Engineering and Technology Industry Council
Campus Investment Proposal
Biennium from July 1, 2007 to June 30, 2009

Campus: Southern Oregon University
Contact Name: Joseph Graf, Dean of Sciences
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Summary of Proposal:

SOU proposes a total project of $530,000 that includes investing $300,000 to continue improvements to our Computer Science programs and investing $230,000 to continue the SOU portion of the cooperative Materials Science Bachelor's Degree program offered in partnership with the University of Oregon

Vision Statement

Computer Science and Physics/Engineering/Materials Science programs at SOU prepare students for graduate school, careers in technology, or seamless transfer to Oregon's Colleges of Engineering. We teach students teamwork and methods of engineering solutions to problems and provide hands-on training in state-of-the-art laboratories. In addition to a comprehensive range of department-based programs, we promote interdisciplinary initiatives in materials science (especially ferroelectrics and metallurgy), forensics, biotechnology and health, and environmental studies. We assist our region through a graduate program in computer science and research on novel and advanced materials for engineering applications, thin film technology, computational linguistics, bioinformatics, discrete global grids, and computer forensics.

Aspirational Peers

For Materials Science:
Universities our size usually do not have undergraduate programs in materials science. Therefore, we propose to align our program with the MSI at the U of O to ensure rigor and seamless transition into their graduate programs as well as other graduate programs in materials science and engineering at PSU and OSU. Indicators of our success would be that most, ideally all, of our materials science graduates who apply are accepted into one of the above graduate programs

For Computer Science:
Portland State University: Some CS options at PSU and SOU are similar but serve different populations – they have an urban audience in the north while we serve a rural population in the south. Indicators of our success would be aligning our curriculum content with PSU's graduate program so that one or two SOU graduates continue to the PSU graduate program in security. We hope to develop a collaborative project that involves students from both campuses. In four years we hope that we could offer opportunities at our campus sponsored under the umbrella of PSU's NSA certification.

Norwich University, Vermont: It is a small, liberal arts college in a rural location (though it has a military tradition). It has been an early leader in CSIA. It has a model curriculum and an engaged faculty. Indicators of our success would be a 10% increase in major headcount and the beginnings of faculty scholarship and/or grant applications inline with the Norwich model.

Long-term Goals

SOU seeks to increase the number of undergraduate majors and degrees in Computer Science and Materials Science, to increase the number of graduate majors and degrees in Computer Science, and to increase the number of pre-engineering students at SOU. SOU's proposal will ensure that we achieve at least a doubling of degrees granted by AY20 (see metrics table and Results section, below). The proposed investment for 2007-09 will continue the momentum we have achieved in Computer Science over the past two biennia and in Materials Science this biennium. In addition to capacity building, our goal is to recruit a diverse population of ECS students to SOU and to help them succeed in ECS programs. If the Materials Science program shows potential for success in 2005-07 as an option under the Physics degree, we plan to propose a stand-alone degree program to OUS during 2007-09.

SOU's ETIC programs are directly applicable to three or four of the potential opportunity areas as defined by the Academic Excellence and Economic Development (AEED) working group of the OUS Board. With past and continuing support, our Computer Science program now has the capacity to make contributions in the areas of Information to knowledge (making sense of complex data) and analog mixed signal (wireless products and services). We also have strengths in the areas of bioinformatics and computer security that have several health-related applications. The increased teaching and broadening and diversification of research activities in materials science and SOU's internationally known ferroelectrics research program support both workforce development and research in the area of nanotechnology.

Investment Description

Computer Science

We propose to invest $300,000 during the 2007-09 biennium, slightly less than originally requested for the 2005-07 biennium. Past ETIC funding has built a critical mass of faculty and supported the development of new degree options in Computer Science and Multimedia (CMM) and Computer Security and Information Assurance (CSIA) and of more stand-alone graduate courses. Continued funding will allow SOU to refine and enhance its curricula, upgrade its teaching and research labs, and build more connections within the southern Oregon region and the State.

Specific investments in Computer Science during 2007-09 will include support for faculty positions, including visiting positions for practicing professionals ($188,000 for the biennium); Lab Assistant positions ($42,000 for the biennium); initiatives for recruitment and retention ($15,000 for the biennium); lab equipment ($43,000 for the biennium); and support for graduate assistantships ($12,000 for the biennium). Funding at the $300,000 level will that program capacity is in line with targets for program growth. The proposed funding will sustain our efforts to develop curricula and research aligned with the economic development goals for higher education in Oregon as described below.

Cyber Security: We have established the computer security curriculum and have begun collaborations on computer forensics with the SOU Criminology department, the US Fish and Wildlife Forensics Lab, and local police departments. Currently this field attracts considerable interest from incoming and transfer students and will help us increase CS graduation production.
Healthcare/IT: We are developing a strategy to provide biomedical informatics training in our region. Discussions are underway with the primary healthcare provider in our region, local health-related software companies, and OHSU. We believe the growing computing needs of the healthcare industry will create an increased demand for entry-level healthcare IT workers and economic development opportunities in the software and consulting professions. Other associated areas such as bioinformatics and data mining techniques also serve the biomedical and biosciences clusters. PSU models a method for biomedical informatics training that might serve our rural region well. In five years, a student can earn a bachelor's degree in computer science at PSU and a master's degree in biomedical informatics from OHSU. We are investigating the viability of offering such a program, conversing with local health care industry, evaluating our curriculum, and discussing with OHSU distance education options.
Education: An SOU faculty member, whose specialty is computational linguistics, created a program to help preserve endangered languages, focused on the Native American tribes. This project involves adults to record lessons and youth to study them. Many tribal members have a strong motivation to participate in a truly historic mission. At the same time young Native Americans are engaged in working with technology. The project involves visits to reservations affording us the opportunity to present computer science at SOU as a target of study for Native American students. We plan to coordinate with our high school recruitment efforts and sponsor summer workshops/contests to further involve them with our program.
Software: We are participating in the academic/industry consortium that has proposed to develop the Open Source Signature Center for Applied Research. It is to support research and commercialization of open source software, a domain in which Oregon is a leader. Other participants are Intel, IBM, OSU, UO, and PSU. A faculty member has been funded by the European Space Agency to research and develop methods of storing very large spatial datasets.

Role and uses of Support to accomplish plans:
We hope to develop paid internships and scholarships for students. We are working on internships in computer security and forensics with the U.S. Fish and Wildlife Forensics Lab, and local police departments. In medical information systems we are working on internships with Asante, our largest regional healthcare provider, Plexis Healthcare, a local software vendor, and other medical-related IT departments. For private match, we will look for financial support and in-kind grants of software such as Encase by Guidance Software, Forensics Toolkit by Axion Software, Claims Manager and EDIWorks from Plexis, and SourceForge from VA Software. These software packages will provide our students with hands-on training with real-world products and will provide a variety of capstone projects where students need to configure, add-on, or integrate packages. We will be applying for several NSF grants for the Native American language project: Broadening Participation in Computing, Preserving Endangered Languages, and Computational Linguistics. We have begun working with the Tolowa, Karuk, Hoopa, and Yakima tribes and will pursue private funding in language restoration as opportunities present themselves.

Materials Science

In order to finalize the development and full implementation of SOU's portion of the joint Materials Science degree program, we propose to invest $230,000 during the 2007-09 biennium, a slight increase over the amount originally requested for the 2005-07 biennium. Specific use of the proposed funding during 2007-09 will include support for the 1.0 FTE faculty position in Materials Science ($140,000 for the biennium), support to hire a practicing professional engineer to teach engineering orientation ($27,000 for the biennium), funding for recruitment and retention activities and to support industry partnerships and summer studies at the other campus ($41,000 for the biennium), and purchase of additional equipment for teaching and research ($22,000 for the biennium).

A key component of the proposal is funding to recruit students and assist them with the cost of commuting to the other campus. We were successful in recruiting 6 potential materials science majors in the 2005-06 academic year, and hiring a new faculty member, specializing in metallurgy and composites (Dr. George Quainoo). Four upper division materials science courses have been approved and will be offered during 2006-07. Most of the other courses in the curriculum are currently offered at SOU and U of O, although the proposed new degree option will require that they be offered more frequently.

Program graduates will be prepared to meet anticipated industrial needs for effective researchers/problem solvers in the microelectronics and the polymer/coatings industry and in the growing nanotechnology sector. Many of them will enter the Materials Science master's program at the University of Oregon, and we plan to market the B.S. program as the initial component of a 4+1 Master's degree in which students who earn their undergraduate degree with the necessary GPA and recommendations from faculty could complete the Master's component at the University of Oregon in one additional year.

Central to our recruiting efforts is the cooperation with local schools. Dr. George Quainoo made two presentations on materials science at local high schools, and in collaboration with SOU's Admissions Office, is planning outreach activities throughout the Rogue Valley. Over the past 4 years, we mentored a science teacher from North Medford (Robert Black) through the Partners in Science Program (sponsored by M. J. Murdock Trust) and 3 precollege youths (sponsored by the Apprenticeships in Science and Engineering, PSU-NSF program). We have also established an active Southern Oregon University Robotics Club (12 active members, including 2 pre-college students.) We were successful in submitting a joint proposal to NASA's reduced gravity program (in collaboration with OIT and NASA Ames Research). Our project is sponsored in part by Umpqua Research Co., and the participation of our majors and a pre-college student is sponsored by local gifts to SOU's Physics/Engineering Department. In collaboration with SOU's Registrar's office, we have established an exhaustive course articulation list covering most of the Community Colleges in the Pacific North West, to facilitate transfer to our pre-Engineering program, and in turn, to Oregon's Colleges of Engineering. Although Dr. Quainoo has been on staff for less than one year, he brings with him a number of collaborative opportunities and he already is developing others. Universities and Companies in Oregon include the University of Oregon (MSI), PSU, and Alumaweld Boats. Private and Public Institutions outside Oregon include the Department of Mechanical Engineering, University of Saskatchewan, Canada;

Novelis Global Technology Inc. (Formally Alcan R & D Center), Ontario, Canada; and Boeing, Seattle, Washington

As further evidence of SOU's commitment to materials science Professor Quainoo's position has been shifted to the tenure-track and the Physics/Engineering Department is in the process of hiring a condensed matter/materials science theorist, who will complement the current expertise in the Physics Department and contribute directly to the Materials Science Degree and the State's nanotechnology initiative.

Role and uses of Support to accomplish plans:
We have had unprecedented success over the last few years in securing external funds in support of our materials science instructional and research capabilities, including a National Science Foundation grant to acquire a x-ray diffractometer ($157,000) and a grant from the M. J. Murdock Charitable Trust ($217,000) to acquire a thin film deposition system and equipment to establish the materials testing instructional laboratories. We are planning to submit a proposal to the National Science Foundation, towards the acquisition of a Scanning Probe Microscope (SPM). The SPM will enable instruction and research in thin films and nanoparticles. The SPM will be central to establishing active co-operations and partnerships. Rogue Valley Microdevices Inc, has expressed strong interest in project collaboration, and is presently considering hiring one of our 2006 graduates. Details on Robotics/NASA reduced gravity/Ferroelectrics are listed in http://www.sou.edu/physics

We plan to persuade companies in and outside Oregon to provide paid internships and scholarship support to students. By applying their knowledge, students gain hands-on experience, and most significantly, their success stories serve as an effective recruiting tool among their peers. Also, we intend to continue working with industries in identifying pertinent problems and develop meaningful and mutually beneficial research initiatives-that will serve as capstone projects for our students and better prepare them for Oregon's job market in technology

Results and Benefits

The proposed investments will maintain the momentum in Computer Science that was begun in 1999-01 and 2001-03. Computer Science Bachelor's Degrees increased from 34 in 1998-99 to 57 in 2001-02. The number dropped for 2002-03, and was still dropping as of this academic year, not unlike the situation in computer science programs everywhere. However, we see hopeful signs in admissions data for next year that we are at or near the bottom. Given the slow rebound, we anticipate that our CS program will reach reasonable capacity between AY10 and AY14, by which time we should be producing 62 B.S. degrees and 12 M.S. degrees in Computer Science, assuming continued support through those years. If the same level of ETIC support continues through AY20 and enrollment growth and State support increase over the same time period, we can anticipate additional growth of 10 more Bachelor's degrees and 3 more Master's degrees.

The proposed investments will allow us to build a first rate undergraduate materials program in partnership with the University of Oregon. The new materials faculty at SOU will be expected to develop nationally competitive research programs and synergistically aid the already strong research efforts within MSI at the U of O. We anticipate a program with approximately 20-30

majors graduating a year between the two institutions, with SOU's share being 10 to 15 per year AY11, assuming continued support through that year. If the same level of ETIC support continues through AY20 and enrollment growth and State support increase over the same time period, the program might grow to produce 15 to 20 graduates.

Detailed metrics for this proposal are given in the table, below. We expect to attain at least 2.3X for total degrees (combining BS and MS in Computer Science and Materials Science degrees) by AY11, assuming continued support through that year. Undergraduate data are for a combination of Computer Science and Materials Science, but individual program goals are given above. Graduate data are only for Computer Science students. As we prepare our 2005-07 scorecards, we will determine the best way to treat SCH numbers for undergraduates in order to distinguish Materials Science students from other Chemistry and Physics majors. Because of targeted recruiting activities, we expect to do a better job of attracting women and minorities to our programs. Our ability to offer high quality science and mathematics programs in a small school setting will ensure the successful preparation of our students for ECS degrees and careers.

Proposed Investment and Private Support Forecast ($M)

1		2007-2009 Biennium
2	**Proposed State investment ($M)**	
3	**Existing programs (2)**	$0.368
4	**New Programs (3)**	$0.162
5	**Subtotal**	$0.530
6	**Expected private support ($M) (4)**	$0.265
7	**Other**	$0.000
8	**Total ($M) (7)**	$0.795
9	**Personnel supported (FTE) (5)**	
10	**Existing faculty (1)**	2.50
11	**New faculty(6)**	0.50
12	**Existing staff (1)**	0.25
13	**New staff(6)**	0.25
14	**Total**	3.50
15	**Uses of proposed investment**	
16	**New facilities**	$ -
17	**Improvements to facilities**	$ -
18	**Laboratory equipment**	$0.165
19	**Other equipment**	$0.020
20	**Other one-time expenses**	$0.162
21	**Existing faculty salaries & benefits (1)**	$0.347
22	**New faculty salaries & benefits (6)**	$0.052
23	**Existing staff salaries & benefits (1)**	$0.014
24	**New staff salaries & benefits (6)**	$0.015
25	**Services & supplies**	$0.020
26	**Total (7)**	$0.795
	Notes/instructions. (Delete these notes and replace with your own in the document you submit.)	
	(1) Hired with ETIC funds through June 2007.	
	(2) Programs started with ETIC funds through June 2007.	
	(3) Use as many lines as you need to describe your programs	
	(4) Consistent with ETIC Private Support Policy dated 1-23-02.	
	(5) FTE expressed as percent of full time over 2 years of biennium. For instance, a new full-time faculty member hired on 7/1/08 would be counted as 0.5 because he/she joined half way through the biennium.	
	(6) To be hired with ETIC funds during 2007-2009 biennium.	
	(7) Totals on line 8 and line 26 should match.	

Metrics Forecast (for programs/departments receiving ETIC funding):

	AY 99 (1)	AY09	AY11	AY13	AY20
Undergraduate student credit hours	6406	8000	9000	9000	10000
Graduate student credit hours	128	400	550	550	650
Bachelor's degrees granted	33	45	77	77	87
Master's degrees granted	5	8	12	12	15
PhD degrees granted					
Externally-funded research expenditures (3)	$100,000	$200,000	$250,000	$300,000	$300,000
Invention disclosures (4)	N/A	N/A	N/A	N/A	N/A
License/options (5)	N/A	N/A	N/A	N/A	N/A
License income received (6)	N/A	N/A	N/A	N/A	N/A
Startup Companies (7)	N/A	N/A	N/A	N/A	N/A
National ranking of <program or department> (8)					
National ranking of <college>					
(9)					
Notes/instructions. (Delete these notes and replace with your own in the document you submit.)					
(1) Actuals from 12 months ending June 30, 1999.					
(2) Forecast for the 12-month periods shows. Eg. AY09 should be forecast for 12-month period ending June 30,					
(3) Total external dollars spent by ETIC-related departments towards research during academic year.					
(4) through (7) SOU might attain some of these during the period in question; however the numbers will be small ranging from zero most years to one or two in the best years. Therefore, annual targets have little meaning.					
(8) Because there is no ranking body for these programs at institutions like SOU, our quality control will be comparison to our aspirational peers. Our progress will be charted relative to the indicators in that section of our					
(9) Add additional metrics as appropriate					