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## BME Annual Report 2003-2004

Department of Biomedical Engineering, Florida International University

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# FIU

FLORIDA INTERNATIONAL UNIVERSITY

## **BIOMEDICAL ENGINEERING**

*Integrating Academia, Clinical Medicine, and the Biomedical Industry*



## Annual Progress Report

September 15, 2004

## Summary

In the past 12 months we have formed a Department, obtained approval for and recruited an outstanding inaugural class for the implementation of a PhD program in the Fall term, enhanced and solidified current partnerships and added more partners, continued to increase external research support, and added outstanding new faculty members to support a fast-growing student body in biomedical engineering. We anticipate increased University support for animal-based research, intellectual property development and commercialization, space to continue to expand our research and educational programs, new faculty and staff for the increasing student load, and a medical school faculty with which to collaborate. As we continue to increase in size and quality, and with the University's support, we will reach our goal of becoming the top BME program in the State by 2008 and one of the top 25 BME programs in the Nation by 2013.

### Accomplishments of the Department for 2003-2004 Academic Year

#### 1. Academic Programs

- BS Program
  - There are currently 68 declared undergraduate majors in BME, and another 33 intended majors (intended majors are lower division freshman and sophomores, declared majors are upper division juniors and seniors). Those numbers are up from 29 declared and 24 intended majors last year. The average SAT score for these students is 1068 and the average FIU GPA is 2.76.
  - Five undergraduate students are receiving the Biomedical Engineering Excellence Scholarships funded by the Wallace H. Coulter endowment to FIU. Three of those students have a 4.0 GPA, and the other two are at 3.7 and 3.8.
- MS Program
  - There are 25 students currently in the MS program that will continue in Fall 2004. We received 62 applications for Fall 2004. 32 were admitted with 5 assistantships awarded. These new admittees with assistantships obtained an average GRE score of 1265.
  - The Graduate Fellowships funded by the Wallace H. Coulter endowment to FIU has been used the last three years to fund worthy MS students. From this point on these funds will be targeted to PhD students.
- PhD Program
  - The PhD in Biomedical Engineering was approved by the State Board of Governors for implementation in Fall 2004. An excellent class of eight students has accepted offers to begin studies in the fall.
  - We received 35 applications for Fall 2004. 20 were admitted with 8 assistantships awarded. These new admittees with assistantships obtained an average GRE score of 1360.
  - See a story in the attached BME Newsletter regarding the PhD program.
  - The Department requested an evaluation from an outside consultant, Thomas

Skalak, Chair of Biomedical Engineering at the University of Virginia, as a part of the approval process. His general comments were as follows: "The FIU faculty in Biomedical Engineering present a compelling case for a new PhD program at FIU that will enhance FIU's international reputation as a growing contributor to education and training in the biomedical engineering and biotechnology sector. Given the very strong BME industry in the South Florida region, and their commitment to this new PhD program, the chance of success in the new PhD program is extremely high." The entire evaluation is attached to this report.

- BME Faculty
  - We have added three new junior faculty members (Nikolaos Tsoukias, Anu Godavarty and Wei-Chiang Lin), and added 50% effort from two ECE faculty members (Malek Adjouadi and Armando Barreto). Tsoukias obtained his PhD from UC-Irvine, Godavarty obtained her PhD from Texas A&M and Lin obtained his PhD from University of Texas, Austin (see attached BME Newsletter for information on the new faculty). A search for an Instructor position is being performed in the Fall 2004 term. BME will have 8 FTE faculty to teach the full slate of BS, MS, and PhD programs in Fall 2004.
- FIU received the Education Award from the Beacon Council in part because of the development of the biomedical engineering programs (see story in attached BME Newsletter).

## 2. Research and Funding

- BME has submitted 20 proposals for a total of over \$8.2 million.
- Research expenditures in BME rose from \$715,000 in 2002-2003 to over \$860,000 in 2003-2004.
- BME has received over \$1.45 million in research award funding for 2003-2004, from NIH, NSF, AHA, ONR, and industry.
- BME has published 21 journal articles and another 19 conference proceedings.
- BME was the lead engineering group in the \$3 million proposal that was funded by the Ewing Marion Kauffman Foundation (see story in attached BME Newsletter).
- BME (Malek Adjouadi) secured an agreement with Miami Children's Hospital to fund the Miami Children's Hospital Professorship in Neuroengineering, and hired Dr. Lin to fill the position.
- Notable individual research accomplishments:
  - 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 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-Cl<sub>2</sub> 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.”
  - Drs. Adjouadi, Barreto, and Crumpler each submitted invention disclosures.
- Biomedical Engineering Partnership Program
    - BME has expanded its Partnership Program by adding 16 new industry members since the Program Review (for a total now of 30 members).
    - We have solidified our partnership with the College of Business Administration by collaboration on the \$3 million Ewing Marion Kauffman Foundation grant and the creation and implementation of the Institute for Technology Innovation (under the leadership of Ofer Amit) under the auspices of the Global Entrepreneurship Center.
    - The Partnership Program is in the process of revamping its Collaborative Technology Innovation Program (CTIP) and the industry internship program, and has developed plans to implement a Young Inventor Award funded by the Wallace H. Coulter endowment.
    - Under the leadership of Malek Adjouadi, BME has also enhanced its partnership with Miami Children’s Hospital. MCH is funding 50% of the faculty position (including start-up funds) for the recently hired Wei-Chiang Lin, who holds the Miami Children’s Hospital Professorship in Neuro-engineering. We are also working with the Ware Foundation on a possible \$1 million endowment to the neuro-engineering program, to be jointly funded to FIU and MCH.
    - With leadership from BME (Ofer Amit) and under the hospice of the South Florida Bioscience Consortium (SFBC) – the regional chapter of BioFlorida - FAU, NSU, UM, and FIU have embarked on an initiative to create a Virtual Incubator for Bioscience Business (VIBS). The incubator will nurture/incubate new biomedical/bioscience ventures by acting as a clearinghouse and linking unique physical resources and talent already at the four universities and at participating private business enterprises. The incubator will provide a framework and an infrastructure for biomed/biotech entrepreneurial and technology transfer activity. Under this arrangement the universities provide scientific/engineering expertise, physical facilities, skilled/trained labor, and intellectual property when relevant, private enterprises from the area complement with business and other pertinent expertise, and the new venture provides vision, market focus, management, and return.