Minutes of the 2012 Computer Science Advisory Board Meeting

Present: Board members – Thomas J. Marlowe, Michael Merritt, Gregory Peterson, Megan Restuccia
College of Science & Health Dean – Sandra DeYoung
Institutional Advancement – Michelle Drame
CS Faculty – Li-Hsiang Cheo, Erh-Wen Hu, Linda Kaufman, Cyril S. Ku (Chair), John Najarian, Gilbert Ndjatou, Bogong Su
CS Staff – Carol Parken, Marvin Kiss

Date: May 4th, 2012 (Friday), 12:30PM-3:30PM
Location: Room 5020, Science Hall East

The meeting was called to order at approximately 1:10PM. The Chair distributed to all participants a packet of documents including:

- The printed version of the extensively documented Agenda for the overall meeting (accessible at: http://cs.wpunj.edu/~abet/dept_docs/CSAB_Agenda05042012.pdf);
- The printed version of the Advisory Board’s Purpose and the Roles and Expectations (accessible at: http://cs.wpunj.edu/~abet/dept_docs/CSAB.pdf);
- The printed WPUNJ brochure “William Paterson University’s Science Complex: At the Forefront of Science Education in New Jersey”;
- The membership of the CS Advisory Board, the College of Science and Health Deans, and the CS Faculty;
- The Minutes of the 2011 CS Advisory Board Meeting, also available at: http://cs.wpunj.edu/~abet/dept_docs/CSAB_Meeting_Minutes_04292011.pdf;
- The year-end report of 2010-2011, which is accessible at: http://cs.wpunj.edu/~abet/dept_docs/CS_YearEndRpt_10-11.pdf.

In accordance with the agenda, the discourse proceeded as follows:

1. In the atmosphere of collegial deliberation and decorum of the forum, the meeting participants sequentially introduced themselves.

2. The agenda was reviewed and unanimously approved.

3. Dr. Cyril S. Ku thanked Dean DeYoung for helping our department and continuously supporting us on every occasion. Even the present lab in which we are meeting and the CS department’s new home were planned and developed under her purvey and auspices. The department and every student of our program will always deeply appreciate her contributions in every aspect of its history and future.
4. Dean’s Report:
   a. Dean Sandra DeYoung welcomed the board members. She thanked them for contributing their time, effort, concern, insights/inferences of the forefronts of our science as practiced/deployed in the industrial and business contexts. The enriching infusion of their experience and guidance enhances the program and CS education in many respects.
   
   b. The search for the new Dean of the College of Science and Health (COSH) is in progress.
   
   c. While the Computer Science Department has moved to these excellent modern facilities and the new Science Building East is a wonderful reality, new state bond issues for building renovation is still an on-going activity. This is a good indication of positive developments to come.
   
   d. The Dean wished us the best in all our future endeavors. Likewise, the department reciprocated. On this solemn note, the swan song ends.

5. Chair’s Progress Report and Discussion among Board Members and Faculty:
   a. (Report): The CS Department’s New Home is basically the South-West half of the 5th floor of the New Science Building East Wing. We have 8 faculty offices, a learning/tutoring center, a research center, a department suite, an open computer lab (5040), three classroom labs (5019, 5020, & 5035), and a computer server room, all oriented as the figure below illustrates:
b. Two New CS Servers: More Computing Power –
   (Report): The CS Department has just acquired and deployed one new server, with a second forthcoming:
   i. Dell PowerEdge R410 for multiprocessing research;
   ii. Dell PowerEdge R710 (coming soon) for license server and research in virtual and cloud computing.

c. ABET Accreditation:
   (Report): Our program has been re-accredited up to 2014. Therefore, we will need to produce a Self-Study Report soon. The report is due in July 2013, with the visiting team coming in Fall 2013.

d. CS Major Enrollment is increasing.
   (Report): The statistics collected is:
   
<table>
<thead>
<tr>
<th>Year</th>
<th>Students</th>
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<tbody>
<tr>
<td>Fall 2006</td>
<td>121 students</td>
</tr>
<tr>
<td>Fall 2007</td>
<td>129 students</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>117 students</td>
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<tr>
<td>Fall 2009</td>
<td>118 students</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>144 students</td>
</tr>
<tr>
<td>Fall 2011</td>
<td>172 students</td>
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</tbody>
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   (Discussion): This observed trend is attributed to either greater interest in Computer Science. An alternate conjectured inference is that it might reflect possibly reduced enrollment standards. Just as plausible is the possibility that the prospect of the new building, changes to modernize the curriculum, ABET accreditation, and other factors contributed; we may be making the right moves.

e. Course Development:
   (Report): Two successes in the UCC (University Core Curriculum) domain are the approvals of one Technology Intensive course (CS 1300 Visual Basic) and one Writing Intensive course (CS 3500 Software Engineering).

   (Discussion): Dr. Kaufman, who is in the UCC Technology Intensive Course Committee, mentioned that UCC has ushered an era of less Math-Science at WPUNJ, in that under the UCC model, the Math-Science component has decreased 14 percent; the core of critical thinking is often experienced in its most rigorous form in Math and Science. In the same manner, some courses called Technology Intensive are assigned such on the tenuous basis of just one email or one PowerPoint file being produced. However, in the good news category, more students are taking CS 2010 in recognition of the importance of technological proficiency as a necessary condition to success in the modern world.

f. Program Development:
   (Report): New CIT major proposal was submitted in Fall 2011, followed by meetings with the COSH Curriculum Committee and then the Math Department. Presently, the
proposed program revision is nearing completion, with modifications, supporting documentation, and comparative surveys.

(Discussion):

i. Much discussion about the distinction between IT and CIT. Despite suggestions otherwise, the name remains CIT for several important reasons. The term IT has been watered-down of late; prevalent misconceptions are that it is less a profession and less advanced, being more a collections of shallow mechanical procedures akin to the complexity of finite automata. The paradigm parody of IT as “the people who don’t understand the applications and just keep the boxes running” makes the use of the term IT Program less effective and, with such a disparagingly reductionist reputation, an untenable name. In the formalization of bodies of knowledge, development of their pedagogy, and construction/establishment of programs, we need to take the higher road, one that commands respect and reflects scholastic excellence, erudite analytic depth, absolute currency, and industrial standards. CIT is a name of distinction, unique, focused on logic, critical reasoning, scientific principles, and professional methodologies / best practices of the discipline. We will be directing and even requiring students attain certain professional certifications prior to graduation.

ii. At this point, in recognition of these criteria of excellence, the advisory board recommends (when the program is approved and ready to implement) that we inform the Career Development Center as a department of the distinction in the nature of our program, specifically to state “what skills, abilities, [certifications], and talents CIT students need to specify [and highlight] in their resumes and cover-letters”.

iii. It was noted that Rutgers has IT in its Communications Department.

g. CS Advisory Board Meeting Date:

(Report): The Chair brought up the issue from our last CSAB meeting that we need to consider the most feasible date for our annual board meeting.

(Discussion):

i. Jon Bentley is at West Point’s Advisory Board Meeting today; this works out fairly (in accordance with the alternation model from operating systems). We appreciate that wonderful beloved bastion of democracy, whose roots are trace back to the origin of our republic and which prepares the great leaders of our free world’s defense. However, this indicates that we need a different day for the CSAB meeting. This concurs with the next item.

ii. The CS4800 Capstone Course Presentation Day meeting model, suggested in prior meetings, will be the scheduled day for the CSAB meeting in the future. For now, we have one exemplary student who will be presenting his seminar project in a few minutes.

iii. It was suggested that we adopt a Poster Day model for CS4800 rather than a PowerPoint project approach. The CSAB can then provide more interactive and timely critiques while interacting with students directly. Perhaps we can
even use that day as a recruitment event, drawing on local high schools to observe our students’ work.

h. Advisement:
(Report): One of the discussion topics from last year’s CSAB meeting was about advisement. Some members suggested that the CS Department should perform all the advisement functions. However, the university has a model for advisement for most of the departments and for now, we will follow this model: freshmen (transfer students with less than 24 credits) are advised by the Advisement Center. Freshmen still come to see the Chair and CS advisors as well, resulting in a more customized experience in some cases and corrective actions in others.

i. Faculty:
(Report): Dr. Linda Kaufman has decided to retire, effective by the end of this semester. Our department is in the last stage of hiring an Assistant Professor.

(Discussion): Faculty members of higher education are often the islands of stability in a sea of change. However, change is inevitable, as this last decade saw the departure of Prof. Radev and Prof. Coomes. As the only constant is change, we need to discuss it and hereby document it:

i. Foremost, we thank the CSAB for writing a cogent letter last year stating our need for a new CS faculty member. In light of Item #iii below, it obviated a disastrous CS faculty shortage in fall 2012. A position was allocated to us by administration, for which we are most thankful and which we filled through aggressively proactive recruitment.

ii. We welcome our new faculty member. [Subsequent to this meeting, the final candidate was selected, Dr. Christopher S. Leberknight.]

iii. It is with great anguish that we reluctantly recognize and accept the retirement of Dr. Linda Kaufman. We applaud her outstanding contributions to the department and commend her on her many accomplishments.

6. Student Presentation:
Title: Remote Sensor Networks
Student Author: Thomas A. Giacchetti

Background: After high school, joined the Air Force and deployed to Ramstein, Germany; Seeb, Oman, and Al Minhad, United Arab Emirates. Major operations included Operation Joint Forge (a NATO-led peacekeeping force in Bosnia and Herzegovina), Operation Northern Watch and Operation Southern Watch (no-fly zones over Iraq), and Operation Enduring Freedom (after 9/11 attacks).

After Iraq, stationed at Pope Air Force Base in North Carolina, as a Staff Sergeant and Non-Commissioned Officer in charge of the Information Protection Office. Obtained two Associate degrees from the Community College of the Air Force in Information Systems Technology and Avionic Systems Technology.

He will graduate from William Paterson University with a B.S. in Computer Science in May.
He received the Omicron Omega Award for Excellence in Computer Science (graduating senior with the highest GPA) and inducted into UPE Computer Science Honor Society this year.

**Project Background:** This project was developed, completed, and documented in fulfillment of his CS 4800 (Computer Science Seminar) capstone project requirement. As these fine projects represent an accomplishment of the student, they span more than one course and reflect the broader program’s objectives (as intended). So Thomas’s project was inspired from CS 341 (Digital Logic and Computer Organization) and transcends the scope of one semester.

**Abstract:** Remote Sensor Networks: Securely Interfacing the World

Reading values from sensors can be a trivial task in the case of a simple micro-controller using analog or digital input. However, a distributed system of sensors that connect to a web server securely can be a complex task. Remote sensors must communicate with the main control unit, then somehow get the data across the Internet without tampering. Also, the remote sensors must be efficient in their use of power, conserving energy when not actively polling the sensor.

Using the Atmel ATmega328P micro-controller, data can be obtained from a sensor using a combination of interrupts and a watchdog timer. The interrupts wake the micro-controller and alert it to a change in digital state or the watchdog timer wakes the micro-controller to send a heartbeat signal. The remote micro-controller then sends the data or status using a simple serial connection to the main micro-controller. The serial connection is wireless via an XBEE Series 1 device using the IEEE 802.15.4 standard and encrypted by an AES algorithm to prevent interception. The main micro-controller can then send the gathered data via TCP connection to a web server. Since the micro-controller cannot connect via HTTPS/SSL some other method of encryption must be used.

In his example, the remote sensor network will consist of a reed sensors to detect when a door is opened. The main micro-controller will upload encrypted reading to a data broker. A client iOS application will subscribe to the data broker feed and decrypt the messages.

**Project Presentation & Report:**
(can be provided upon request by CSAB members or CS faculty)

7. **Discussion: How Can We Attract More Female Students to CS as a Discipline?**

**The Problem:** The statistics are alarming! As of spring 2012, there are only 13 female students out of 172 students in the Computer Science major. That is a woeful paltry eight percent (8%). Contrast that with the general WPU NJ student population gender ratio: 54% female and 46% male. This is a serious under-representation situation. We have two outstanding students out of the thirteen female students.

**Forum of Ideas to Address and Solve this Problem:**

a. The problem is more a matter of persuading women to consider Computer Science as a fascinating direction of intellectual inquiry, as a relevant area, as a valuable
opportunity, a career direction, and as an area they should consider in all respects. CS is a social enterprise, not to be associated with the lone male sitting in some cubical (the introvert hacker scenario) but as a vibrant science in which women have equal footing with men. The goal of all education is to make students possess the knowledge, make it theirs, not just recognize it is in some remote book. So we need in this situation to present and make CS worth possessing and making it their discipline.

CS is now inherently a social enterprise, as software engineering demonstrates.

One perspective was that the CIT program would help here, since CIT takes the more socially integrated perspective. We need more team orientation and team projects.

b. We need to collect and distribute more documentation on graduates. This includes job opportunities for CS beyond classical ones. Dr. Kaufman mentioned one key fact is that CS students are given a preference in Law School and Medical School Admissions (cyber law is one hot area)!

c. We need to document in a demonstrable and convincing manner some of the benefits of CS careers such as flexible work hours and other perks that would make it more promising.

d. We need to make CS more attractive in Support Courses (i.e. GE/ UCC/ Service courses) such as CS 1300, CS 2010, CS 2150, …

e. We need to provide a more interdisciplinary perspective of CS. Thomas’s Remote Sensor Lecture just delivered is a case in point. It easily could have, as an appended the phrase, “for Patient Nursing” and suddenly the discipline opens from a narrow subject to one greater, thereby appealing to a greater audience and demonstrating relevance and value.

f. Another aspect of introduction to CS is to promote the higher degree of empowerment attainable by modern first programming languages such as Alice (CMU), Scratch (MIT), Logo (MIT/BBN), Squeak (Xerox), and Go (Google). C/C++/Java requires many semesters before students can produce animations and powerful graphics, audio, and multimedia. These languages can generate them after one lecture. In the 2011 AIM High Summer Camp of Computer Graphics and Game Design at WPUNJ, students learned slowly basic Java graphics and progressed at a reasonable pace. When they were introduced to Scratch and Alice, they felt empowered / enthusiastic and the subject became relevant. It piqued their interest and they wanted to experiment and explore. To quote their colloquial terms, “That’s cool.” We can still teach syntax, programming formalisms, math, and equations of motion but why not present them in a context of creativity and graphics to fire their imagination, making them active learners. Research has shown statistically that these languages promote increased concept retention, student retention, exam grades, and continuation in the discipline.
Another breakthrough was attained by Dr. Kaufman in introducing Allegro Graphics into CS 2300. Rather than just text mode screens identical to old mainframe monitors, students were drawing city-street scenes and animation penguins in C++. If we want to attract this next generation, we will need to program in contexts they prefer, such as hand-held devices, cell phones, iPads, and very recent Web API’s. That we dwell in 80x25 dumb-terminal punched-card-constraints makes matters unappealing, antiquated, and less relevant to students. It sets a divide between their generation and ours. Students text; they don’t email. If that sentence seems grammatically incorrect, then that just proves the point. In the peer pressure world of students and especially their perception of prospective occupations, antiquities and obsolescent contexts are unacceptable.

“Technology gives options to vary what they can do and move geographically.” We need to promote awareness of career possibilities, exciting options available, and directions they can consider.

“This is a lost opportunity in terms of [such] tragic statistics.”

We need to find who on campus is couldfacilitate here and whose job description includes raising the underrepresented gender statistics herein.

We need to go to Trenton and convince politicians that in K-12 education, CS needs to serve a significant role.

We need to have faculty presence in Open Houses (which we did) and other recruiting events. This last one did not even include faculty in the process.

We need to go to NJAS and present poster-sessions to attract High School students. Perhaps we can include that in the CS 4800 course expectation.

We need to stress small class-size and direct faculty contact early.

We need to document our students going to Graduate School more prominently.

We need to influence freshmen at the starting point of their college experience.

We need to interview female students who leave CS, correlate observations, and then determine exact causes or weak-points.

It was noted that “Beata Zaluska and Karolina Roszkowski are our two best students.”

We “need to assign female students to female alumnus members, as a mentor or job-counselor”

“Women at Bell Labs were theory people, not as hands on” [in terms of hardware]. “Most CS now is not [heavily oriented towards] hardware.”
We need to recruit in local High Schools. Awards may provide some incentive.

Resources for further consultation:
- [http://www.wepan.org](http://www.wepan.org) (Women in Engineering ProActive Network)
- [http://www.awis.org](http://www.awis.org) (Association for Women in Science)
- [http://sites.nationalacademies.org](http://sites.nationalacademies.org) (Committee on Women in Science, Engineering, and Medicine)
- [http://nova.wpunj.edu/wise](http://nova.wpunj.edu/wise) (Women in Science & Engineering at WPU)

8. Fund Raising:
The issue of fund raising is vital. Synoptically highlighting the key points:
- We now have a CS-account in COSH. We thank Megan for the idea and for contributing.
- Please also email fund-raising ideas to Dr. Ku.
- One enterprise previously implemented in the past was partnering with Cisco and also (on a separate occasion, independently) with Microsoft to conduct certification training.

9. Epilogue:
- John distributed a list of student presentations given by the CS 4800 class.
- Megan said we need to make that list more visible on the Web.

Dr. Ku directed a tour of the department’s new facilities. Afterwards, the Chair and CS faculty thanked the Advisory Board for their time, effort, expertise, insights, and help. The meeting was adjourned on this note.

Respectfully recorded by:

John Najarian