

Engineering and Technology Industry Council New Initiative Proposal Biennium from July 1, 2005 to June 30, 2007

Campus: Portland State University
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Summary of Proposal: Economic Enhancement Through Biomedical Engineering

Portland State University is uniquely positioned to meet the demands of Oregon's projected economic growth in biomedical engineering and biotechnology. ETIC's funding would leverage PSU and Portland's existing resources in these areas with the creation of a new program in biomedical engineering. The program would be created by the combined efforts of three faculty (two new and one existing). The program would consist of a course sequence for senior and first-year graduate engineering students, joint research/design projects with local companies, federally-funded research, and student internships. This program will meet the pending demand for biomedical engineers, foster a business climate conducive to growth, and strengthen Oregon's economy.

Goals

The number of biomedical engineering jobs nationwide will increase by 31.4% through 2010 according to the U.S. Department of Labor. This is double the rate of projected overall job growth and triple the rate of overall engineering jobs. The job growth in this field is driven by the health needs of the aging U.S. population and the need for more sophisticated and cost-efficient medical equipment. In 2002 the median annual earnings of biomedical engineers nationwide were \$60,410 with the highest 10% earning more than \$107,000.

There are approximately 75 companies with a focus on bioengineering or biotechnology in Oregon. These cover a broad range of products including agriculture, environmental technologies, medical devices, testing laboratories, information technology, and biotechnology products. Most of these companies are located in the Portland metropolitan area, but they span the entire state including a cluster of companies in Bend. According to the Oregon Bioscience Association, the state has three main components necessary to foster the economic growth of bioscience and medical technology: government support, strong research universities, and a well-trained workforce. The Oregon Economic and Community Development Department has chosen biotechnology as one of 12 key industries to focus resources in order to achieve rapid sustainable growth. The Portland Development Commission has identified biotechnology as a key economic growth area and is helping to plan the development of the 130-acre North Macadam District south of downtown Portland.

To meet OHSU's projected need for 70% increased space, OHSU is planning to develop in the North Macadam District south of downtown Portland. The district will eventually include 1.5 million square feet of space for clinical, research, and educational activities. This district is expected to generate about 4,500 new jobs over the next 20 years. Although this will stimulate growth in the future, the first building is not scheduled to be occupied until 2006.

PSU is also dedicated to contributing to the development of biotechnology in this district. PSU is using the Corbett Building, in the heart of the North Macadam District, as an accelerator for small businesses with a focus on medical devices and bioscience. Medi-Screw (a biomedical company) and Stratyx Biotechnology (a contract biopharmaceutical manufacturing firm) have leased space in the building. The triangle consisting of PSU, OHSU, and the redeveloped North Macadam District has the potential to emulate the success of the Research Triangle in North Carolina.

Portland State University (PSU) is Oregon's largest university and serves approximately 22,000 students annually. PSU has well-established growing engineering and biology programs at both the undergraduate and graduate levels. During the 2002-2003 academic year they graduated 407 students combined. Although both of these programs are strong individually, there are currently no courses or programs that unify biology and engineering to meet the new demands for biomedical engineers.

The goals of this proposal are 1) to create a program to prepare Oregon students for biomedical engineering careers and 2) to contribute to the development of intellectual property and new companies that will help grow the Oregon economy.

Investment Description

With ETIC support, a new engineering program will emerge that has its roots in biology, along with traditional foundations in chemistry, physics, and mathematics. Seed funding is requested for the hire of two new faculty and the support of a current faculty member. These individuals will provide the research and educational foundation to establish a new biomedical engineering program at PSU. This program will prepare students through coursework and project-based learning experiences. These efforts will be focused on strengthening partnerships with the emerging local biomedical/biotechnology industry. New electives will prepare undergraduates to participate in industry-sponsored Capstone Projects. Advanced electives will enhance the preparation of students working on sponsored Masters Theses. Internships with local industry will continue the development of these capstone and research projects and further prepare students for careers in biomedical engineering.

In addition to preparing students to meet the needs of Oregon's growing biomedical/biotechnology industry, the new program will strengthen PSU's position for both competitive external funding. Many new funding mechanisms are being introduced through federal agencies such as the National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), the Department of Energy (DOE), and the Department of Defense (DOD). The mechanisms support research in emerging biomedical engineering areas, such as tissue engineering, minimally invasive surgery, bio-nanotechnology, biosensors, data processing, and medical instrumentation. The new National Institute for Biomedical Imaging and Bioengineering at the NIH, was established to foster new bioengineering research priorities through design-driven discovery. PSU would be well-positioned to pursue these funds as complementary support of industrial-initiated projects through both traditional research mechanisms and mechanisms that target university-industry partnerships.

Results

A result of the investment in this initiative will be a new engineering program with new faculty and four new biomedical engineering courses. Initial courses targeted to seniors and first-year graduate students would include:

- Introduction to Biomedical Engineering (co-taught by new ECE and ME faculty)
- Biomedical Instrumentation (new ECE faculty)
- Biomechanics (new ME faculty)
- Biomaterials (new ME faculty)

Additionally, engineering students will be given access to background courses in physiology and biochemistry. Consistent with the national trend, we expect this program to attract a higher proportion of women (as high as 50%) than other engineering disciplines.

Proposed Investment and Private Support Forecast (\$M)

	7/1/05- 6/30/06	7/1/06- 6/30/07	Total
Proposed OUS Investment (\$M)			
Associate Faculty Positions (2)	0.30	0.30	0.60
Faculty Start-up Funds	0.20	0.20	0.40
Subtotal	0.50	0.50	1.00
Expected private support (\$M) (2)	0.75	0.75	1.50
Total (\$M)	1.25	1.25	2.50
New Faculty Supported (FTE) (3)	2.0	2.0	2.0
Notes:			
(1) Use as many lines as you need to give the proposed new investment(s)			
(2) Consistent with ETIC Private Support Policy dated 1-23-02.			
(3) To be hired with ETIC funds during 2005-2007 biennium.			

Metrics Forecast:

	Baseline	Projected			
	AY 99	AY06	AY07	AY08	AY09
Undergraduate SCH	NA	32729	34105	36115	38999
Graduate SCH	NA	18937	19605	21115	22572
Women Graduating from ECS Programs	NA	24%	26%	30%	32%
ECS Graduate Degrees Granted	NA	188	199	220	244
Capstone Project SCH	NA	24	30	35	40
Internships	NA	2	3	4	5
Total Research Expenditures	NA	\$4.505M	\$5.35M	\$6.4M	\$7.25M
Notes:					
SCH = student credit hours.					