



Message from the Chair



One year ago, as we prepared to establish the Department, we developed a strategic plan for our future. As a part of this process, we honed and expanded our mission statement. We made a very important decision to include in our mission, along with the usual activities of higher education (education, research, and service), the translation of our research to commercialization and clinical implementation. We firmly believe that universities must be aggressive in translating their research for the sustainability and growth of the local medical device and biotechnology industry.

Our activities since that time indicate our commitment to this mission. Our research efforts will be greatly enhanced by the implementation of our PhD program, and, in the future, by the proposed medical school. Our areas of study include a rich mixture of basic research along with new intellectual property development and funded research and technology development with entrepreneurial firms. Our fast growth of biomedical engineering education and research programs and its potential impact on the local industry has led to an award from the local economic development board (Beacon Council).

We are also actively enhancing our ability to bring our research to commercialization and clinical implementation through strategic partnerships. The partnership with our own College of Business to develop a technology entrepreneurship program has been funded by a large grant from the Kauffman Foundation. One of our clinical partners, Miami Children's Hospital, has funded a joint faculty position in Neuroengineering, with the ultimate goal of providing a direct link from our research labs to the clinical environment.

As our research programs continue to mature, we hope to make a significant impact on the local industry and clinical environment. Only time will tell.

Richard T. Schoephoerster

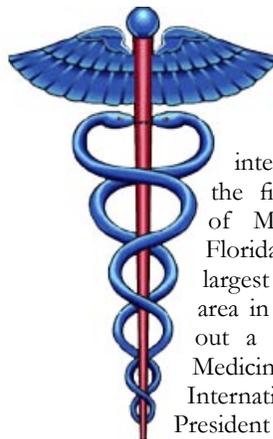
FIU Becomes Third Public University in Florida to Offer PhD Program in Biomedical Engineering

Florida International University is now one of only three public academic institutions in Florida to offer a PhD program in Biomedical Engineering. FIU joins the University of Florida and Florida A & M University-Florida State University (along with the private University of Miami) as the premiere institutes at the forefront of the development of biomedical engineering in the state of Florida.

For the past year, the degree proposal has been in review and was finally approved by the Board of Governors for the State Univer-

sity System. Chair and Professor of the Department of Biomedical Engineering at FIU Richard T. Schoephoerster believes that the approval of the PhD program is important on a variety of levels. "The PhD approval rounds out and completes our programs and will help move our research forward to make us a more attractive university for students looking to major in biomedical engineering and for industry and clinical organizations to initiate new collaborative research and development activities," said Schoephoerster. The new doctoral program kicked off this Fall 2004 semester.

Biomedical Engineering Helps Realize Medical School Dream



Florida International University officials recently announced their intention to open the first public School of Medicine in South Florida. "We live in the largest metropolitan area in the country without a public School of Medicine," said Florida International University President Modesto A. Maidique. "This also happens to be a diverse, relatively poor area with unfilled medical needs and a pool of talented young people ready for the opportunity to become physicians."

Maidique made the announcement at FIU-University Park, standing alongside representatives of four major local hospitals: Baptist Health, Mercy Hospital, Miami Children's Hospital and Mount Sinai Medical Center - all of which are long-standing clinical partners of the FIU Department of Biomedical Engineering. The Florida International University plan does not call for the construction of a new

teaching hospital; rather, it will train residents at affiliated facilities throughout the community.

While the medical school concept was in the gestation phase, the University prepared by conducting extensive activities in the health arena. With more than 150 faculty/staff in health programs in medical sciences, FIU has been playing a leading role in training professionals who provide health care and shape health care systems.

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Biomedical Engineering Society

Message from the President

The Biomedical Engineering Society at Florida International University foresees a great year with the new executive board of dedicated students that will engage in the society's growth and development. Diana del Rio was elected vice president; Anna Paola Hegeudus is our new secretary; Rozita Fallahinejad will be our events coordinator; and Sachin Gursahani will be the webmaster. BMES has exponentially grown in number of members and strength, making itself one of the most active engineering societies of the college of engineering.

We have worked closely with SOC (Student Organization Council) and ESC (Engineering Student Council) in an array of events such as club fairs, community services, fundraising campaigns, engineering week, in addition to other initiatives organized by our society. Our members have been given the opportunity to participate in conferences such as ISET 2004, BioTech 2004, and the BMES National Conference in Nashville.

In recognition of the leadership the BMES has provided to the College of Engineering, the Engineering Student Council bestowed our chapter the Outstanding Student Organization award for 2003-2004. This award clearly belongs to the student body. Congratulations!

The leaders of BMES are determined to assist the department in educating its students with respect to what biomedical engineering is as well as the roles and responsibilities that these future engineers will have in their profession.

One of ABET accreditation's important requirements is that students obtain the "ability to recognize the need for, and engage in, life-long learning, the ability to apply engineering solutions in a global and societal context in consideration of contemporary issues, and the ability to recognize professional and ethical responsibility." The BMES is the key that will contribute the department's responsibility to the BME engineering students in obtaining such skills.



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ALUMNI EDGE

>> Ben Boytor



A brand new resident of South Florida by way of Illinois, Ben Boytor represents the best example of a student whose drive, determination and career goals have already taken him to great heights. Immediately after earning his master's degree in Biomedical Engineering at FIU, Boytor found his dream job at Bioheart, Inc., a company that specializes in the discovery, development and commercialization of cell-based therapy products for the treatment of cardiovascular diseases, including myocardial infarction, congestive heart failure and cardiovascular electrical abnormalities.

Bioheart represents one of the most important industry partnerships fostered by the FIU Department of Biomedical Engineering. Boytor's outstanding education and training at FIU made him the ideal candidate for a company that strives to support biomedical innovation, invention, and discovery.

Prior to joining Bioheart, Boytor gained considerable experience in biotech research, both in the bioscience industry and in the academic world. While working on his Bachelor of Arts degree in Pre-Med/Biology from Augustana College (located in Rock Island, Illinois), Boytor learned the ropes of biomedical research at Centeon Bioservices; upon moving to Miami, he worked as a graduate research assistant for the Department of Biomedical Engineering at FIU, where he studied the growth, passage, and cryopreservation of human cell lines; finally, he spent more than a year working as a research assistant in the Molecular Biology/Immunology lab at the University of Miami. An enthusiast for all things outdoors, Boytor spends his weekends going to the beach, traveling and playing volleyball.



STUDENT SPOTLIGHT

>> Varinia Consiglio

As a young girl in Cuba, Varinia had two passions: biology and design. By the time she arrived in Miami at the age of 18, she already had a clear idea on how to apply them. First she enjoyed a brief stint in the optical industry, during which she became a certified optician.

While this career proved both interesting and challenging, the desire to affect human lives on a deeper level made her decide to embark on a more exciting academic journey. Following the advice of her mechanical engineer father, she joined the Department of Biomedical Engineering at FIU as an undergraduate student. This December, she will receive her bachelor's degree in Biomedical Engineering.

Her academic perseverance and enthusiasm has made her a favorite among fellow students and faculty members alike. In fact, she has already decided to continue her studies at FIU by joining the master's program next Spring. "I feel fortunate to be a part of such an impactful and cutting-edge field", says Consiglio, who is also married and enjoys spending time with her beagle and two black labs. "Before joining the industry, I want to further develop my knowledge in biomedical engineering and biomechanics." As busy as she is with school, Consiglio still manages to find time for the beach and mountain-biking. We are looking forward to seeing great professional accomplishments from her.

Topics in Student Research » Tissue Engineering



Made possible by years of research into processes by which cells grow, tissue engineering deals with regenerating damaged tissue and anatomical parts. The Department of Biomedical Engineering at FIU has embraced this groundbreaking research through the leadership of Dr. Eric Crumpler. Tissue engineering began by us-

ing simple constructs and cells: you start with some building material (e.g., extracellular matrix or biodegradable polymer), shape it as needed, seed it with living cells and bathe it with growth factors. When the cells multiply, they fill up the void spaces between the scaffold and grow into three-dimensional tissue, and once implanted in the body, the cells recreate their intended tissue functions. Tissue engineering works with most types of defects (i.e. reconstructive surgery, periodontal diseases), as well as organs (i.e. liver, brain and lung). Dr. Crumpler's group is engineering biomaterials for reparatory medicine, using natural and synthetic materials (polymer and silk). Through quantitative tests, they intend to show that the engineered tissue is morphologically similar and compatible with native tissue.

Grants for FIU Fund Innovation and Entrepreneurship for Biomedical

The National Science Foundation bestowed a \$600,000 grant to the Department of Biomedical Engineering that served as seed money for two important endeavors. One is the Biomedical Engineering Partnership Program, which provides an infrastructure for entrepreneurial and technology transfer activity. The other one is the Institute for Technology Innovation, whose mission is to create both an environment and an infrastructure for technology innovation and commercialization at FIU. As part of the Global Entrepreneurship Center (www.entrepreneurship.fiu.edu), the Institute focuses on stimulating university-wide faculty, student, alumni, and staff engagement in technology ventures throughout their academic and professional careers. "The Center's Technology Innovation Institute will play a major role



in creating new ventures for technologies created in South Florida, particularly at FIU, thereby contributing significantly to the job creation and economic development of this region," said Dean of Engineering Vish Prasad. The Center, which encompasses four institutes and an Entrepreneurial Academy, focuses on entrepreneurial opportunities and challenges – by providing expert advice, networking and learning initiatives – and the development and growth of new ventures that will make South Florida companies more competitive in the global marketplace. It was made possible by an grant of \$3 million made by the Ewing Marion Kauffman Foundation. Both the Biomedical Engineering Partnership Program and the Institute for Technology Innovation are already active and will serve as catalysts for additional initiatives that will expand to the entire College of Engineering,

FACULTY FOCUS

» Nikolaos Tsoukias

A chemical engineer by training, Nick Tsoukias is one of the latest additions to the Department of Bio-



medical Engineering. After earning his PhD degree from the University of California at Irvine, he spent three years as a postdoctoral fellow at Johns Hopkins University School of Medicine. Dr. Tsoukias joined Florida International University in the Fall of 2003. His research area focuses on angiogenesis and tissue oxygenation, computer simulations of oxygen transport, nitric oxide transport in microcirculation in presence of hemoglobin-based blood substitutes. More specifically, in vitro, in vivo and in silico studies investigate the function of the cardiovascular and respiratory systems in health and disease such as asthma and hypertension and the effects of molecules in respiratory systems and the effects that regulate blood vessels. Most of his research is at the theoretical level and there are currently three graduate students in his group. A native of Athens, Greece, Dr. Tsoukias has lived in California, Baltimore and Boston, but enjoys the cultural diversity that Miami offers. He recently was able to go to Greece and participate in some of the Olympics' festivities. During his spare time, he enjoys traveling and playing soccer.

Beacon Council Honors Biomedical Engineering and Nursing

Florida International University was named a winner of the Second Annual Beacon Awards in recognition of its programs that have helped strengthen the local economy. The Education Award is presented to the institution that has developed and implemented the most innovative new education programs that address one or more of the One Community One Goal (OCOG) target industries of The Greater Miami Chamber of Commerce. The Beacon Council, Miami-Dade County's economic development agency, presents the annual award. "As a university that is intimately tied to its community and committed to improving the quality of life enjoyed by its residents, we are honored to receive this distinguished award," said Modesto A. Maidique, president of FIU. "FIU is well aware that its future is closely tied to the economic health of our state and community, and we will continue to do everything in our power to improve it."

Lecture Series to Address Neuroscience, Neuroengineering

The Lecture Series program on Neuroscience and Neuroengineering is designed to provide students and faculty with the latest developments in these fields, along with their key applications and health and technological implications. Distinguished scholars will be invited to present research at the forefront of this critical field. Organized by Dr. Malek Adjouadi, the lecture series will address the following topics:

- Functional brain mapping
- Neurological basis for brain functions/dysfunctions
- Impairments related to early neurological injury
- Cognitive and developmental assessments
- Pharmaco-therapeutics and blood brain barrier
- Diagnosis and prediction of key brain disorders
- Cognitive, perceptual and learning disabilities
- Surgical techniques and future of microsurgery



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>> Nikolaos Tsoukias received the prestigious Scientist Development Award from the American Heart Association. The award is in the amount of \$260,000 over four years to study "Signal transduction in the regulation of microcirculatory vascular tone involving Nitric Oxide." Dr. Tsoukias received one of the highest scores in the peer review group of over 100 applications from across the nation.

>> Richard Schoephoerster and Eric Crumpler each served as FIU PI's on successful SBIR/STTR Phase II submissions (\$750,000 awards over two years, up to 50% of award to academic collaborator). Dr. Schoephoerster will collaborate with Innovia LLC on a "Novel Polymer Trileaflet Heart Valve" with funding from the NIH. Dr. Crumpler will collaborate with Nanomat, Inc., on "Nanocapsule Coatings Utilizing Biomolecules to detect and Nano MgO-Cl₂ adducts to Neutralize Biological Agents" with funding from the Army Research Office.

>> Malek Adjouadi served as the engineering PI (with Barreto as Co-PI) on the \$4.5 million CREST award from the NSF to create a "Center of Emerging Technologies for Advanced Information Processing and High-Confidence Systems."

>> Armando Barreto received a \$758,166 grant from the NSF Universal Access Program (with Adjouadi as Co-PI) to develop "On-screen Deconvolution to Facilitate Computer Access for Users with Visual Impairments Involving Higher-order Wavefront Aberrations."

>> The Department of Biomedical Engineering received an award from the office of Environmental Health & Safety for having the laboratories with the least number of safety violations at FIU. This achievement was made possible through the work of Dr. James Byrne, Biomedical Engineering lab manager and instructor.

Biomedical Engineering Helps Realize Medical School Dream

In addition, partnership programs with South Florida hospitals and bioscience companies have exposed the university to scientific breakthroughs that will dramatically improve the health and well-being of future generations. "We thought it was important to develop partnerships with local industry and clinicians. This approach not only helped support the plan of a new medical school; it also set the groundwork for making South Florida a new hub in medical research," said Dr. Richard Schoephoerster, Chair of the FIU Department of Biomedical Engineering.

The new School of Medicine seeks to address a dire shortage of physicians at the national, state and local level and responds to a recent decision by the American Medical Association reversing a long-standing position that enough doctors were being produced at the nation's medical schools.

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Honor Recognizes Programs that Boost Local Economy

FIU was recognized for its programs in the School of Nursing and the Department of Biomedical Engineering, which address the OCOG target industries of the biomedical and healthcare services.

The department, which works closely with clinical and industry partners, is playing an important role expanding multidisciplinary research efforts at FIU, technology creation and commercialization, regional economic development and partnership with biotechnology companies and hospitals.

New Faculty



Anuradha Godavarty

Ph.D., Texas A&M University, 2003
Assistant Professor, Department of Biomedical Engineering
Post-doctoral fellow at University of Vermont, Dept of Computer Science. Recipient of the 2002 Ethel-Ashworth Tsutsui Memorial Award for Research at Texas A&M University.

Research Area: Three-dimensional optical-based molecular imaging and tomography, fluorescence-lifetime imaging and 3D tomography: Phantom and in-vivo small animal imaging studies.
Bioinstrumentation, Development of 2D/3D image reconstruction algorithms, Tomographic analysis using finite-element based computational tools.

Publications: Over 15



Wei-Chiang Lin

Ph.D., University of Texas at Austin, 1997
Miami Children's Hospital Assistant Professor, Department of Biomedical Engineering. Previously at Vanderbilt University
Research Areas: the development of non- or minimally-invasive technologies that utilize intrinsic properties of tissue to accurately detect diseased/cancerous tissues and assess tissue vitality.

Patents: 5 (applied or granted)

Publications: 10



Biomedical Engineering STATS

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Biomedical Engineering STATS, the Newsletter of the Department of Biomedical Engineering is published annually.