligent vehicle and highway systems.

Motorola Nanofabrication Research Facility

W. Kinzy Jones, *Director and Professor, Mechanical and Materials Engineering*

The first centralized facility of its kind in Florida, the Motorola Nanofabrication Research Facility is an open-access initiative in support of nano-scale devices, systems and materials research that encompasses a broad range of technologies and capabilities. The facility provides nanofabrication, analytical instrumentation, materials characterization and process-development laboratories for students, faculty and industrial researchers. This \$15 million Research Facility is an integral part of the Advanced Materials Engineering Research Institute (AMERI), FIU's broader materials research program.

Harnessing the synergy inherent in the study and development of nanoscale technologies, the facility boasts:

- Specialized equipment required to develop new and novelfabrication techniques unique to the creation of functional materials and devices that are no greater than 100 nanometers (1,000 times smaller than the diameter of a human hair);
- A full complement of standard semiconductor processing equipment to leverage the capabilities of robust and proven techniques; and
- State-of-the-art analytical tools to study, and characterize these nano-sized devices, as well as the materials and processes used to make them.

The Nanotechnology Faculty Team

Arvind Agarwal, *Assistant Professor, Mechanical and Materials Engineering*

Frank Candocia, *Assistant Professor, Electrical and Computer Engineering*

Wonbong Choi, *Associate Professor, Mechanical and Materials Engineering*

Roman Chomko, *Assistant Research Professor, Electrical and Computer Engineering*

Eric Crumpler, *Assistant Professor, Biomedical Engineering*

Yesim Darici, *Associate Professor, Physics*

George Dulikravich, *Professor and Chair, Mechanical and Materials Engineering*

W. Kinzy Jones, *Director and Professor, Mechanical and Materials Engineering*

Sukky Jun, *Assistant Professor, Mechanical and Materials Engineering*

Sakhrat Khizroev, *Associate Professor, Electrical and Computer Engineering*

Grover Larkins, *Associate Professor, Electrical and Computer Engineering*

Watson Lees, *Associate Professor, Chemistry*

Wenzhi Li, *Research Faculty, Chemistry*

Anthony McGoron, *Assistant Professor, Biomedical Engineering*

Kevin O'Shea, *Associate Professor, Chemistry*

Roberto Panepucci, *Assistant Professor, Electrical and Computer Engineering*

Surendra Saxena, *Professor, Mechanical and Materials Engineering*

Frank Urban, *Associate Professor, Electrical and Computer Engineering*

Yuriy Vlasov, *Assistant Professor, Electrical and Computer Engineering*

Kuang-Hsi Wu, *Professor, Mechanical and Materials Engineering*

Hexiong Yang, *Associate Professor, Mechanical and Materials Engineering*

Jiandi Zhang, *Assistant Professor, Physics*

Telecommunications and Information Technology Institute

Niki Pissinou, *Director and Professor, Electrical and Computer Engineering*

Florida International University (FIU) recognizes the need to nurture highly trained personnel for the nation's industry and business, develop research to support the rapidly expanding high-tech industry and become proactive in technology transfer. Thus, ensuring continued economic growth and prosperity in the region. In order to fully meet today's technological demands, FIU has established the Telecommunications and Information Technology Institute (IT²). IT² promotes advanced multidisciplinary education and research focused on telecommunications and information technologies. IT²'s mission is to:

- 1) Deliver high quality telecommunications and information technology education and training.
- 2) Conduct and promote research to enhance Florida's role as a leader in telecommunications and information technology.
- 3) Offer training that is needed to foster business development and workforce preparedness.
- 4) Promote technology transfer to enhance the enabling technologies of the telecommunication and information technology industries.

In fulfilling its mission, IT² promotes multidisciplinary collaboration and serves as the catalyst to promote intellectual cross-fertilization among disciplines. This effort results in the synergistic enhancement of teaching and research, so critical in the telecommunications and information technology fields, where disciplinary barriers are falling and lines are blurred. An objective of the Institute is to infuse telecommunications and information technology content into the curriculum at all appropriate levels. To fill the urgent demand of industry, the institute is

developing interdisciplinary telecommunication programs that provide certificate programs, Bachelors, Masters and Ph.D. degrees.

IT² constitutes an infrastructure that is viable for cutting edge research activities. Researchers at the institute conduct funded research and development targeted at solving complex problems conducive to the early identification of high impact opportunities. Of particular importance to the institute's research efforts is the emerging global wireless, optical and personal communications infrastructure and the ability to represent, store and access information to perform a variety of information related tasks. To provide an effective forum for original research results and to foster communication among researchers, industry leaders can collaborate on education, training, and re-engineering the telecommunications workforce of the future. The alliance provides effective ways to educate the workforce of the 21st century. In accordance, the institute provides technical assistance and applied research services to transfer acquired knowledge and technologies to the commercial sector. The IT² team can work with industrial organizations to tap into some technological innovations that drive the industry to its strategic advantage.

For more information, contact Dr. Niki Pissinou, the director of the Telecommunications and Information Technology Institute, at (305) 348-3987 or visit our Website at www.it2.fiu.edu.

Core Faculty

Niki Pissinou, *Director and Professor*

Kia Makki, *Lucent Technology Professor*

Chi Zhou, *Assistant Professor*

Hao Zhu, *Assistant Professor*

Jian Wang, *Assistant Professor*

Affiliated and Research Faculty

Kang Yen, *Chairperson and Professor, Electrical and Computer Engineering*

Wannava Subbarao, *Professor, Electrical and Computer Engineering*

Tadeuz Babij, *Professor, Electrical and Computer Engineering*

Jean Andrian, *Associate Professor, Electrical and Computer Engineering*

Shih-Ming Lee, *Chairperson and Associate Professor, Industrial and Systems Engineering*

Ronald Giachetti, *Assistant Professor, Industrial and Systems Engineering*

Marc Resnick, *Associate Professor, Industrial and Systems Engineering*

Osama Mohammed, *Associate Chairperson and Professor, Electrical and Computer Engineering*

Raimund Ege, *Associate Professor, School of Computer Science*

Juan Polanco, *Research Faculty*

Lance Hester, *Research Faculty*

S. Huang, *Research Faculty*