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BME Annual Report 2006-2007

Department of Biomedical Engineering, Florida International University

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FIU

FLORIDA INTERNATIONAL UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

Annual Report

July 2007

Submitted by
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Acting Chair
Department of Biomedical Engineering
Florida International University

Executive Highlights

- The biomedical engineering enrollment continues to climb, with a total enrollment this year of 153 undergraduate students (awarded 25 degrees), 32 MS students (awarded 15 degrees), 20 PhD students.
- The undergraduate program received ABET for accreditation.
- The research productivity of the biomedical engineering faculty continues to be strong. The BME tenure-track faculty produced 32 journal publications, 54 conference presentations, and almost \$2,230,361 of external funding and \$1,525,340 expenditures.
- The Department submitted 19 proposals and received 38 awards.
- Five IP disclosures in calendar year 2006
- An FIU chapter of the BME honor society, Alpha Eta Mu Beta was established

Endowment Funded Activities in 2006-2007

- Excellence Fund \$100,000/year
Faculty start-up funds (Chengzhong Li)
General support for department research
Support two graduate students as teaching and research assistants
Chowdhury, Raquibul
Chang, Szumin
- Graduate Fellowships \$50,000/year
Funded stipend for 7 BME graduate students
Chowdhury, Raquibul
Fernandez, Alejandro
Ge, Jiajia
Tang, Yuan
Zhang, Zhiqi
Fernandez, Alicia
Gallocher, Siobhain
- Undergraduate Scholarships \$25,000/year
Funded scholarship for 7 new high quality undergraduate students
Shams, Alirez
Frosch, Louis
Brooks, Patricia
Ordonez, Roxana
Guyton, Kenneth
Fawzia, Mohammed
Sueiras, Vivian Maria
- Research Initiation Program \$50,000/year
- Research Center Fund \$25,000/year
Supports maintenance contracts and software licenses purchased by the Department.
- Young Inventor Program \$75,000/year
These funds were used to fund a post-doc under the FIU BME Young Inventor Award. This program awards stipend and research support to recent PhD's who want to come to FIU and work with a BME faculty mentor on development of new biomedical technology and the translation of that technology to clinical implementation. The recipient of the award is Banghe Zhu.
- Eminent Scholars Chair \$100,000/year
Held by the Department Chair
General research support for the Chair, including a Post-doctoral trainee
Secretarial support for the Department

- Professorship \$50,000/year

This position is has recently been awarded to Joe Leigh Simpson. It was not filled in 2006-2007 so no funds were used. Dr Simpson is Executive Associate Dean for Academic Affairs in the College of Medicine.

Prior to joining FIU Joe Leigh Simpson, M.D. served as professor and Ernst W. Bertner chairman of the Department of Obstetrics and Gynecology. He was also a professor in the Department of Molecular and Human Genetics. He is president of the Society for Gynecologic Investigation (1998-99), past president of the International Society for Prenatal Diagnosis (1994-98), the Society for the Advancement of Contraception (1995-98) and the American Society for Reproductive Medicine (1994-95). His major research interests are prenatal genetic diagnosis, genetics of the disorders of sexual differentiation, and elucidating causes of birth defects. He has authored over five hundred articles and chapters and fifteen books.

Lecture Series \$25,000/year

These funds were available for the first time this year and were used to fund the following speakers:

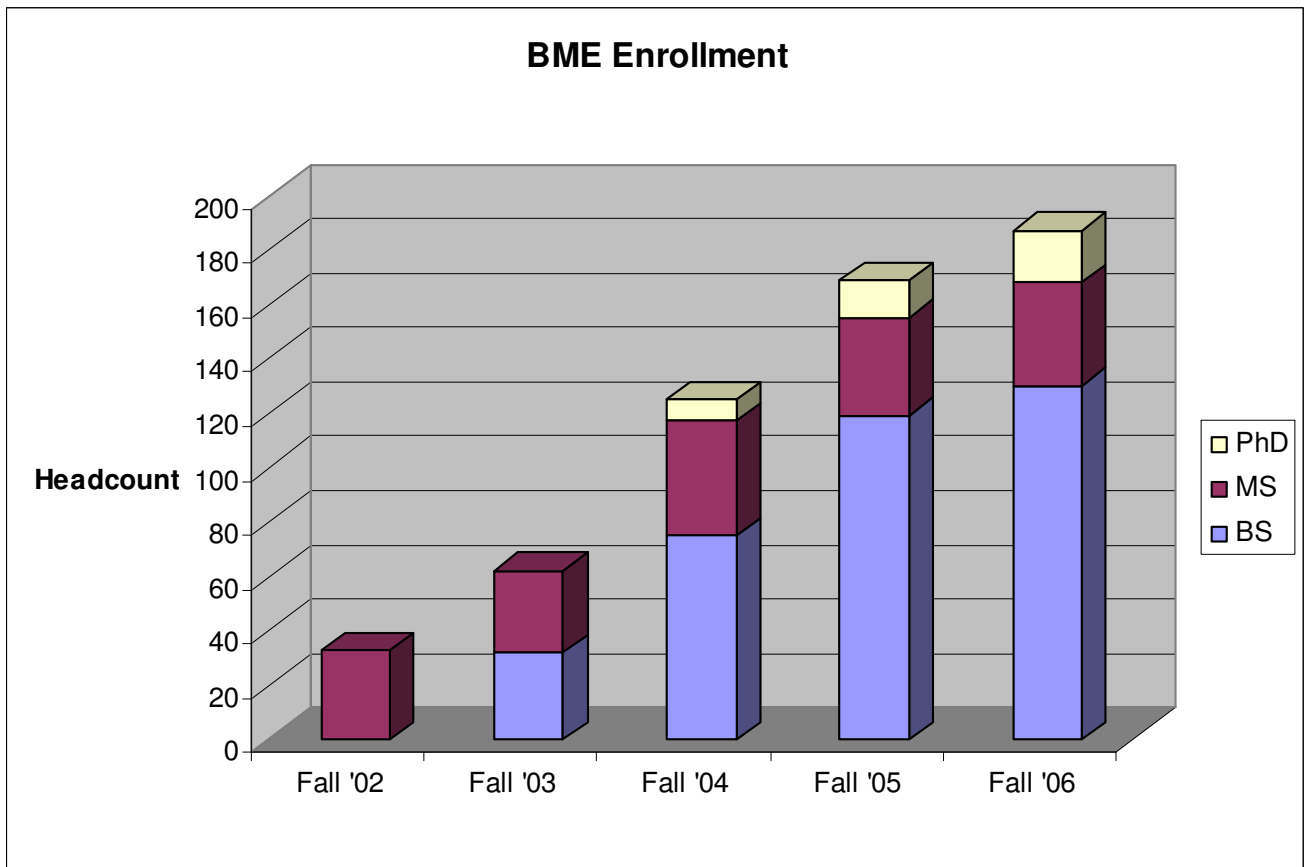
| Speaker | Date | Title |
|------------------------|------------|---|
| John Luong | 1/12/2007 | Probing Cell Behavior by Emerging Impedance Spectroscopy |
| Ashok Mulchandani | 1/26/2007 | Biosensors for Chemical and Biological Warfare Agents |
| Heinz-Bernhard Kraatz | 1/29/2007 | Biosensors for Biological and Environmental Applications |
| Mohammed Kiani | 2/16/2007 | Tumor Vasculature as a Target for Drug Delivery |
| John Linehan | 2/23/2007 | Accelerating Biomedical Technology Innovation: The Role of Education |
| Michael Johnson | 3/30/2007 | Drug Design for Biodefense Applications |
| Parijat Bhatnagar | 5/4/2007 | Multiplexed Multifunctionalized Surfaces by CMOS Processing for Biosensing and Cell Surface Interaction |
| Yadong Wang | 12/1/2006 | Glycerol-based biodegradable polymers for regenerative medicine |
| Michael VanAuker | 10/27/2006 | Engineering Analysis of Degenerative Heart Valve Disease |
| Miguel Cerrolaza Rivas | 3/9/2007 | design and manufacturing of medical devices by using numerical methods and virtual reality |
| Len Pinchuk | 9/15/2006 | Balloons, Stents, Glaucoma Shunts and Other Medical Devices: Biotechnology and Entrepreneurship |

Accomplishments of the Department for 2006-2007 Academic Year

1. Academic Programs

- Enrollment

The following chart shows the enrollment growth for biomedical engineering over the last five years. The MS program was implemented in Fall 1999 with an initial enrollment of 3 students in the Spring 2000 term. The BS program was added in Fall 2002, and the PhD program was implemented in the Fall of 2004, with an initial class of 9 students.



| | 2006-2007 |
|--------------------------|-----------|
| Undergraduate Enrollment | 153 |
| Undergraduate FTE | 34 |
| BS Degrees | 25 |
| MS Enrollment (Sp 07) | 32 |
| MS (Grad I) FTE | 24 |
| MS Degrees | 15 |
| 0.25 FTE Assistantships | 2 |
| PhD Enrollment (SP 07) | 20 |
| PhD (Grad II) FTE | 11 |

| | |
|-----------------------|-------------|
| PhD Degrees | 0 |
| Research Awards | \$2,230,361 |
| Research Expenditures | \$1,525,340 |
| RA (C&G Supported) | 22 |
| FTE Faculty | 10 |

2. Research Programs

- Summary Data

The following tables and graphs depict the research data generated by the Department of Biomedical Engineering over the last five years.

Summary Research Data for the Last Five Years

| DEPARTMENT OF BIOMEDICAL ENGINEERING | AWARD YEAR | | | | |
|--|------------|------|------|------|------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| Number of: | | | | | |
| FTE Tenure-track faculty | 5 | 7 | 7 | 7 | 8 |
| Manuscripts published in major journals | 14 | 30 | 38 | 36 | 32 |
| Presentations at major scientific meetings | 45 | 38 | 38 | 47 | 54 |
| Research grant applications submitted | 19 | 16 | 27 | 30 | 19 |
| Research grant applications awarded | 5 | 4 | 17 | 31 | 38 |

- Center of Excellence (COE) proposal to be submitted December 2007

Title: Biomedical Device Sensors for Rare Cell Detection, Enhanced Screening and Targeted Treatment. Joe Leigh Simpson, PI. This a \$12 million collaborative proposal to the State of Florida from the College of Medicine, College of Engineering and Computing and the College of Public Health.

Grant money from the COE will fund the first round of translational research grants to generate preliminary data for Federal and State research proposals. Each funded research team will match the Center's investment with a comparable level of leveraged resources from industry-academic partners and then apply for federal funds under the Small Business Technology Transfer Research/Small Business Innovation Research program to provide for self sufficiency. The three major research locations (FIU, UCF, FGCU) form an economic triangle covering the southern portion of Florida from Orlando, over to Ft. Myers, and completing in the Miami area which will permit collaboration with a broad intersection of small, medium, and large partners. The PI and Executive Director for this project will be Joe Leigh Simpson MD, Executive Associate Dean of Academic Affairs for the College of Medicine at FIU. He will be assisted by two Co-Directors: W. Kinzy Jones PhD (FIU), Director of the Advanced Materials Engineering Research Institute, and James Hickman PhD (UCF), Director of the NanoScience Technology Center. Technical and business advisory boards will review research proposals, oversee the projects and promote the IP translation into marketable applications.

Plans and Goals for 2006-2007

Departmental Goals for 2007-2008

1. The Department is working with the Dean's office the Advanced Materials Engineering Research Institute's Nanofabrication Facility and the College of Medicine to prepare a \$12 million proposal to the Florida State Centers of Excellence Program "Biomedical Device Sensors for Rare Cell Detection, Enhanced Screening and Targeted Treatment"
2. Increase collaborations with science and health related departments and the number of faculty from Engineering with joint appointments. In particular establish collaborations with Physics and Medicine to compliment current collaborations with the departments of Biological Sciences and Chemistry and Biochemistry. The Department will continue to work with the Provost's office in the further planning for the College of Medicine at FIU. The BME Chair is working closely wit Joe Leigh Simpson (Executive Associate Dean for Academic Affairs in the College of Medicine and the new Coulter Professorship in Bioinstrumentation in BME) to promote collaborative research with the College of Medicine.
3. Increase NIH Funding
Biomedical related research must be funded through the NIH. We have submitted grants through the MBRS SCORE program and faculty in the department currently have undergraduate and (at least two) graduate students supported through the program. The MBRS SCORE program will help us establish our research with NIH.
4. Coordinate with Community Colleges to better prepare their AA students to enter BME.
Currently students are not being advised properly at the Community Colleges to allow them to transfer to the BME program after their AA.
5. Begin graduating PhD students
Five PhD students have progressed to Candidacy as of Spring 2007
6. Develop one course for the Medical School Curriculum
The Medical School curriculum has been designed to promote technology. We believe that by contributing to the Medical School curriculum we will be in a better position to also develop strong collaborations with their faculty.