

***IGEM***

***An Investment in Idaho's Future***

***2012 Year-End Report***



**BOISE STATE UNIVERSITY**

# **IGEM**

## ***An Investment in Idaho’s Future***

***2012 Year-End Report***

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### **IGEM – An Investment in Idaho’s Future**

## Computer Science at Boise State University

### 2012 Year-End Report

#### Project Summary:

The Idaho Global Entrepreneurial Mission (IGEM) and State Board of Education Higher Education Research Council (HERC) have provided three years of funding to expand and restructure the Boise State University Computer Science Department to help meet compelling state economic development, research, and workforce needs. The five-year Idaho Strategic Research Plan for Higher Education identifies Information Management and Software Development as a strategic research area that has tremendous potential to drive future economic growth within the state. Responding to this need, Boise State identified the expansion of the Computer Science Department as an institutional priority.

#### Task Performance Summaries:

The project plan identified three primary strategies to achieve this goal:

- 1) *Hiring Faculty;*
- 2) *Tighter Industry Integration;*
- 3) *Enhancing the Student Pipeline.*

Progress to date toward implementing these strategies is detailed in this report.

**Strategy One: Hiring Faculty** - IGEM funding provides support for Boise State to recruit four additional tenure/tenure track faculty members to the Computer Science Department. Software engineering is an area that is extremely important to local industry and was one of the two areas of faculty recruitment identified in the Boise State IGEM proposal. To date, the Computer Science Department has recruited one new faculty member and a visiting lecturer in these specialties – Elena Sherman and Jim Conrad – who both demonstrate a commitment to excellence in teaching, a desire to make significant contributions in research, and an interest in collaborating with faculty and local industry to develop and sustain high-profile funded research programs.

#### Jim Conrad

Jim Conrad earned his PhD in computer science from the University of Idaho in 2010. He also earned a MS in computer science from University of Idaho and a BS in Electrical Engineering. Jim has more than 25 years of industry experiencing, including 7 years as a senior software design engineer at Hewlett Packard (HP) and 9 years as the research & development manager for HP.

In addition to his extensive industry experience, Jim has a broad range of academic experience, including senior systems analyst at Missouri University of Science and Technology. Jim has also taught for Boise State University as an adjunct since 2004.

Jim's industry experience and contacts at HP fill a critical need for the program in piloting an undergraduate senior capstone design course where teams of 3 to 4 Computer Science seniors will work on industry-sponsored projects. Jim was hired as a visiting lecturer for the 2012-13 academic year. Additional information on Jim Conrad can be found in his attached CV.

#### Elena Sherman

Elena Sherman will defend her PhD Thesis in Computer Science from the University of Nebraska at Lincoln (UNL) in December 2012. She earned a MS in Computer Science from UNL in August 2008, and a MS in Astronomy from Moscow State University, the top university in Russia, in January of 2000. Elena's area of expertise is Software Engineering and she comes from an extremely strong research group at UNL.

Elena has two high-quality conference publications in her field. She was involved in writing a successful competitive NASA research grant. Elena has experience teaching at UNL and received excellent teaching reviews. She also has experience as a teaching assistant and has supervised undergraduate students on a CREW funded research project. In addition, Elena has experience working in industry at both Google and NASA.

Her specific area of expertise in software analysis and testing within software engineering will be a good addition to the program curriculum at Boise State University. Elena was hired in June 2012 as a tenure-track assistant professor to join the department in January 2013. Additional information on Elena Sherman can be found in her attached CV.

Recruiting continues for the remaining positions. Ads have been placed in ACM, IEEE and Computing Research Association job announcements with approximately 140 applications received to date. The search committee reviewed this strong, diverse group and narrowed down the pool to nine outstanding candidates for on campus interviews which will begin in January 2013. The focus of the search was in the sub-areas of software engineering and databases, as these sub-areas are critically important for our industrial partners in Idaho. We expect that these new areas will quickly build research programs that will result in a positive economic impact in the region. These new faculty members lead to an increase in computer science research as well as bring expertise that will help prepare our students for careers in high technology.

**Strategy Two: Tighter Industry Integration** - The Computer Science Department has always enjoyed strong ties with the software industry in Idaho. As the faculty and student body grow, it is important to maintain and expand these relationships to members of the community. One effort to meet this strategy has been to expand the Industrial Advisory Board for the Computer Science Department chaired by Jay Larson, President of the Idaho Technology Council. This board will provide direct feedback from industry to the department. The board has met this fall and has determined to focus on retention, program scalability, and curriculum. Teams have

been formed to provide advice and suggestions in these areas and they are actively working on recommendations to the department.

A second effort to increase industry integration has been the creation of a senior capstone design class, COMPSCI 497/481. This class, taught by Jim Conrad (see above bio), engages students in a fast-paced software development team project with industry partners, applying knowledge acquired throughout the undergraduate Computer Science curriculum (see detailed course description at <http://cs.boisestate.edu/~jconrad/CS497I/>). This two semester project will provide a “real world” project-based environment to the students and aid in their transition from the classroom to a career in industry.

A primary outcome of the IGEM effort is to increase funded research activity and technology transfer in collaboration with industry partners. To achieve this goal, the new faculty hires will increase the research capacity of the department and existing faculty members. While the impact of new hires on research productivity is clearly not available at this time, the following shows the research output of the existing faculty. For the time period of this grant, a total of twenty-two proposals were written and submitted to various institutions. From these submissions, eight have been awarded, four are pending, and ten were not awarded. The following table shows the current pending proposals.

Proposals Submitted 7/1/2012 – 10/9/2012				
Faculty	PI/co-PI	Title	Agency	Amount
Andersen, Tim	co-PI	Creation of Models and Drug Screening Methods for Neurological Disorders	NIH	\$422,757
Andersen, Tim	PI	DockoMatic: An Integrated Software Suite for High Throughput Virtual Screening of Molecular Interaction	NSF	\$713,394
Uh, Gang-Ryung	PI	CSR: Medium: Collaborative Research: Energy Efficient Acceleration of Applications	NSF	\$400,000
Joshi, Alark	co-PI	Idaho Scholarships for Engineering and Computer Science Students	NSF	\$627,736

The following proposals were awarded to Computer Science faculty members, totaling \$1,285,962.

Proposals Awarded 7/1/2012 – 10/9/2012				
Faculty	PI/co-PI	Title	Agency	Amount
Andersen, Tim	co-PI	MRI: Acquisition of a GPU-accelerated High Performance Computing and Visualization Cluster	NSF	\$555,384

Joshi, Alark	PI	Context Providing Techniques for Visualization of Scientific Simulations	DOE	\$ 20,000
Joshi, Alark	co-PI	Badges for Personalized Learning in Science Using 3D GameLab	MacArthur Foundation	\$150,000
Uh, Gang-Ryung	PI	Preprocessing for Modulo Scheduling within Open Source ARM Cortex-A8 Compiler	Google Research	\$ 37,400
Uh, Gang-Ryung	PI	Development of Virtual Sensor Terminal Environment that Assists Personalized Mobile Application Development	Moneual INC	\$ 51,149
Joshi, Alark	PI	Fast 3D Reconstruction Algorithms for Cryo-EM	NIH	\$ 6,402
Joshi, Alark	PI	Developing Novel Vision Techniques for Recognizing Sensor Pedestals in 3D Photogrammetry	Electrical Geodesics, Inc.	\$ 8,033
Andersen, Tim	co-PI	Collaborative research: CDI Type-1: A Computer Framework for Modeling Complex Pattern Formation	NSF	\$300,000
Uh, Gang-Ryung	PI	Development of Virtual Machine of Smart Sensor Network Access Control Based on Smart Platform	Kunsan Korean National University	\$130,594

**Strategy Three: Enhancing the Student Pipeline** - The third strategy of the IGEM proposal is to focus on the student pipeline to attract, retain, and graduate a larger number of high-quality students. The Computer Science curriculum in the primary, lower-division courses is challenging, resulting in retention issues. One strategy to improve retention is to allow students more time to absorb the material. The core sequence of COMPSCI 125, 225 and 342 (each a four credit class) will be restructured into COMPSCI 121, 221, 321 and 421 (each three credits) starting fall 2013.

A second retention strategy was to develop a Computer Science Tutoring Center that will employ graduate-level teaching assistants (TAs) to aid undergraduate students in a one-on-one instructional environment. To date, the department has hired nine graduate students who provide tutoring services (50% effort) and aid the faculty with grading.

The tutoring center will be housed in a newly remodeled 1200 ft<sup>2</sup> room in the Engineering Building, ENGR 111. This new facility has been designed to encourage collaboration and provide access for up to 30 students at a time. As mentioned above, graduate teaching assistants will provide one-on-one instruction to students on a drop-in basis. Up to nine TAs will be available, allowing for the tutoring center to be available approximately 10 hours per day for 6 or 7 days per week. Construction is nearing completion, with the tutoring center scheduled to be open

and available for student use at the beginning of the 2013 spring semester. The Computer Science Tutoring Center design schematic diagram is shown on the next page.

### **Demonstrated Economic Development**

A new relationship has been developed between the **Boise Angel Alliance** and the Computer Science Department with faculty member Amit Jain as liaison. In this arrangement, the department faculty with relevant experience/knowledge will help the Angel Alliance with evaluating startups for funding.

As previously mentioned, external funding is trending upwards with a total of \$1,285,962 thus far this year with an additional \$2,163,887 pending. With the addition of new faculty this year, this will continue to grow.

### **Future Plans**

Work will continue on the planned tasks while focusing on making the right hires for the department. Plans are underway to step up the department's involvement with industry including specific outreach to local companies. Meetings are scheduled for spring 2013.

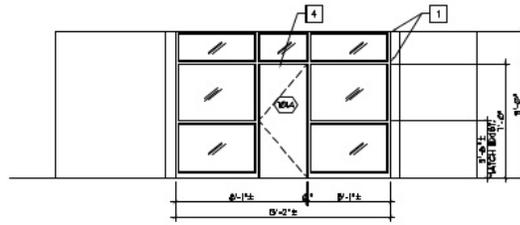
### **Commercialization Report**

There is no commercialization revenue to report at this time.

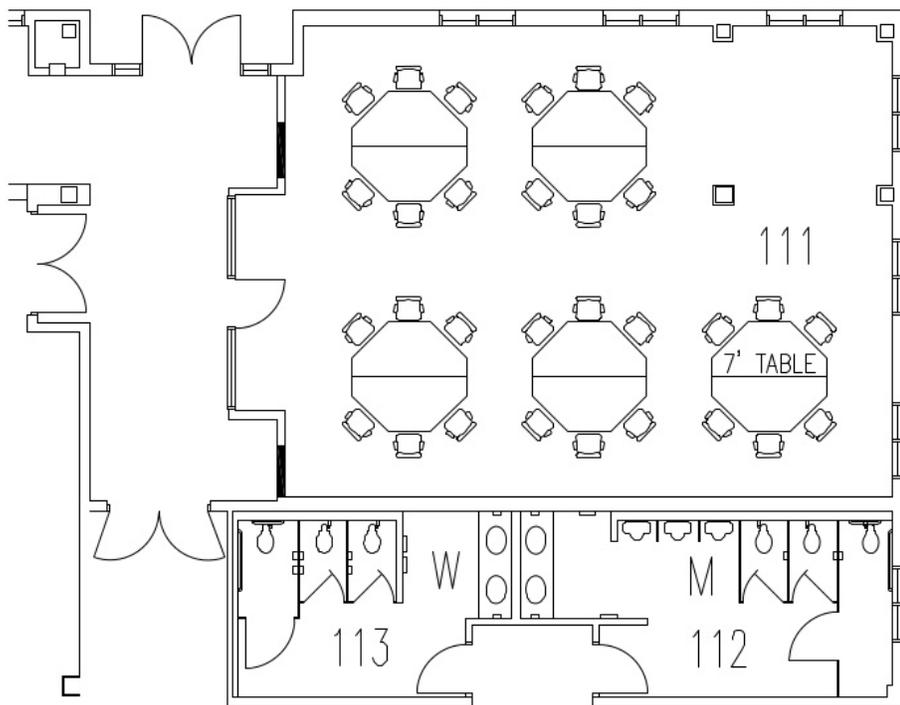
### **Expenditure Report**

Expenditures have been low for this period of time as the project ramps up. Costs for faculty, and remodeling will begin to accumulate this spring as hires begin, and work completes on the tutoring center.

Category	Tuition	Salary	Fringe	Total
Graduate Students	\$20,486.00	\$34,631.66	\$144.41	\$55,262.07



CORRIDOR ELEVATION



ROOM 111 OPTION 2: WOOD DOOR AND STEEL WINDOWS IN EXISTING WALL

SCALE:

