

Computer Science Industry Advisory Board Meeting Minutes April 23, 2004

Board Members Present:

- Bill Ivanich, EchoStar
- Rita Spear, MSE Technology Applications
- Bill Seymour, Zoot Enterprises
- Davis Almanza, Computers Unlimited
- Greg Waring, EDS
- Chris Jones, SRI International
- Craig Spanning, Mid-Tech
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Montana Tech Representatives Present:

- Celia Schahczenski, C.S. Dept. Chair
- Michael Grinder, C.S. Faculty
- Gary Mannix, C.S. Faculty
- Lou Glassy, C.S. Faculty
- Chris Boroni, C.S. Faculty
- Jeff Braun, C.S. Faculty
- Nicole Burns, C.S. Administrative Associate

I. Welcome

William Kirschke, the Vice Chancellor of Institutional Advancement and Development and President of the Montana Tech Foundation, gave a brief presentation on the Foundation's efforts to "brand" Montana Tech. He stated that the Foundation needs a capital campaign to convince people to invest in the future of the school and elevate it for the future. The Foundation believes that "branding" the school is a way for the campus to make the case that the school is worth an investment. The process of "branding" consists of three researching steps:

1. Institutional Audit
2. Marketplace & Competitor Audit
3. Target Audience Audit

After this research is conducted, the Foundation will create a "brand promise." At the conclusion of the branding process, the campus will have a plan that will help the institution as a whole.

II. Undergraduate Research Program

Dr. Courtney Young, the chair of the Undergraduate Research Committee and the Department Head of Metallurgical Engineering, spoke about the Undergraduate Research Program where undergraduates are granted \$1,000 to participate in research and scholarly activities at Montana Tech. Students conduct research under the supervision of a faculty member. The program has grown from 14 students participating in the first year to 52 students participating this year. Fifty-three proposals have been submitted for next year, which is the most proposals the program has ever seen. The Undergraduate Research Fair will be held on April 24th. The following Computer Science and Software Engineering students are involved in the program this year:

- Quadtree Image File Project: Loren Block, Chris Johnson, and Scott Myers with Lou Glassy as supervising faculty member
- Bioinformatics Tools and Methods with Cluster Computing: Dan Cleary with Rick Donovan as supervising faculty member
- St. James Healthcare, A Study of Information Flow, How to Improve It, and How to Redirect it Toward Strategic Service: Marlene Johnson with Gary Mannix as supervising faculty member

The following Computer Science and Software Engineering students have submitted proposals for next year:

- Computers, Freedom, and Privacy in the Post- 9/11 World, The USA Patriot Act: Jenn Vieth with Celia Schahczenski as supervising faculty member
- Investigating the Digital Divide, Technology's Effect on Community: Koa McCullough with Celia Schahczenski as supervising faculty member

III. Tech Update

A. Overview of 2003 IAB meeting and resulting actions

1. Enrollment: The Computer Science program will graduate seven students this year, and the

Software Engineering program will graduate one this year. The enrollment of the Computer Science and Software Engineering programs is down by 22 students from last year. The drop in enrollment may be contributed to the perception that there are no jobs in the C.S. or S.E. industry. A higher number of Computer Science and Software Engineering graduates are entering graduate school because of this same perception. The enrollment of Computer Science majors across the nation is down mostly because companies are looking for experienced workers, and there are experienced workers in the job market to hire.

2. Newsletter: One edition of the newsletter has been sent out to Computer Science alumni and friends. The Department is working on a process that would produce two newsletters per year.
3. Website: The Computer Science Department website (www.mtech.edu/cs) is used as a communication tool within the department, especially for curriculum changes and objectives.
4. Accreditation: During the 200/2001 ABET accreditation visit, concerns were raised that graduates were insufficiently prepared in oral and written communication and ethics. There were also concerns over the stability of the program. An Interim report was submitted to ABET in January, and the Computer Science program is now accredited through 2007-2008. The Software Engineering program will work on getting accredited when the program has produced more graduates.
5. Freshman Seminar: The one-credit Freshman Seminar seems like a success and helps us to place students better. The Department is now adding a Senior Seminar to the C.S. and S.E. curricula.
6. Recruitment: The Department is working on posting IAB members' pictures and contact information on the C.S. website so that potential students can contact the members for more information about the C.S. and S.E. programs and MT Tech. The recruitment letter was revised to include scholarship information to parents. The faculty has noticed that students who request campus visits are more aware of what computer science and software engineering is than previous years.
7. Programming Class: Michael Grinder discussed changes made to C.S. 2106 & 2116, Introduction to Programming I & II in the past year:
 - Calculus I is now a co-requisite to the C.S. 2106 Introduction to Programming I class; as a result, the enrollment in this class is down and fewer non-majors are taking the class.
 - He is now teaching Object Pascal, which is easier to teach to beginners, instead of Java.
 - Object Pascal is now taught for both semesters, and this makes things smoother.
 - Business majors now take a different type of class, C.S. 2126 Applications Programming.
 - Outcomes of this switch will be assessed next year.
8. 20 for 20 Campaign: Several C.S. alumni called their classmates to raise money for this scholarship. A new freshman scholarship was established to give a student \$500 for 4 years, and a scholarship was awarded for an entering freshman. As a result of this campaign, alumni were able to give the Department new contact information for 20-30 alumni. Celia mentioned that the Department may not have alumni call their classmates for next year's campaign because the callers felt uncomfortable soliciting.
9. Curricular Changes: Jeff Braun explained the following changes to the curriculum:
 - After the Introduction to Programming series (C.S. 2106 & C.S. 2116), the students go to Object-Oriented Programming (C.S. 2546) which will be in either C++ or Java.
 - The Unix, C, & C++ course was replaced with Object-Oriented Programming (C.S. 2546).
 - Unix is now taught within the Introduction to Programming series (C.S. 2106 & C.S. 2116)
 - Database Management went from a junior level class (C.S. 3656) to a sophomore level class (C.S. 2656) so that the students are better prepared for Software Engineering.
 - More professional electives were added to the curricula: the Economics degree option was replaced with a Statistics option, and an Engineering Applications and Technical Communication option were also added. Bill Ivanich recommended that the "Control Systems" option be renamed to "Embedded Systems" because the current name can be confusing to industry.
 - Specifically to the Software Engineering curriculum, the MIN 1010 has been eliminated and will be replaced with Operating Systems.
 - A senior seminar has been added.

B. New Happenings at Tech

1. Senior

- Seminar: The one-credit Senior Seminar will be similar to the seminar course taught at MSU; it will focus on research in the field of Computer Science. In addition to guest speakers, students will

present their research in 40 minute talks. The goal is to get all seniors to take this class next year. Craig Spanning advised that the students will need guidance when preparing a lengthy talk because the 40-minute requirement surpasses what their freshman level speech class taught them. Greg Waring suggested that the talk should consider a “real-world” audience of upper management and business people rather than a technical audience. The IAB members would also like to see the basics of an effective PowerPoint presentation taught.

2. Programmable

Robots: The Department bought Lego Mindstorm programmable robots with capital equipment funds for community events such as Tech Days and Expanding Your Horizons. These were used at the Expanding Your Horizons career conference in February and at Tech Days in March.

3. Networking

Lab: Lou Glassy is setting up a networking lab for the C.S. and Business networking classes in the Museum building. Computers in this lab will not be connected to Tech’s network. This lab will also be funded through a capital equipment account.

4. Recruitment

Linux CD: Lou Glassy has students working on a recruitment CD for students who are interested in MT Tech’s Computer Science or Software Engineering program.

5. Exit Exam:

The Department has been considering an exit exam much like the EIT exam. The intent of this exam is to prove that C.S. and S.E. graduates are proficient in their area, and it would also give the faculty feedback on class material and give them an idea of what the graduates really know after four years of classes. The exit exam would be used for assessment purposes only and would not be a graduation requirement, but the faculty needs to make it worth something so that the students take the test seriously. The exam would test the objectives from all of the classes. The suggestion of an oral exam was made, but it was stated that there could be a documentation problem with an oral exam.

6. Service

Courses:

- Because of the new Healthcare Informatics degree, more students are taking C.S. 2126 and C.S. 3106 Applications Programming I & II (Visual Basic).
- Instead of designing new classes for the Healthcare Informatics degree, Gary Mannix encouraged the committee to use existing Computer Science classes. However, Lou Glassy did design a new course for HCI called “Decision Support Systems” (HCI xxxx).
- Information Technology is eliminating the Operating Systems class (I.T. 1416), which will be replaced by the “Decision Support Systems” class.
- Those students who are not “Calculus ready” but still want to start Computer Science courses will take C.S. 2126 & C.S. 3126 Applications Programming I & II (Visual Basic). The faculty expects that the students will have improved problem solving skills from taking these courses.

IV. Panel Discussion: “Designing for Testability”

IAB representatives discussed the process and importance of developing systems that are easy to test and maintain.

V. Industry Trends

A. Outsourcing

- If a worker has communication skills, creative thinking skills, flexibility, critical thinking skills, versatility, and the ability to be a team player, his or her job will mostly likely stay in the United States.
- There is a strong market for software architecture in the U.S.
- Time zone difference is the biggest problem when companies in the U.S. are trying to communicate with offshore workers.
- When things become a commodity, they will be sent offshore. The U.S. has the cutting edge, and its workers must keep up with technology to keep it.
- When the baby boomers retire, the job market will be more open in the U.S.

B. Managing Huge Masses of Data

- IAB members are concerned that students may be managing large amounts of information (possibly GIS information).
- Faculty members feel that Lou’s new class “Decision Support Systems” will address this topic.

C. Information Privacy

- Information privacy is getting much more attention and becoming an issue with customers.
- Network security is important.

VI. “Process” Across the Curriculum

The faculty members asked the IAB members for ideas as to how they can implement process within every course across the curriculum so that the process is engrained in students so that it’s second nature to them by the time they graduate.

- Have the lecture part of the course be strictly design and lab sections for programming specific languages.
- Ask for a design that is not connected to a program and then later assign a program based on that design.
- Design is such as abstract thought and skill that it's hard for the students to understand in the earlier classes, and sometimes the complexity of an assignment does not warrant a design. However, the instructor can present the design of a large system and then have the students program a little piece of it.
- Textbooks do not show the process, just the answer.
- Walk through the pros and cons of a design.
- Every software artifact must have a set of things that it must be accompanied by; it's cheaper to learn this fact in school than it is in industry. A template such as a student edition of a Personal Software Process model may aid in this discovery.
- Celia's year long Software Engineering class is ideal for implementing the whole process.

Respectfully submitted,
Nicole Burns