MEMORANDUM

TO: Nariman Farvardin
   Dean, A. James Clark School of Engineering

FROM: Phyllis Peres
       Associate Provost for Academic Planning and Programs

SUBJECT: Proposals to create a Fischell Department of Bioengineering; transfer the M.S. and Ph.D. programs in Bioengineering; and transfer, modify, and rename the B.S. in Biological Resources Engineering as the B.S. in Bioengineering (PCC log nos. 05052, 05053, and 05054)

I am pleased to inform you that final approval has been given for the establishment of the Fischell Department of Bioengineering and the transfer and modification of the related academic programs. Copies of the approved proposals are attached.

On June 23, 2006, the Board of Regents approved the creation and naming of the Fischell Department of Bioengineering, effective July 1, 2006. The proposal to transfer in the M.S. and Ph.D. programs in Bioengineering was approved by President Mote on April 27. Finally, the proposal to transfer, modify and rename the B.S. in Biological Resources Engineering as the B.S. in Bioengineering was given final approval by the Chancellor on June 30, and the Maryland Higher Education acknowledged the change that same day.

The College should ensure that the new requirements are fully described in the undergraduate and graduate academic catalogs and in all relevant descriptive materials.

CWR/

Enclosure

cc: William Destler, Provost
    Ellin Scholnick, Associate Provost for Faculty Affairs
    Sarah Bauder, Office of Student Financial Aid
    Mary Giles, University Senate
    Barbara Hope, Data Administration
    Anne Turkos, Archives
    William Bentley, Fischell Department of Bioengineering
    Sandra Huskamp, Fischell Department of Bioengineering
June 27, 2006

Dr. C.D. Mote, Jr.
University of Maryland, College Park
1101 Main Administration Building
College Park, MD 20742

Dear Dan:

This is to officially inform you that the Board of Regents, meeting in executive session on Friday, June 23, 2006, at Frostburg State University, approved creating a Department of Bioengineering in the A. James Clark School of Engineering and to name the Department the Fischell Department of Bioengineering after Dr. Robert Fischell; as you requested in a letter date May 9, 2006.

Sincerely,

William E. Kirwan
Chancellor

WEK/tm

cc: William Destler
    Ellin Scholnick
    Nariman Farvardin
    Katie Ryan
THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM PROPOSAL

DIRECTIONS:
- Provide one form with original approval signatures in lines 1 - 4 for each proposed action. Keep this form to one page in length.
- Early consultation with the Office of the Associate Provost for Academic Planning & Programs is strongly recommended if there are questions or concerns, particularly with new programs.
- Please submit the signed form to Claudia Rector, Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus.
- Please email the rest of the proposal as an MSWord attachment to pcc-submissions@umd.edu.

DATE SUBMITTED February 8, 2006

COLLEGE/SCHOOL Engineering

DEPARTMENT/PROGRAM Bioengineering

PROPOSED ACTION (A separate form for each) Add New Department

DESCRIPTION (Provide a succinct account of the proposed action. Details should be provided in an attachment. Provide old and new sample programs for curriculum changes.)

The purpose of this proposal is to establish the Fischell Department of Bioengineering in the Clark School of Engineering, University of Maryland, College Park. The effort is made possible through the transformational support and foresight of Dr. Robert Fischell and efforts of the university administration, faculty and staff.

JUSTIFICATION/REASONS/RESOURCES (Briefly explain the reason for the proposed action. Identify the source of new resources that may be required. Details should be provided in an attachment.)

The reason for this action is to provide a comprehensive world-class resource for the University of Maryland System to educate students to excel in the field of bioengineering and carry out the reach and development of biomedical systems that will improve healthcare for human subjects throughout the world.

APPROVAL SIGNATURES

1. Department Committee Chair
2. Department Chair
3. College/School PCC Chair
4. Dean
5. Dean of the Graduate School (if required)
6. Chair, Senate PCC
7. Chair of Senate
8. Vice President for Academic Affairs & Provost

DATE
3/1/06
3/1/06
1 March 06
3/1/06
4/24/06
4-24-06
7-17-06

VPAAP 8-05
PROPOSAL TO CREATE

THE FISCHELL DEPARTMENT OF BIOENGINEERING

A. JAMES CLARK SCHOOL OF ENGINEERING

UNIVERSITY OF MARYLAND

COLLEGE PARK

DEAN NARIMAN FARVARDIN

KIND OF DEGREE: B.S., M.S., Ph.D

Effective July 1, 2006
Introduction

“The finest goal that engineering can achieve is to improve the quality of life for millions of people throughout the world…… Bioengineering and biomedical devices are the most direct means to achieve that goal.

Wealth allows us to do good works and to remove impediments to bettering the human condition….Our gift to the Clark School will help engineering students to develop their ideas to improve health care for human beings throughout the world.”

Dr. Robert Fischell
December 19, 2005
University of Maryland, A. James Clark School of Engineering
Gift Announcement

In a memorandum to the National Institute of Health Directors on the creation of the Bioengineering Consortium:

"Bioengineering advances the nation's health by increasing biological knowledge through the use of engineering principles and techniques and contributes methods that have facilitated the development of novel devices and drugs…."

Dr. Harold Varmus
Noble Laureate
National Institutes of Health

What is Bioengineering?
Bioengineering is rooted in physics, mathematics, chemistry, biology, and the life sciences. It is the application of a systematic, quantitative, and integrative way of thinking about and approaching the solutions of problems important in biology, medical research, clinical practice, and population studies. Bioengineering integrates physical, chemical, or mathematical sciences and engineering principles for the study of biology, medicine, behavior, or health. It advances fundamental concepts, creates knowledge from the molecular to the organ systems level, and develops innovative biologies, materials, processes, implants, devices, and informatics approaches for the prevention, diagnosis, and treatment of disease, for patient rehabilitation, and for improving health.

National Institutes of Health Bioengineering Consortium 1997-1998
Purpose of Proposal

The purpose of this proposal is to create the Fischell Department of Bioengineering in the A. James Clark School of Engineering, University of Maryland College Park (UMCP) by July 1, 2006. Concurrently, separate proposals have been prepared to establish an undergraduate program in the Fischell Department of Bioengineering and to move the current Bioengineering Graduate Programs, Masters and Ph.D., into the Department creating a comprehensive Bioengineering unit.

In November 2005, Dr. Nariman Farvardin, Dean of the Clark School of Engineering, named a committee of faculty and staff from UMCP and the University of Maryland School of Medicine (Attachment A) to investigate the feasibility of developing an undergraduate bioengineering curriculum. The committee thoroughly examined all aspects of creating this curriculum in the context of programs within USM, at other leading universities, our vision for the future of human health care, and in light of our own expectations for a “world-class” Department. During the committee’s deliberations, Drs. Bentley, Fischell, and Dean Farvardin also visited 3 of the top 4 Departments of Bioengineering / Biomedical Engineering in the US, Johns Hopkins University (JHU), Duke University (Duke), Georgia Institute of technology (Georgia Tech), in order to fully understand their education and research programs, departmental operations and future directions.

The committee’s deliberations have resulted in this document, which proposes to create the Fischell Department of Bioengineering with undergraduate and graduate programs of the highest caliber that will educate Maryland students to meet the current and future demands for its graduates, for the University, the State and the Nation.

Bioengineering in the Nation, State, UMCP and The Clark School

At the national level, a tremendous surge in enrollment within bioengineering has occurred in just the past five years and has fueled a resurgence in undergraduate engineering on the whole (see Figs. 1 & 2), with many of our nation’s best and brightest students choosing bioengineering as their academic home.

![Undergraduate Bioengineering Enrollment](Figure 1. (Source: Engineering Workforce Commission of the American Association of Engineering Societies))
Coincident with demand from students, there are many nationwide initiatives and foundations that promote and fund technological growth at the interface of engineering and the life sciences for the betterment of human health (e.g., new National Institute of Health (NIH) Institute of Biomedical Imaging and Bioengineering (NIBIB), NIH Roadmap, Gates Foundation, etc.). There are also several philanthropic foundations with programs to develop human resources to meet current and future manpower requirements foreseen for next generation biomedical technologies (e.g., Whitaker Foundation, Coulter Foundation, Howard Hughes Medical Institute, etc.).

The biotechnology industry in the State of Maryland has grown into the third largest, behind California and Massachusetts, creating an increased demand for bioengineers. While growth has primarily been in the biopharmaceuticals sector, the State has also emerged as a leader in the genomics, proteomics, diagnostics and bioinformatics areas as noted by companies such as Human Genome Sciences, Celera, and The Institute for Genomic Research (TIGR). The Maryland State Plan for Postsecondary Education identifies these areas as foundations upon which to build Maryland’s research and development success. Increasing the supply of qualified graduates in these high-demand fields and workforce shortage areas is critical to the development of a highly qualified workforce [link].

UMCP is located within an area rich in health care facilities, medical schools, and biomedical research centers, including the pharmacy, dental, and medical schools at the University of Maryland, Baltimore (UMB), the University of Maryland Biotechnology Institute (UMBI), the medical schools at JHU, Georgetown, George Washington, and Howard Universities, the NIH, the Red Cross, and the Food and Drug Administration (FDA). Many engineering faculty members at UMCP enjoy strong collaborations with researchers at these institutions and engineering graduate students often work in their laboratories. Yet, there are no departments in the USM meeting educational and research needs in bioengineering. There are presently two undergraduate biomedical or bioengineering programs within the Baltimore/DC metropolitan area: Johns Hopkins University and Catholic University. Neither of these focuses on biomedical devices and issues at the cellular, subcellular, and systems levels.

UMCP has also undergone a strategic planning process and identified five initiatives (i-v) that will significantly impact the State's economic and cultural development and position Maryland as a major contributor of the Nation’s intellectual capital.1 This proposal, and that of the creation of the Fischell Department, are aligned with all of these university initiatives: (i) elevate the quality of undergraduate

education experience within the College and on campus, (ii) enrich the culture of excellence in education, research and scholarship, (iii) enhance the level of diversity, (iv) engage the greater community in entrepreneurial and commercial activities, and (v) enhance the infrastructure consistent with that of a world-class university. In 2001, the Clark School underwent an extensive strategic planning process resulting in a clear vision for its future.\(^2\) Initiative 2 of the resulting strategic plan is to build a culture of excellence in research and scholarship while expanding the impact of the research program by emphasizing specialty topics of large potential. One of the specific steps identified to achieve this objective is the investment of significant resources on strengthening or building specialty areas of large potential with the aim of making the college a significant force in these areas on the national landscape. Five such areas were identified: (i) Information Technology, (ii) Smart Small Systems, (iii) Intelligent Transportation Systems, (iv) Nanotechnology, and (v) Bioengineering.

According to U.S. News & World Report, [http://www.usnews.com/usnews/edu/college/rankings/](http://www.usnews.com/usnews/edu/college/rankings/), the undergraduate programs of the Clark School of Engineering are currently tied for 22nd. Among public institutions, the School’s undergraduate engineering programs are ranked 13th. Among the public graduate engineering programs, the Clark School is ranked 12th (17th overall). The University of Maryland and the A. James Clark School of Engineering is the only engineering school among the top 25 undergraduate engineering schools nationwide, without a formal undergraduate degree program in bioengineering/biomedical engineering.

### Table 1. Best Undergraduate Engineering Programs

<table>
<thead>
<tr>
<th>Rank</th>
<th>Institution</th>
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<tbody>
<tr>
<td>1</td>
<td>Massachusetts Inst. of Technology</td>
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<tr>
<td>2</td>
<td>Stanford University (CA)</td>
</tr>
<tr>
<td></td>
<td>University of California–Berkeley *</td>
</tr>
<tr>
<td>4</td>
<td>California Institute of Technology</td>
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<tr>
<td></td>
<td>University of Illinois–Urbana-Champaign *</td>
</tr>
<tr>
<td>6</td>
<td>Georgia Institute of Technology *</td>
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<tr>
<td></td>
<td>University of Michigan–Ann Arbor *</td>
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<tr>
<td>8</td>
<td>Carnegie Mellon University (PA)</td>
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<td></td>
<td>Cornell University (NY)</td>
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<tr>
<td></td>
<td>Purdue Univ.–West Lafayette (IN)*</td>
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<tr>
<td>11</td>
<td>University of Texas–Austin *</td>
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<tr>
<td>12</td>
<td>Princeton University (NJ)</td>
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<td></td>
<td>University of Wisconsin–Madison *</td>
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<td>14</td>
<td>Johns Hopkins University</td>
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<td></td>
<td>Northwestern University</td>
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<td>Texas A&amp;M University–College Station *</td>
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<td>Virginia Tech *</td>
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<td>18</td>
<td>Pennsylvania State U.–University Park *</td>
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<td></td>
<td>Rensselaer Polytechnic Institute</td>
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<td>Rice University</td>
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<td>University of Minnesota–Twin Cities *</td>
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<td>22</td>
<td>Duke University</td>
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<td>University of California–Los Angeles *</td>
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<td>University of Maryland–College Park *</td>
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<td>University of Washington *</td>
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</tbody>
</table>

Table 2. Best Graduate Engineering Programs
1. Massachusetts Institute of Technology
2. Stanford University (CA)
3. University of California–Berkeley *
4. Georgia Institute of Technology*
4. University of Illinois–Urbana-Champaign*
6. University of Michigan–Ann Arbor*
7. University of Southern California*
8. California Institute of Technology
9. Carnegie Mellon University (PA)
10. Purdue University–West Lafayette (IN)*
11. University of California–San Diego*
12. Cornell University (NY)
12. University of Texas–Austin*
14. Texas A&M University–College Station*
15. University of California–Los Angeles*
15. University of Wisconsin–Madison*
17. Princeton University (NJ)
17. University of Maryland–College Park *
*denotes public institution

During the 2001-02 academic year a Bioengineering Program Committee was created by the Dean Farvardin and charged with the task of developing a Graduate Degree Program in Bioengineering. The committee was chaired by Dr. Tim Barbari, then Chair of the Department of Chemical Engineering and consisted of the following faculty members: Dr. Art Johnson of Biological Resources Engineering, Dr. Bill Bentley of Chemical Engineering, Dr. Shihab Shamma of Electrical and Computer Engineering, Dr. Don DeVoe of Mechanical Engineering, Dr. Peter Kofinas of Materials and Nuclear Engineering, Dr. Avis Cohen of Biology, Dr. Jason Kahn of Chemistry and Biochemistry, and Dr. Dennis Healy of Mathematics. Building on current research efforts and focusing on strengthening activities at the interface between engineering and the life sciences, a strong and independent Graduate Program in Bioengineering emerged to fulfill the vision of the School’s Strategic Plan.

In just three years, the bioengineering program has recruited 25 outstanding graduate students from among the most highly ranked undergraduate programs in the United States. The current bioengineering graduate student population is 44% female and 68% domestic. The more than 50 faculty formally affiliated with the graduate program come from over 12 academic departments on the College Park campus, the Schools of Medicine and Pharmacy in Baltimore, and the University of Maryland Biotechnology Institute. Research collaborations with the Schools of Medicine and Pharmacy have been enhanced and collaborations with the School of Dentistry have been initiated. The bioengineering graduate students benefit greatly from this unique interdisciplinary environment; not only do they have a wide array of research projects available to them, but they also have the opportunity to explore laboratories across the campus(es) in the new lab rotation program. In biology and medicine, laboratory rotations are standard; they are rare in engineering. Many of the concepts needed in experimental design and data analysis, as well as research methods, are best served by this type of hands-on instruction. This rotation is a first in engineering at Maryland.

At steady state, the graduate program is expected to have 125 graduate students, with all but a few pursuing a Ph.D. in Bioengineering. With average time to degree in doctoral engineering programs of between 4 and 5 years, ~25 new students would be admitted per year.
At steady state, the undergraduate program is anticipated to have ~320 students. Going into the first year, a cap of fifty students will be instituted. Given demand, this will grow to 80 entering students by 2010. It should be noted that the field of bioengineering has become synonymous with Biomedical Engineering at many institutions and the two terms often used interchangeably. Student from undergraduate programs in bioengineering and Biomedical Engineering seeking graduate education in the field represent a new population of potential students to the graduate program at UMCP.

**Review of Other Universities/Bioengineering Departments**

Over the past several months, teams of individuals from UMCP, the University of Maryland Medical School and experts in the field visited three of the top four Bioengineering Departments in the country. These visits included Johns Hopkins, Duke University and Georgia Institute of Technology. Included below is a description of each of these programs. A visit is planned in the near future to the University of California, San Diego.

**Johns Hopkins** – September 14, 2005 – Murray Sachs (chair), Art Shoukas (undergraduate program), Rai Williams (graduate program); Bob Fischell (UMCP), Farvardin (UMCP), Bentley (UMCP)

The JHU Biomedical Engineering Institute faculty number 17 in School of Medicine, 10 in Whiting School, and 7 joint in other engineering departments and are housed in Clark Biomedical Engineering Building. There are seven research thrusts: imaging, micro/nano instrumentation, cardiovascular, cell/tissue engineering, computational biology, molecular/cellular engineering, and neuroscience/neuroengineering. There are several centers and institutes that bring these thrusts together.

The Ph.D. program has a joint 1st year with the medical students. Starting in the 2nd year, the engineering students become differentiated. The average term to degree is 5.8 years. The undergraduate program emphasizes biology and medicine. There are three 1-semester courses in biology [organ systems, molecular sciences, and cell biology]. The undergraduates start in Biomedical Engineering from the first day and they are separate from the other engineering students. A typical entering class of biomedical engineering students numbers 100.

The department stresses longitudinal design as a signature element to the program. Senior undergraduates are incorporated as lab managers. The design course consists of a team leader upper level undergraduate who works with freshmen. BS graduates go 1/3 to industry, 1/3 to graduate school, and 1/3 to medical school.

The department has ~$2MM in funds that are largely discretionary. This includes funds from salary support (both from research contracts and from the Whiting School), endowment, corporate sponsors, etc. The department has a significant number of staff (~14). The department has tremendous financial and institutional flexibility to formulate new initiatives and create centers and institutes. It resides in the Clark building and in a Whitaker Institute – the impact of these major gifts are evident.

**Duke University** – October 4, 2005 – Scott and Bob Fischell (UMCP), Bill Bentley (UMCP), Kristina Johnson (Dean), George Truskey (Chair), Greg Trahey, Kam Leong (JHU), Warren Grill, Fan Yuan (Undergraduate Program), Chris Clarke (Development), Tod Laursen (Associate Dean for Education), Craig Henriquez, and Judge Carr (Development).

The College of Engineering has 4 departments, Biomedical Engineering being one of the strongest. The faculty are principally in the Biomedical Engineering department (25 primary, 29 secondary), with a plan to move to 30 within three years. There is a focus on biomedical imaging (e.g., biophotonics), biomechanics, electrophysiology, and biomolecular and tissue engineering. They stress translational efforts
that impact patient health and were recently awarded a Coulter Foundation grant. The College is starting a bioengineering initiative. While an established department, it is within a fairly new and dynamic College of Engineering.

The undergraduate program has many ways for students to gain connections with practice (disabled students, clinically linked design projects, etc.). They have extramural grant support for these initiatives and they are primarily student run. They do not cap the undergraduate enrollment and are deeply concerned about the affect on infrastructure. They have a dual major option and most non-premed students select this dual major. Pre-meds do not. 1/3 of their undergraduates go to medical school; 1/3 to industry; and 1/3 to graduate school.

The graduate program was very large (~160 students). Students are placed in Biomedical Engineering labs, hospitals, etc. They tailor the program to the student, match the student with mentor early, and actively engage medical center faculty on their dissertation committees. Students are required to be a teaching assistant for 2 semesters and must have involvement with a clinical environment during their stay. They support the first year of graduate studies from IGERT, NIH training grants, the Whitaker endowment, and Breast Cancer fellowships.

Georgia Institute of Technology (Georgia Tech) November 15, 2005 – Bill Bentley (UMCP), Julie Babensee (GT Undergraduate Programs), Larry McIntire (GT Chair), Ajit Yoganathan (GT Associate Chair Research), Bob Nerem (Director, IBB).

Georgia Tech’s Coulter Department of Bioengineering has 30 primary faculty and will grow to 40 in the next 5 years and 50 in 10 years. The department is small within Georgia Tech, but large among biomedical engineering departments. It has an additional 17 Program faculty. Research thrusts are enabled by the Coulter Foundation Endowment ($20 MM), the Whitaker Foundation (building) and the Petit Institute of Bioengineering and Biosciences (IBB, building). The connection with Emory is 20 years old. There are five foci: cardiovascular mechanics and biology; biomaterials and tissue engineering, neuroengineering, biomedical imaging and bioinformatics, and cellular and biomolecular engineering. This enables the department to grow in new areas, hire new faculty, explore new educational initiatives. The faculty teach 1 course per semester. The Department has a participative advisory board and 3 associate chairs, all of which get 12 month salaries. The staff include 3 in a finance department; a staffed academic office that is run by a director of alumni, student affairs, and industry; an IT person; a web person; 6 office staff; 1 ½ lab personnel; and a full-time development officer.

The undergraduate programs consist of a BS Biomedical Engineering, a minor program, and a certificate program in materials. The undergraduate population has soared to 200 entering students in the current and previous 1 year (from 130). Hallmarks of their undergraduate program are: 1. a two-course problem-based learning sequence that divides undergraduates into groups of 8 that are closely mentored and, in this course, introduced to Biomedical Engineering; 2. laboratory sequences that include a cell-based systems physiology course and a organ systems course that are very well outfitted and run by a full time technician; and 3. elective courses and senior design program which includes a clinical experience. Premed students are not segregated, which the Department noted as a problem at UCSD. Tracks that paralleled the research thrusts were dropped as they really didn’t give students true expertise in a topical area. The Department ties into a campus-wide career fair. 15% go to medical school, which is less than the reported national average.

The graduate program consists of Biomedical Engineering, BIOE, and MD/PhD programs. The program has 200 students split among a fixed Biomedical Engineering graduate curriculum and a flexible BIOE graduate curriculum. The entering Biomedical Engineering students (~27) are supported for 9-months. The entering bioengineering graduate students are supported only on grants. The biomedical engineering
graduate students take cell biology, etc., at Emory in the Science Departments. Academic units are “Departments” at Emory and “Schools” at GT, but a “School” within the School of Medicine at Emory could not exist.

The Fischell Department of Bioengineering

In December 2005, Dr. Robert Fischell and his sons presented the University, specifically, Bioengineering with a truly transformational gift. The University and the A. James Clark School of Engineering have a significant opportunity and charge….to create a world class bioengineering department with stellar undergraduate and graduate programs. Through this gift and the support of the University and the State, we propose to establish the Fischell Department of Bioengineering effective July 1, 2006. The mission of the Fischell Department of Bioengineering will be to:

educate students to excel in the field of bioengineering and to carry out research and development of biomedical systems that will improve healthcare for human subjects throughout the world.

The Fischell Department of Bioengineering will (i) elevate the quality of undergraduate education experience within the School and on campus, (ii) enrich the culture of excellence in education, research and scholarship, (iii) enhance the level of diversity, (iv) engage the greater community in entrepreneurial and commercial activities, and (v) enhance the infrastructure consistent with that of a world-class university.

Contingent upon the approval of this proposal, the department will be home to the Bioengineering Graduate Program, currently residing in the A. James Clark School of Engineering, and to an undergraduate program that is being established in a separate proposal. An existing undergraduate program in Biological Resources Engineering (ENBE), with its roots in Agricultural Engineering, has over the recent decade modified its curriculum substantially so that with some additional modification, it can be efficiently transformed into the undergraduate program of the Fischell Department of Bioengineering. The Department will be responsible for enabling the current Biological Resource Engineering students to complete their ENBE programs as originally offered.

Human Resource Requirements

The new department must be efficient, effective, flexible, strong and visionary. Critical to ensuring success of the new department are sufficient human capital (numbers and determination), infrastructure and finances, translating to human resources, physical resources and financial resources.

The human resource requirements include the chair, associate chairs (3), faculty, students, and administrative staff. An organization chart is included in Attachment B. The department will be directed by the Chair of Bioengineering. The Chair will be in place during the 2006 Spring Semester. The Chair will be responsible for the academic and administrative oversight of the department and programs as well as the vision for the future. Associate Chairs will be developed for the (1) undergraduate and (2) graduate programs and for (3) research and outreach. The Chair will report to the Dean of Engineering and will participate in governance of the School of Engineering along with other Department Chairs and Institute Directors.

The proposed structure of the department includes 25 full time equivalent faculty who will come from internal and external sources. Internally, the Dean of the School of Engineering has provided The Clark
School of Engineering faculty with an opportunity to express interest in participating in this new department. A date of February 3, 2006 was set as the deadline for inquiry. It is anticipated that four to six faculty will come from this avenue. In addition, the faculty in the College of Agriculture and Natural Resources’ Biological Resource Engineering department have also been given the opportunity to express interest in participating in the new department. It is anticipated that four faculty members will come from the Biological Resource Engineering department. Externally, active recruitment of candidates for outstanding faculty is also in process through two searches, one for the new department only and the second joint with the School of Pharmacy at the University of Maryland Baltimore. It is anticipated that the department will have 12 faculty (from all sources) by the beginning of FY 2007, 16 by FY 2008, 20 by FY 2009 reaching an anticipated steady state of 25 faculty by FY 2010. Positions will include full appointments, partial appointments split 50/50 with another department and partial appointments with a zero line (e.g. a formal affiliation for bioengineering graduate program faculty) of assistant, associate and full professors. Faculty areas of expertise are anticipated to include cellular and metabolic engineering, physiological systems, biological materials, biomechanics, transport processes, biomedical instrumentation, electrophysiology, signal processing & molecular imaging, drug delivery, protein and metabolic engineering, systems biology, integrated medical devices, nanobiotechnology and neuroengineering

Faculty efforts, in the classroom and in the laboratory, will be supported by teaching assistants. During the initial year of the department, eight teaching assistants will be employed. The number will increase to ten in FY 2008, twelve in FY 2009 and reach a steady state of fifteen in FY 2010.

The faculty in Bioengineering will have very specific needs for laboratory space and equipment. Laboratory technicians will be employed to assist with faculty efforts in the laboratories and to maintain these laboratories. Two technicians will be employed during FY 2007, three in FY 2008, four in FY 2009, five in FY 2010 reaching steady state of six in FY 2011.

While not reflected on the organization chart, the Department will also have faculty appointed as Associate Chairs for Undergraduate Studies, Graduate Studies and Research/Outreach.

The administrative efforts of the department will be the responsibility of the Director of Operations, who will report to the Department Chair. The Director of Operations will be responsible for all financial, physical and human resources management of the department. All administrative staff, including the academic and research coordinators, will report to this Director. The plan is to hire all of the staff during the first two years of operations.

Administrative staff will include:

- Graduate Studies Coordinator
- Undergraduate Studies Coordinator
- Research Coordinator
- IT Support Staff
- Payroll/Human Resources Coordinator
- Purchasing/Travel Coordinator
- Administrative Coordinator
- Administrative Assistants (2)
- Student Assistants (hourly)

The Director will also work with the Chair in the construction and outfitting of the new space for Bioengineering in the Jeong H. Kim Building.
A plan for transitioning all administrative processes from Chemical and Biomolecular Engineering (which has generously supported the administration of the Graduate Program in Bioengineering) and other Engineering departments to personnel in Bioengineering is under development. Existing positions and appointments will be created in the Bioengineering. New positions and appointments will be added. Access to University systems will be established. This transition is anticipated to be completed by July 1, 2006.

**Physical Resource Requirements**

Bioengineering currently occupies approximately 5,000 square feet of space, including laboratory space all within the Kim Building. This space is not only insufficient to meet current requirements it falls far below the anticipated requirement of ~14,000 square feet by the end of this fiscal year. An immediate need exists to define the administrative space for the new department. An approximately 5000 square foot addition onto the Kim building has begun and is being fast-tracked however, occupancy is not anticipated until 2007 at which time the need for space will exceed 33,000 square feet. By the end of the first five years, it is anticipated that Bioengineering will require more than 40,000 square feet. This does not address the physical needs for the proposed Fischell Institute for Biomedical Devices. The attached chart (Attachment C) outlines space requirements by position and by year as positions are filled. The space requirements are consistent with financial requirements outlined in the budget section.

Office size is commensurate with the position held and with square footage assignments inside the Kim Building. Each faculty will be provided with approximately 1,000 square feet of laboratory space and approximately 180 square feet for faculty office space.

**Financial Resources**

The department and programs must be of the highest caliber and, over time, are intended to propel the Clark School of Engineering at the University of Maryland into the top five of public institutions in the United States. The financial requirements to create and establish the Fischell Department of Bioengineering are substantial and will require reallocation of existing resources, new resources, as well as completion of previous obligations at all campus levels. The initial faculty nucleus will consist of individuals seeking realignment from other departments including, but not limited to: chemical engineering, mechanical engineering, and biological resource engineering. The salaries and associated support of these individuals will be transferred to the Fischell Department; mechanisms to restore their lines and support to the vacated departments are being established by Dean Farvardin. Staff positions are being filled at present; a Director of Operations is already in place in a contingent position. Future faculty and staff hires will be added in the next several years based on commitments made by Provost Destler in 2003. Finally, in 2005, Dr. Robert Fischell and family have generously provided a staged gift of $31 million to establish and endow future chairs, professorships, and fellowships that is predicated on future USM commitments. This gift complements a previous gift and endowment of the Robert Fischell Graduate Fellowship in Biomedical Engineering.
Letters of Support

Letters of support for the Department are included in Attachment E. These letters include the Maryland Department of Business and Economic Development, national and local companies, and UMCP Chairs.

Conclusion

The Nation
Enrollment in bioengineering/biomedical engineering at other institutions across the nation is soaring.

The State
Bioengineering and related areas have been identified by the State as foundations upon which to build the State’s research and development success and a focus area for developing a more highly qualified workforce.

The University
Investments in bioengineering would enable the University to address all five of its initiatives identified in the strategic plan; (i) elevate the quality of undergraduate education experience within the College and on campus, (ii) enrich the culture of excellence in education, research and scholarship, (iii) enhance the level of diversity, (iv) engage the greater community in entrepreneurial and commercial activities, and (v) enhance the infrastructure consistent with that of a world-class university.

The Clark School
It is the Clark School’s goal to build a culture of excellence in research and scholarship while expanding the impact of the research program by emphasizing “specialty topics of large potential”. Bioengineering has been identified by the Clark School as one of the five areas for investment of significant resources to build specialty topic areas with large potential. However, The Clark is the only engineering school among the top 25 undergraduate engineering schools nationwide without a formal undergraduate degree program in bioengineering/biomedical engineering.

The Fischell Department of Bioengineering
From Dr. Robert Fischell on the occasion of the announcement of his $30 million gift for bioengineering, the finest goal that engineering can achieve is to improve the quality of life for millions of people throughout the world....... Bioengineering and biomedical devices are the most direct means to achieve that goal.

Now is the time for the University of Maryland College Park and the A. James Clark School of Engineering to seize the moment; to move forward in a steadfast yet intense pace to create the world-class Fischell Department of Bioengineering; a comprehensive unit with undergraduate and graduate programs of the highest caliber that will educate Maryland students to meet the current and future demands for its graduates, for the University, the State and the Nation.
ATTACHMENT A

Bioengineering Program/Curriculum Committee
Bioengineering Program/Curriculum Committee

Bill Bentley  bently@umd.edu  Herbert Rabin Distinguished Professor
Director, Bioengineering Graduate Program
3232 Jeong. H. Kim Engineering Building
Maryland Technology Enterprise Institute
301-405-4321

Bruce Jarrell  bjarrell@som.umaryland.edu  Vice Dean Academic Affairs
University of Maryland School of Medicine
14-032A, BRB
655 West Baltimore Street
Baltimore, Maryland 21201-1559
410-706-2304

Raj Shekhar  rshekhar@um.edu  Visiting Professor
Imaging Technologies Laboratory
Room 119
108 N. Greene Street
Baltimore, MD 21201
410-706-8714

Art Johnson  aj16@umail.umd.edu  Professor
Biological Resource Engineering
1429 Animal Science/Agric Engr Bldg
301-405-1184

Hubert Montas  montas@umd.edu  Associate Professor
Biological Resource Engineering
1453 Animal Science/Agric Engr Bldg
301-405-1196

Adam Hsieh  hsieh@umd.edu  Assistant Professor
Mechanical Engineering
3242 Jeong H. Kim Engineering Building/
2181 Martin Hall
301-405-7397

John Fisher  jpfisher@umd.edu  Assistant Professor
Chemical & Biomolecular Engineering
3238 Jeong H. Kim Engineering Building/
1223A Chemical & Nuclear Engineering
301-405-7475
<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Position and Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brendan Casey</td>
<td><a href="mailto:bcasey1@umd.edu">bcasey1@umd.edu</a></td>
<td>Graduate Assistant 1 CBE-Bioengineering Program 2144 Chemical &amp; Nuclear Engineering</td>
</tr>
<tr>
<td>Colin Hebert</td>
<td><a href="mailto:cghebert@umd.edu">cghebert@umd.edu</a></td>
<td>Maryland Biotechnology Institute Research Graduate Assistant UMBI-Center for Biosystems Research 6142 Plant Sciences Building</td>
</tr>
<tr>
<td>Sandra Huskamp</td>
<td><a href="mailto:shuskamp@umd.edu">shuskamp@umd.edu</a></td>
<td>Bioengineering Program Acting Director of Operations 3234 Jeong H. Kim Engineering Building 301-405-7771</td>
</tr>
</tbody>
</table>
ATTACHMENT B

Human Resource Requirements
Fischell Department of Bioengineering

Department Chair

Director of Operations

Administrative Coordinator

Graduate Studies Coordinator

Undergraduate Studies Coordinator

Purchasing/Travel Coordinator

IT Support

Faculty (25)

Assistants (2)

Research Coordinator

Personnel/Payroll Coordinator

Communications Coordinator

Student Assistants

Laboratory Technicians (6)

Teaching Assistants (15)

Fischell Undergraduate Research Assistants (12)

Student Assistants

Administrative Coordinator

Graduate Studies Coordinator

Undergraduate Studies Coordinator

Purchasing/Travel Coordinator

IT Support

Assistant

Research Coordinator

Personnel/Payroll Coordinator

Communications Coordinator

Student Assistants

Laboratory Technicians (6)

Teaching Assistants (15)

Fischell Undergraduate Research Assistants (12)

Student Assistants
ATTACHMENT C

Physical Resource Requirements
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<td>Department Chair</td>
<td>220</td>
<td>220</td>
<td>220</td>
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<tr>
<td>Director of Operations</td>
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<tr>
<td>Administrative Assistant</td>
<td>140</td>
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<tr>
<td>Administrative Assistant</td>
<td>140</td>
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<tr>
<td>Research Coordinator</td>
<td>140</td>
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<tr>
<td>Personnel/Payroll Coordinator</td>
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<tr>
<td>Coordinator for Undergraduate Programs</td>
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<tr>
<td>Coordinator for Graduate Programs</td>
<td>140</td>
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<tr>
<td>Coordinator for Communications</td>
<td>140</td>
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<td>General Office Space:</td>
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<td>Reception, Mail, Copier, Printers, Student helpers, Supplies, etc.</td>
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<td><strong>Total Administrative Staff &amp; Operations</strong></td>
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<td><strong>2,054</strong></td>
<td><strong>2,054</strong></td>
<td><strong>2,054</strong></td>
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<tr>
<td>Technicians (2 in FY 07, 3 in FY 08, 4 in FY 09, 5 in FY 10, 6 in FY 11)</td>
<td>200</td>
<td>300</td>
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<td>IT Support</td>
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<td>Teaching Assistants (8 in FY 07, 10 in FY 08, 12 in FY 09, 15 in FY 10 @ 9 month)</td>
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<td>Fischell Undergraduate Research Assistants (Match) 12</td>
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<tr>
<td>Fischell Fellowship Match</td>
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<tr>
<td><strong>Total Technical Staff</strong></td>
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<td><strong>3,900</strong></td>
<td><strong>4,900</strong></td>
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<tr>
<td>Proposed Faculty from Existing Faculty (Aranda, Bentley, Fisher, Johnson, Hsieh, Kofinas, Montes, Tao, Shirmohammadi, etc. Assume 10 total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Office Space</td>
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<td>New Faculty for 2006-2007 (4)</td>
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<td>New Faculty 2008-2009 (3)</td>
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<tr>
<td>Lab Space</td>
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<tr>
<td><strong>Total Research Activities</strong></td>
<td><strong>16,000</strong></td>
<td><strong>16,000</strong></td>
<td><strong>16,000</strong></td>
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<th>Instructional Laboratories</th>
<th>FY 2007</th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
<th>FY 2011</th>
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<td>Bioengineering Undergraduate Laboratory &amp; Office</td>
<td>2,000</td>
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<td><strong>Total Square Footage Requirements</strong></td>
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<td><strong>22,270</strong></td>
<td><strong>33,370</strong></td>
<td><strong>39,470</strong></td>
<td><strong>40,070</strong></td>
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Current Space is distributed on campus, but Kim space is currently = 5,562

<table>
<thead>
<tr>
<th>Current Space is distributed on campus, but Kim space is currently</th>
<th>FY 2007</th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
<th>FY 2011</th>
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<tr>
<td>Office Space for Director, Faculty, Students and Staff</td>
<td>1,271</td>
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<tr>
<td>Lab Space</td>
<td>4,291</td>
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<tr>
<td><strong>Total Square Footage Assigned to Bioengineering</strong></td>
<td><strong>5,562</strong></td>
<td><strong>10,000</strong></td>
<td><strong>10,000</strong></td>
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Attachment D

Letters of Support
January 12, 2006

Dr. William Desler  
Senior V.P. Academic Affairs & Provost  
University of Maryland College Park  
1119 Main Administration Building  
College Park, MD 20742-5031

Dear Dr. Desler:

I am writing in support of the new Department of BioEngineering at the University of Maryland College Park. A new department will fill a crucial role in providing an undergraduate program to the new and growing graduate BioEngineering program. This increased focus on bioengineering will be good for the State of Maryland, and for the field of bioengineering. Beneficial outcomes would be many: new discoveries, trained professionals, and further interaction with local industry.

The presence of a Department of BioEngineering would allow the A. James Clark School of engineering to continue its ascent into the top ranks of engineering schools nationwide. Basic research in bioengineering would be an important component to this effort. The newly proposed undergraduate program would address a significant workforce need. The State of Maryland’s growing biotech industry has workforce needs that are currently unmet. A stream of trained graduates would be welcome and able to be hired in the local industry.

In addition to more basic academic research and teaching, this new department is expected to have a significant impact on the regional industry and economy. An increased translational research effort would also result, and effectively provide new technologies with commercial potential. This increased capability would be very beneficial for the region’s economy. The State’s biotech industry has already had significant interactions with UM through its biotech program and bioprocessing scale-up facility, the UMBI, and with UMB’s clinically based strengths. We expect that the new BioEngineering Department will provide increasing opportunities for local industry to work collaboratively with the University of Maryland.

I enthusiastically support the new Department of BioEngineering at the University of Maryland, and look forward to its great success.

Sincerely,

Christopher C. Foster  
Deputy Secretary
February 2, 2006

Dr. William Destler  
Senior V.P. Academic Affairs & Provost  
University of Maryland College Park  
1119 Main Administration Building  
University of Maryland, College Park, MD 20742-5031

Dear Dr. Destler:

I am writing to add my support for the creation of the new Fischell Department of Bioengineering at the University of Maryland College Park. A new department will fill a crucial role in providing a rich and diverse educational experience for both undergraduate and graduate students on this campus. As you are aware, many of our faculty already participate in the Bioengineering Graduate Program. With the new undergraduate program, we envision even more interaction between scientists – particularly life scientists – and engineers, adding to the technological and scientific base of our university’s BS graduates.

We are cognizant of the existing ENBE curriculum and have examined the proposed BIOE curriculum. Currently, there is no intersection between the ENBE and ENCH curricula and there is no explicit request for our department to teach any of the proposed BIOE classes. Therefore, the new BIOE undergraduate curriculum will have no negative implications in terms of teaching activities in the Chemical and Biomolecular Engineering Department. In fact, there exist a number of positive potential interactions that will result from the new degree program; for example, faculty in our department may participate in teaching the proposed Biofluidics or Biotransport courses, and our department may choose to offer a number of our electives to BIOE students. Of course, any future interactions are subject to the ENCH curriculum review presently underway aimed at expanding the biologically related content of current ENCH core classes. We will be happy to work with the Bioengineering Department to identify courses to be cross-listed which would be of the greatest benefit to students in both degree programs.

Sincerely,

Raymond A. Adomaitis  
Associate Professor and Acting Chair
February 9, 2006

Dr. William Destler
Senior V.P. Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
University of Maryland, College Park, MD 20742-5031

Dear Dr. Destler:

I am writing to add my support for the creation of the new Fischell Department of Bioengineering at the University of Maryland College Park. A new department will fill a crucial role in providing a rich and diverse educational experience for both undergraduate and graduate students on this campus. As you are aware, many of our faculty already participate in the Bioengineering Graduate Program. With the new undergraduate program, we envision even more interaction between scientists, particularly life scientists, and engineers—adding to the technological and scientific base of our university’s BS graduates.

We are cognizant of the current ENBE curriculum and have examined the proposed BIOE curriculum and foresee only minor difficulties in adjusting our courses and instructor teaching loads. In particular, we will need to rework and enhance our Physics 174 lab to take the 50% increase in enrollment. We anticipate this will require we add at least one extra faculty teaching assignment and two TA’s.

Sincerely,

[Signature]

Jordan A. Goodman
Professor and Chair
February 2, 2006

Dr. William Destler
Senior V.P. Academic Affairs & Provost
University of Maryland

Dear Bill:

I am writing to add the enthusiastic support of the College of Chemical and Life Sciences, and its constituent departments, for the creation of the new Fischell Department of Bioengineering at the University of Maryland. A new department will fill a crucial role in providing a rich and diverse educational experience for both undergraduate and graduate students on this campus. As you are aware, many of our faculty already participate in the Bioengineering Graduate Program. As this department and its programs grow, it will provide new opportunities for collaboration and student training among faculty in our two colleges. With the new undergraduate program, we envision even more interaction between scientists, particularly life scientists, and engineers – adding to the technological and scientific base of our university’s BS graduates.

We have reviewed the proposed BIOE curriculum, and have analyzed it in relation to the current ENBE curriculum. Initially, we anticipate little impact on our curriculum/resources as new BIOE students replace current ENBE students in CLFS courses such as BSCI 222 and 230, and CHEM 135/136 and 231/232 in the first few years of the program. Once the program grows to its anticipated enrollment of 80 (or more), this picture could change, and could necessitate at least one lab/discussion section beyond current offerings in these courses. We will assess the impact as the BIOE major grows (in the context of other enrollment ups and downs). We will request seats/sections through the ACCESS Planning Cycle Funds process should demand seem to warrant an expansion of these courses. We hope as well to include Bill Bentley and others in discussions of curriculum revisions in the courses that overlap with the BIOE curriculum, particularly BSCI 230 curricular changes that are currently under discussion.

The creation of a Bioengineering department is an exciting opportunity for the campus, and one we are very pleased to support.

Sincerely,

Norma M. Allewell
Professor and Dean
30 January 2006

Dr. William Destler
Senior V.P. Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
University of Maryland, College Park, MD 20742-5031

Dear Dr. Destler:

I am writing to add my support for the creation of the new Fischell Department of Bioengineering (BIOE) at the University of Maryland College Park. A new department will fill a crucial role in providing a rich and diverse educational experience for both undergraduate and graduate students on this campus. With the new undergraduate program, we envision even more interaction between scientists, particularly life scientists, and engineers – adding to the technological and scientific base of our university’s BS graduates.

We are cognizant of the current Biological Resources Engineering (ENBE) curriculum and have examined the proposed BIOE curriculum and foresee only minor difficulties in adjusting our courses and instructor teaching loads. We look forward to working with the new department of Bioengineering faculty and staff in strengthening the Clark School’s educational and research programs.

Sincerely,

[Signature]

Ali Haghani
Professor and Chairman
January 16, 2006

Dr. William Destler
Senior V.P. Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
University of Maryland, College Park, MD 20742-5031

Dear Dr. Destler:

I would like to express my support for the creation of a new Department of Bioengineering at the University of Maryland College Park. The presence of a Department of Bioengineering will lead to new technologies that promise to impact human health, generate a cadre of trained professionals that will find job opportunities in companies such as ours, and otherwise enhance interactions between faculty, staff, and students of the Clark School of Engineering with health care related institutions such as the NIH and the University of Maryland Baltimore.

In particular, I hope to convey that there exists a critical need for trained engineers with communication and personal skill sets that are commensurate with the medical device business environment.

I look forward to interacting with you as you move your institution in this new and vital direction.

Sincerely yours,

Edward M. Sullivan
District Manager—Baltimore
Medtronic USA, Inc.
January 10, 2006

Dr. William Destler
Senior V.P. Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
University of Maryland, College Park, MD 20742-5031

Dear Dr. Destler:

I am writing in support of the new Department of BioEngineering at the University of Maryland College Park. A new department will fill a crucial role in providing an undergraduate program to the new and growing graduate BioEngineering program.

This increased focus on bioengineering will be good for the State of Maryland, local industries and for the field of bioengineering. Beneficial outcomes would be many: new technologies, trained professionals, and further interaction with local industry.

The presence of a Department of BioEngineering would allow the A. James Clark School of engineering to continue its ascent into the top ranks of engineering schools nationwide. Basic research in bioengineering would be an important component to this effort.

The newly proposed undergraduate program would help provide much needed expertise in the areas of biology and engineering.

In addition, this new department is expected to have a significant impact on the regional industry and economy. An increased translational research effort would also result, and effectively provide new technologies with commercial potential. This increased capability would be very beneficial for the region’s economy.

The State’s biotech industry has already had significant interactions with UM through its biotech program and bioprocessing scale-up facility, the UMBI, and with UMB’s clinically based strengths. We expect that the new BioEngineering Department will provide increasing opportunities for local industry to work collaboratively with the University of Maryland.

I enthusiastically support the new Department of BioEngineering at the University of Maryland, and look forward to its great success.

Sincerely yours,

Joe Hernández
President and CEO
Innovative Biosensors, Inc.
January 12, 2006

Dr. William Desler
Senior V.P. Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
University of Maryland, College Park, MD 20742-5031

Dear Dr. Desler:

I write to add my support of the new Department of BioEngineering at the University of Maryland College Park. A new department will fill a crucial role in providing an undergraduate program to the new and growing graduate BioEngineering program.

This increased focus on bioengineering will be good for the State of Maryland, and for the field of bioengineering. Beneficial outcomes would be many: new discoveries, trained professionals, and further interaction with local industry.

The presence of a Department of BioEngineering would allow the A. James Clark School of Engineering to continue its ascent into the top ranks of engineering schools nationwide. Basic research in bioengineering would be an important component to this effort.

The newly proposed undergraduate program would address a significant workforce need. The State of Maryland’s growing biotech industry has workforce needs that are currently unmet. A stream of trained graduates would be welcome and able to be hired in the local industry.

In addition to more basic academic research and teaching, this new department is expected to have a significant impact on the regional industry and economy. An increased translational research effort would also result, and effectively provide new technologies with commercial potential. This increased capability would be very beneficial for the region’s economy.

The State’s biotech industry has already had significant interactions with UMD through its biotech program and bioprocessing scale-up facility, the UMBF, and with UMBF’s clinical based strengths. We expect that the new BioEngineering Department will provide increasing opportunities for local industry to work collaboratively with the University of Maryland.

I enthusiastically support the new Department of BioEngineering at the University of Maryland, and look forward to its great success.

Sincerely yours,

Wei-Wu He, Ph.D.
General Partner
January 16, 2006

William W. Destler, Ph.D.
Senior VP, Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
College Park, MD 20742-5031

Dear Dr. Destler:

I support the establishment of a new Department of BioEngineering at the University of Maryland College Park. This department will provide an important undergraduate counterpart to complement the growing BioEngineering program at the graduate level. In addition, a Department of BioEngineering will allow the A. James Clark School of Engineering to continue its drive toward becoming one of the top engineering schools in the country.

The new discoveries and trained professionals emerging from this department are just some of the benefits that can be expected. The proposed undergraduate program would also address a significant workforce need. The continued growth of Maryland’s bioscience industry suggests that the industry’s current need for skilled workers will only increase in the future. A stream of trained bioengineering graduates would be welcome in the local industry.

In addition to basic academic research and teaching, the translational research anticipated in this new department can be expected to have a significant impact on the regional industry and economy. This work can effectively seed the local industry with a variety of new technologies of significant commercial potential. This increased interaction with local industry will greatly assist many of the companies that MdBio serves, and this will be good for the economy of the State of Maryland as well.

The State’s bioscience industry already has significant interactions with the University System of Maryland through, for example, the bioprocessing scale-up facility at College Park, the varied research programs at UMBI, and UMB’s clinically-focused programs. I enthusiastically support the new Department of BioEngineering at the University of Maryland College Park, and look forward to its great success.

Sincerely,

C. Robert Eaton
President
MdBio, Inc.
February 14, 2006

Prof. William Destler
Senior V.P. Academic Affairs & Provost
University of Maryland College Park
1119 Main Administration Building
University of Maryland, College Park, MD 20742-5031

Dear Prof. Destler:

I am writing to add my support for the creation of the new Fischell Department of Bioengineering at the University of Maryland College Park. A new department will fill a crucial role in providing a rich and diverse educational experience for both undergraduate and graduate students on this campus. With the new undergraduate program, we envision even more interaction between scientists, particularly life scientists, and engineers – adding to the technological and scientific base of our university’s BS graduates.

We are cognizant of the current ENBE curriculum and have examined the proposed BIOE curriculum and, because there is minimal overlap between ENME and BIOE, foresee no difficulties in adjusting our courses and instructor teaching loads. On the contrary, our department is enthusiastic about seeing additional BIOE students participating in the ENME232 Thermodynamics course and the potential to cross-teach courses, between ME and BIOE, such as a course in BioFluid Mechanics.

Sincerely,

Avram Bar-Cohen, Ph.D.
Distinguished University Professor and Chair