



Computer Science Industry Advisory Board Meeting Minutes
October 9, 2009

Industry Members Present:

- Davis Almanza, IAB member representing Computers Unlimited
- Peter Sprague, IAB member representing Capstone Consulting Group
- Craig Spanning, IAB member representing Spraying Systems
- Nakoa McCullough, IAB member representing RightNow Technologies
- Jim DiFronzo, IAB member representing RightNow Technologies

Montana Tech Representatives Present:

- Michele Van Dyne, C.S. Dept. Chair
- Frank Ackerman, C.S. Faculty
- Jeff Braun, C.S. Faculty
- Rick Joyce, C.S. Faculty
- Jim Rhodes, C.S. Faculty
- Celia Schahczenski, C.S. Faculty
- Tami Windham, C.S. Administrative Associate
- Aaron Hoff, C.S. Student
- Tyler Lee, C.S. Student
- Kyle Nelson, S.E. Student
- Mitchell Meyer, S.E. Student

I. Welcome and Introductions

Introduction of all attending the meeting were made. Michele Van Dyne welcomed the board members to MT Tech and thanked the members for their input to the department.

II. Update on the Computer Science Department (Michele Van Dyne)

- Four main topics that will be covered in the update:
 - **Department Changes Since Last Year**
 - **Progress on 2008 Goals**
 - **2009 Department Goals**
 - **Review of Assessment Process**
- Department Changes since Fall 2008.
 - Jeff Braun is back from last year's sabbatical and working part-time at the Rocky Mountain Supercomputer Center. (RMSC)
 - Celia Schahczenski is on sabbatical this year and working on an AGR grant.
 - The department has purchased a new server from Sun Microsystems.
- **Progress on Department Goals 2008** – Accompanied by a PowerPoint presentation Michele gave an overview of the department's goals for 2008 and progress towards reaching those goals.
 - **2008 Short Term Goals :**
 - Enrollment

- Recruiting
 - Retention
 - **2008 Long Term Goals:**
 - Department Image
 - Website
 - Printed Materials
 - Newsletter (mid November)
 - Streamline Overhead Tasks
 - Curriculum Enhancement
 - Course Outcome Review (And Oversight)
 - Course Additions
 - Software Engineering Differentiation
- Progress – To address recruiting, enrollment and retention; Michele informed the IAB members of the recent CS scholarship developed by the CS department to encourage students to apply for when they complete online modules. The R.E.A.L. scholarship will be discussed by Rick Joyce. Rick will also be talking about enrollment trends, and will present numbers that indicate why recruiting and retention have to be the department’s major priority right now. Michele also noted that enrollment is up in both the CS and SE program; although the numbers are small they are going in the right direction but we still need to do a lot better at recruitment.
- **Progress** – Michele continued her presentation with an overview of the department’s goals for 2009.
- **Progress on Enrollment**
 - R.E.A.L. Scholarship Program - *to be presented by Rick Joyce*
 - Trends - *to be presented by Rick Joyce*
- **Department Image**
 - Website
 - Montana Tech has updated its web presence
 - CS/SE is still listed under IT, though has created department website at <http://cs.mtech.edu>
 - Printed Materials
 - Unchanged – Still listed under IT on Tech materials
 - Newsletter
 - Planned for mid-November 2009.
- **Streamline Overhead Tasks**
 - Program outcome assessment process - *Jeff Braun to present results*
 - Educational objective assessment process – *Jim Rhodes to present results*
 - Advising processes? (*Michele had hoped to simplify this process by creating student files and setting up a process the faculty could follow and would be easy; however, I don’t think it is well defined and not all of us are using it. But it is a start*).
- **Curriculum Enhancement**
 - Course Outcome Review (And Oversight)
 - Unchanged (*We as a group meet and talk about each of our courses; what our outcomes are and how they relate to the program outcomes, what we think we should change and what should not be changed. This is a very cumbersome process and has not been updated this year*).
 - Curriculum Additions and changes

- Computational Thinking (*Offered first time this year for non-majors*)
 - Healthcare Informatics Option (*Board of Regents approved options in September; options will be added to our other CS options*).
 - Requesting two new courses this year:
 - Web Applications – *Jim Rhodes will present*
 - Web Architecture – *Rick Joyce will present*
 - Object Oriented Programming removed from curriculum
 - Software Engineering Differentiation
 - Unchanged
- **Department Goals 2009**
 - Increase Enrollment
 - Decrease Administrative Overload
 - Ensure Faculty Continuity
 - Enhance (External) Image
- **Assessment Process** – Accompanied by a picture illustrating the assessment process; Michele informed IAB members that one of the things the department did in order to respond to the ABET evaluation was to document the assessment process graphically. The process was simplified as were course outcomes and educational objective assessment process.

III. Assessment

- **Program Outcomes Assessment**
 Jeff Braun began his presentation with a general overview of the Program Outcomes Assessment Results. There are 17 program outcomes which map to ABET EAC and CAC outcomes. The program outcomes are achieved by establishing course outcomes for each of the CS/SE courses and then associating each course outcome with one or more program outcomes. The mapping of course outcomes to program outcomes permits the faculty to use a matrix that shows which course covers or contributes to each program outcome. For each program outcome the faculty can also specify how that outcome will be assessed. (See table below)

Computer Science & Software Engineering (2008-2009)

	Total score	Critical Thinking score	Reading score	Writing score	Math score	Humanities score	Social Sciences score	Natural Sciences score
Link to the MAPP Web-Site http://www.ets.org/portal/site/ets/menuitem.1488512ecfd5b8849a77b13bc3921509/?vgnnextoid								
Link to comparative data: http://www.ets.org/portal/site/ets/menuitem.1488512ecfd5b8849a77b13bc3921509/?vgnnextoid								
< 92 % means that 92 % of these institutions scored lower than Montana Tech								
30 Doctoral/Research I & II Universities (N = 62,922)	87%	93%	87%	73%	90%	87%	87%	97%
118 Master's Comprehensive Colleges & Universities I & II (N = 150,910)	94%	98%	94%	86%	99%	95%	97%	99%
All Tech Average (N = 252)	458	116	122	116	119	118	117	120
30 Doctoral/Research I & II Universities (N = 62,922)	99%	99%	99%	99%	99%	99%	99%	99%
118 Master's Comprehensive Colleges & Universities I & II (N = 150,910)	99%	99%	99%	99%	99%	99%	99%	99%
Computer Science & Software Engineering Average (N = 4)	482	122	127	120	128	124	122	124

- Educational Objectives Assessment**

Accompanied by a PowerPoint presentation Jim Rhodes gave a review of the Educational Objectives Assessment Results for 2008/2009. Jim continued his presentation; introducing to members the present data collection process. There is only one form; questions are intended solely for graduates with Computer Science and Software Engineering degrees. He emphasized that the program is confident of having complete participation of all alumni eligible to take the survey to the extent that the educational objectives have been met and are clearly defined in a quantitative manner. The data collection form is available on line at <http://cs.mtech.edu/alumniurvey.htm>.

I have adapted, thrived, and contributed in an industry setting (0: this statement is completely inaccurate; 10: this statement is completely accurate).	I have improved software quality and the state of the art by promoting the adoption of best practices and supporting those best practices that are already being used. (0: this statement is completely inaccurate; 10: this statement is completely accurate).	I have improved software development processes or computer environment of the workplace using my broad theoretical and practical knowledge. (0: this statement is completely inaccurate; 10: this statement is completely accurate).	I have demonstrated an ongoing commitment to professional development (0: this statement is completely inaccurate; 10: this statement is completely accurate).
9		7	9
9	9	7	9
8	7	7	7
7		2	9
9		6	6
3		3	4
9		5	6
8		6	7
5		5	4
5		3	3
7	7		
9		6	9
6	7	7	7
9	9	9	9
7.36	7.80	5.62	6.85

Two categories fell below the 70% criterion; **Section 7** (I have demonstrated an ongoing commitment to professional development) and **Section 5** of survey (I have improved software development processes or computer environment of the workplace using my broad theoretical and practical knowledge)

Questions, comments or suggestions:

- **Section 7 of Survey** (*I have demonstrated an ongoing commitment to professional development*)
 - How much emphasis do you put on your employees to join organizations?
 - We will pay for them but we do not push them into joining.
 - Conferences are more important than being a part of a professional organization.
 - Is looking at reference material on the web considered professional development?
 - Have a list in your company of professional development sites.
 - Leave question the way it is and have them list what they did.
- **Section 5 of Survey** (*I have improved software development processes or computer environment of the workplace using my broad theoretical and practical knowledge*)
 - Question is unfair because a new developer may have no control over that process.
 - Even a developer that has been there for years may not have any control over that process.
 - Change for the sake of change isn't necessarily the best. If it is a good process; leave it alone.
- **Section 4 of Survey** (*Do you follow the adopted standards of your company?*)
 - Did you expect anyone to really admit they do not follow the company standards?
 - This question is unfair; should be are you using or did you use your educational background to contribute to changing or improving practices.
- Questions suggested by IAB member to include on survey:
 - Do you think your education at Montana Tech was useful?
 - Would you recommend to someone who is interested in going into the program to repeat what you did?

IV. Computer Science Department Projects

• **Enrollment Trends, Recruiting Efforts, REAL Scholarship**

Rick Joyce presented data over the last ten years of the Computer Science and Software Engineering program enrollment. According to the combined data the enrollment was monotonically decreasing in the year 2000 and has been steadily decreasing. He emphasized that this has been a trend in other universities and is a systemic problem for Computer Science but most places have seen a bottoming out in the past two to three years. MT Tech echoes this trend and has seen a slight increase in the last year.

Rick informed members of a recruitment initiative the CS department has been undertaking; making personal visits to high schools. The faculty have discovered during these visits that students lack logical thinking, computational thinking, have little idea what computer science is and their perception as far as employment is that jobs are outsourced to other countries. Rick expressed the importance of high schools introducing more math and science to students.

Rick presented the REAL Scholarship to the IAB members. Students go online and complete online modules and can earn up to \$600.00 in scholarship credit. There is also a Summer Camp Scholarship offered to students. Attending one of the camps held in May of 2010 will double the scholarship credit amount up to \$1200 per year. Participants must be planning on entering college within the next two years as a first year computer science or software engineering major. Additional information and the modules are found on the Web at: <http://cs.mtech.edu>.

• **Proposed Curriculum Revisions**

- **Two year AAS Degree**

Proposal for an AAS Degree was presented by Frank Ackerman to the IAB members.

- Create a rigorous two year degree that would permit CS students to be effective on-the-job two years earlier.

- Utilize local and long-distance education to continue on toward a bachelor's degree while on-the-job.
- Support and motivation from industry

Win-win Result

- Students:
Get started working two years earlier and with less debt
- School:
Unique (at least initially) program that would attract student from outside Montana and substantially increase size of department.
- Industry
Get well-trained, productive staff for less; provide direct motivation for further education

Program Highlights

- Rigorous qualifications for entry
- All courses directed toward job performance and foundation for further professional study
- Almost as much programming and project experience as our four year program

Frank continued his discussion with a handout documenting the rationale of the proposal for an A.A.S. Degree. He asked IAB members what kind of reception business people would have towards these students and would like members' feedback concerning the A.A.S. degree option.

Feedback: Some groups inside our company would value this degree. Communication ability is such an important skill; this course throws that away. IAB members expressed concern for a student deciding to continue with their education; how much would this mess up their degree? Frank assured members that this course meets their present degree requirements and a student can jump into a bachelor's degree and be right on target.

○ **Web Applications Course**

Jim Rhodes presented a proposal for a new course Advanced Web Design and Programming. The motivation behind this course was a recommendation from the 2008 IAB Meeting and a general agreement within the department that such a course is needed in modern computer science curriculum. He continued the presentation with a general course description stating that this proposed advanced web design and programming course will be collaboration between the Computer Science (CS) and Professional and Technical Communication Departments (PTC) at Montana Tech. It will team PTC students who are interested in exploring advanced-level design practice with CS students who are concentrating on programming skills to create client and server side applications. The students will sometimes work in separate groups and sometimes together, enabling the CS students to appreciate the skills and techniques involved in the design process, and vice versa.

The PTC portion of the course trains students in various advanced graphic and navigational design methods to design and implement innovative, leading-edge dynamic web sites. Included will be 2-Danimation, on-line merchandizing site construction, cascading style sheets, PHP site design, and database interface design.

The CS portion of the course will familiarize students with various approaches to creating static and dynamic Web pages, as well as database interfaces using some of the following: ASP.NET, Visual Basic.NET, Visual C#. Net, Java, AJAX, SOAP, Ruby on Rails, CGI/Perl, SQL, and scripting languages such as JavaScript and VBScript.

Questions, comments or suggestions:

- What level is this course?
 - Course will be a 200 or 300 level
 - PTC will be putting a tremendous amount of time on the inter-face.
 - CS will do the back end.

- **Web Architecture Course**

Rick Joyce began his presentation with a course description of the Web Architecture course. This course is designed to give the student an understanding of the plumbing that makes the Web work. It covers basic and some advanced technologies currently being used in Web based systems, and provides an overview of the technical issues surrounding the Web. Students successfully completing this course will learn Web technologies to build high-value web applications. Accompanied by a handout a course overview was presented to IAB members.

Questions, comments or suggestions:

- IAB members liked the idea of the course but questioned the course name; might be something for CS to revisit and discuss among faculty.
- **Correctness Arguments**

Due to a lack of time Frank Ackerman asked IAB members to take a moment and review the handout he presented to them and if they were curious about how this process worked to contact him and he would arrange time to meet with them individually.

V. Welcome from Doug Coe, Dean of the College of Letters, Sciences and Professional Studies

Doug Coe, Dean of the Colleges of Letters, Sciences and Professional Studies welcomed the board members to MT Tech and emphasized how valuable their advice is to the department. Dr. Coe expressed his appreciation to the board members for their time and efforts put into the Computer Science program.

VI. Industry Update – IAB Members

- **Davis Almanza:** Computers Unlimited is looking for the “*Rock Stars*”, leaders, someone who can relate to our customers. We are looking for people that have human communication skills. When hiring new graduates we look at the GPA, grades and how the student communicates and presents them self.
- **Peter Sprague:** Students should have good problem solving skills, communication and database skills. When interviewing new graduates some of the questions Microsoft asked; who have you worked for in the past, what were some of your challenges and how did you overcome your challenges? Peter expressed that he thought the CS program does a great job in general, and strongly recommended to the CS faculty to resist the trend to become to vocational and not change the curriculum. Peter also emphasized that MT Tech is kind of special; it gives people the opportunity to come out of Butte, Montana with what we call a tier (2) Computer Science degree; a good solid Computer Science education.
- **Nakoa McCullough:** RightNow Technologies is looking for good people with problem solving skills and good technical skills. RightNow does its own unit testing. Tools we use: Linux, Python, SQL, and UNIX.
- **Jim DiFronzo:** RightNow Technologies looks at their experience level when hiring, GPA, what have they done outside of academia, what interests them, and do they have the maturity drive to excel. Tools we use: Java, C, Linux and UNIX. Jim would like to see teaching of fundamental security in programming and students introduced to software development methodologies and testing methodologies.
- **Craig Spanning:** Spraying Systems is looking for people who are self starters, can write code, proficient in English, have real world experience, the ability learn, and a strong theoretical background.

VII. Discussion and Wrap-Up

Michele asked IAB members for their input/suggestions on how to “market” the Computer Science and Software Engineering programs.

Responses:

- Highlight projects that are successful:
 - Games

- Robots
- Webpage
 - Accredited program
 - SE program – only (8) bachelor programs offered in the country.
 - 100% Placement
 - Starting salary
- Micro-programs; do projects which include cell phones to attract high school students.

Michele informed IAB members that she is concerned about continuity of faculty in the department and asked for the board's support and suggestions.

- Continuity is a trust factor for students
- Use student research project, which documents justification for tenure track positions. (George Cox's URP on student retention)
- Continuity in the curriculum
- Consistency in the way the course is taught
- Faculty turnover is a great concern to the IAB members.
- Counseling students to stay in the program; program needs to have stability in faculty.
- One IAB member expressed a willingness to write letters of support for tenure year track positions.

Michele thanked the members for their attendance and support to the Computer Science program.

Meeting adjourned.

Respectfully submitted,
Tami Windham