Engineering and Technology Industry Council
Core Investment Plan
Biennium from July 1, 2005 to June 30, 2007

Campus: OGI School of Science & Engineering of OHSU

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Summary of Proposal: This Core Investment proposal requests $2.6M: $1.8M to hire and support the start-up of three new faculty members in the newly founded department of Biomedical Engineering in the OGI School of Science and Engineering of OHSU and funds for continuing support of four faculty members who received support from ETIC funds during the 2003-2005 biennium ($800K). Funding of this proposal and funding of the accompanying New Initiative and Capital Investment proposals will allow OGI to create a multi-disciplinary center for research and education in technology-based health care. The new faculty hires will maintain research programs, expand our knowledge base, and develop new technologies that are focused primarily in areas of nanotechnology, computational biofluid mechanics, medical image computation, and medical information retrieval of heterogeneous data. These programs will complement and leverage existing strengths in biomedical engineering, computer science, and electrical engineering at OGI, thereby enhancing our visibility, competitiveness, and productivity in these areas of education and research.

New health care technologies resulting from the program are anticipated to include strategies for the improved diagnosis, monitoring, treatment and long-term assessment of patients, and especially those patients with cardiovascular, neurological, and orthopedic disorders. These patient populations have been targeted because they are highly significant medically and economically and present important opportunities for improved patient care and medical information management. Within the center for research and research-based education, the newly hired biomedical engineers will be responsible for the research and development of the new technologies and their application to identified areas of opportunity. The resulting center of excellence will create intellectual capital, highly skilled graduates, new jobs, and broadly based growth opportunities for existing high-technology companies and for newly emerging industries in technology-based health care, environmental science, safety, and security.

Goals

OGI is the premier provider of high-technology graduate education in the state of Oregon. During the past two years, OGI has graduated approximately 40% of all Masters degrees in computer science and electrical engineering in the state of Oregon (137 in AY02, 123 in AY03). We provide advanced education where it is needed most, in the high-technology center of greater Portland, Beaverton, Hillsboro, and Wilsonville. More

than half of OGI's students are employees of local industries; they are attending classes and pursuing graduate degrees on a part-time basis.

The CSE Department has recently changed its direction, and is now focused on computer science and electrical engineering research for biomedical research and clinical practice, building on its expertise in functional programming, machine learning, multimodel technologies, image processing, signal processing, and control theory.

We have similar goals for the newly founded department of Biomedical Engineering (BME). Although the BME department is less than one year old, it already has 10 FTE core faculty members, 28 students, and research programs in tissue engineering, biomedical optics, neuroengineering, and speech and language engineering. Laboratories and research groups have been formed in biomedical photomechanics, cardiovascular engineering, neuroscience, and point-of-care health care engineering. The Oregon University System has approved the Masters and Ph.D. programs and the Northwest Commission on Colleges and Universities has accredited those degree programs. The current research budget of the BME department is $2.1M. The goal for the BME department is, by AY10, to have18 faculty members, 50 graduate students, and a research budget in excess of $6M.

Investment Description

This Core Investment proposal requests $1.8M to hire and support the start-up of three new faculty members and $800K for continuing support of four faculty members who received support from ETIC funds during the 2003-2005 biennium. The new faculty positions will be in biomedical engineering. These new hires will have specialties within those disciplines that will, in conjunction with the resources provided by the accompanying New Initiative and Capital Investment proposals, allow OGI to build a center of research and educational excellence in areas of bio/nano-technology, computational biomechanics, medical image computation, and medical information management. These programs will complement and leverage existing strengths in biomedical engineering and computer science at OGI, thereby enhancing our competitiveness and productivity in these expanding areas of education and research.

The resulting programs will support applications in diverse areas ranging from nanotechnology to technology-based and computer-based strategies to address important health care problems. New technologies resulting from the program will improve the diagnosis, monitoring, treatment and long-term management of patients. Due to the increasing complexity and cost of health care, these opportunities for improved patient care and information management are an attractive focus for our research and education efforts. Progress in these areas will be of considerable medical and economic importance. Research and educational activities within the center will necessarily involve a variety of scientists and engineers, including biologists, physicists, chemists, biomedical engineers, electrical engineers, and computer scientists.

OGI is uniquely qualified, within the context of OHSU and using the resources that will result from funding of this proposal and the accompanying proposals, to build a multi-disciplinary center of research and education that covers the spectrum from devices to

computational modeling to medical informatics, activities that will involve scientists and engineers from multiple disciplines.

The proposed center of excellence will allow OGI to assume a leadership position in creating intellectual capital, producing graduates, creating jobs, and supporting a broad range of existing high-technology companies as well as facilitating the creation of newly-emerging industries in technology-based health care, environmental science, and safety and security.

Investment Description

This Core Investment proposal seeks funding for the creation of three new faculty positions in the 2005-2007 Biennium, at a cost of $1,800,000 and $800,000 for continuing support of four faculty members who received support from ETIC funds during the 2003-2005 biennium. The funds requested to hire new faculty members will be used to recruit and support the start-up of new faculty members who will enhance OGI's capacity and excellence in areas of biomedical device technology and computational methods for medical applications. The proposed faculty growth will continue to enhance both the capacity and excellence of graduate education in the state.

This recruitment strategy to enhance and expand OGI's expertise in device-based adaptive, distributed, and embedded systems is based on three criteria. This technology:

- will emerge in the coming decade as technology of critical importance to the continued success of Oregon's high-technology industries within the global economy;
- is ideally suited to OGI's philosophy of research-based education, bringing leading-edge scientific and engineering knowledge and state-of-the-art technology to the classroom; and
- complements and strengthens OGI's existing programs that are nationally recognized and that provide a world-class environment for collaboration among various disciplines necessary to attract top-quality academic talent.

In addition to funding the creation of three new faculty positions in the 2005-2007 Biennium, OGI also seeks $800,000 from ETIC for continuation funding of four existing faculty positions created with ETIC funding in the 2003-2005 Biennium. OGI's ETIC proposal for the 2003-05 Biennium indicated that OGI would request follow-on funding for those faculty positions. OGI will request continuation funding in the 2007-2009 biennium for the three new faculty positions requested in this proposal.

Summary of OGI's 2005-2007 ETIC Core Investment Request

	ETIC Funding 2005-2007 Biennium
Faculty Expansion (3 Positions)	$1,800,000
Faculty Continuation (4 Positions)	$800,000
Total	$2,600,000

Results

The requested ETIC support will enable OGI to expand capacity and excellence of graduate education and research in these areas of critical importance to Oregon industry. The tables below summarize the expected benefits from this proposed investment in OGI.

In addition to the benefits shown in the tables below, new faculty hired with ETIC funding will attract significant outside funding for sponsored research. OGI's research funding per faculty is among the highest in the nation. Following a 4- to 5-year "spin-up" period, newly-hired OGI faculty members typically generate competitive research funding of approximately $250,000 per year, primarily from federal government sponsors. Sponsored funding of research generates a wide range of benefits to the community, by providing research training opportunities for local-area graduate students, enabling faculty to pursue technology challenges of interest to industry, and supporting a significant number of family wage-earners

Proposed Investment and Private Support Forecast ($M)

	7/1/05-6/30/06	7/1/06-6/30/07	Total
	7/1/05-6/30/06	7/1/06-6/30/07	Total
Proposed OUS Investment ($M)			
Support of existing faculty (1)	$400,000	$400,000	$800,000
Funds tied to existing programs (2)			0.00
Programs (3)			0.00
New BME Faculty	$900,000	$900,000	$1,800,000
Subtotal	$1,300,000	$1,300,000	$2,600,000
Expected private support ($M) (4)	$2,000,000	$2,000,000	$4,000,000
Total ($M)	$3,300,000	$3,300,000	$6,600,000
Faculty Supported (FTE)			
Existing (1)	4.0	4.0	4.0
New (5)	2.0	1.0	3.0
Total	6.0	7.0	6.5
Notes:			
(1) Hired with ETIC funds through June 2005.			
(2) Programs started with ETIC funds through June 2005.			
(3) Use as many lines as you need to describe your programs			
(4) Consistent with ETIC Private Support Policy dated 1-23-02.			
(5) To be hired with ETIC funds during 2005-2007 biennium.			

OGI Metrics Forecast:

	Baseline	Projected			
	AY 99	**AY06**	**AY07**	**AY08**	**AY09**
Average SAT/ACT percentile of incoming freshmen (1)	N/A	N/A	N/A	N/A	N/A
Average GRE percentile of incoming grad. students (2)	79%	83%	84%	85%	90%
Women graduating from ECS & BME programs (3)	29%	30%	31%	32%	35%
Minorities graduating from ECS & BME programs (3)(4)	13%	18%	19%	20%	25%
ECS & BME undergraduate student credit hours	N/A	N/A	N/A	N/A	N/A
ECS & BME bachelors degrees granted	N/A	N/A	N/A	N/A	N/A
ECS & BME graduate student credit hours	13,202	8,000	8500	9000	10,000
ECS & BME graduate degrees granted	131	115	120	125	135
Pre-college contact hours (5)	N/A	N/A	N/A	N/A	N/A
Total research expenditures per year (6)	$15M	$14M	$16M	$18M	$22M
National ranking of <program or department> (7)					
Computer Science and Engineering department(CSE)*		15th	13th	11th	10th
Database group in CSE**	5th	4th	3th	2rd	1st
National ranking of <college> ***					
Licenses sold (8)					
(9)					

Notes:

(1) If your applicants are required to submit SAT scores, use the percentile corresponding to the average composite SAT score of those submitting them. If they have the choice of SAT and ACT, use the average composite SAT score and the average composite ACT score, convert them to percentiles, and compute a weighted average of the two.

(2) Percentile based on the average quantitative score over those submitting such scores; ignore verbal and analytic scores.

(3) As a percent of all those graduating

(4) Racial and ethnic minorities who are US citizens or permanent residents

(5) Pre-college students participating in pre-college engineering, technology, computer science, math, and science programs

(6) Total dollars spent by ETIC-related departments towards research during aacademic year.

(7) Forecasts for multiple programs and departments are encouraged. Each ranking should be footnoted with the ranking body or ranking methodology.

(8) Patent licenses or other royalty-generating intellectual property licenses granted to commercial entities

(9) Add additional metrics as appropriate

BME Metrics Forecast:

	AY 99	**AY06**	**AY07**	**AY08**	**AY09**
Core Faculty (FTE)	N/A	12	13	15	16
Total research expenditures per year	N/A	$2.5M	$3M	$4M	$5M
Number of Masters graduates	N/A	10	15	20	25
Number of Ph.D. graduates	N/A	3	5	7	10