UNIVERSITY OF WASHINGTON
BOTHELL

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October 31, 2008

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James Antony
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Dear Deans Baldasty and Antony,

This letter is the UW Bothell Computing and Software Systems Program's response to the Report of the Ten-Year Review Committee. We greatly appreciate the time and care that all of the committee members spent here and in preparation of their report. With one notable exception, we are in almost complete agreement with the committee's report and are gratified that they recognized the quality of our degree programs, the health of our Program, the hard work and quality of our staff and faculty, and the challenges and opportunities in our future.

Overall, the committee found that:

- CSS is serving the student populations and community it was intended to serve.
- Our Bachelor of Science degree is healthy.
- Our Bachelor of Arts degree has transformational potential.
- Faculty and staff are committed to student and Program success.
- Our staff are highly effective.
- Our students are engaged in their education.
- We have a highly collegial culture.
- CSS maintains excellent relationships with area community and technial colleges.

The committee recommended that:

- Our Master's program should not be launched at this time. Later in this response, we explain why this is not in the best interest of CSS, local industry, and area professionals.
- The CSS Program should be continued and reviewed again in 10 years.
- CSS staff are over-extended; additional clerical support is needed.
- CSS needs additional funding for branding and marketing of our Bachelor of Arts degree.
- Our Bachelor of Science degree needs additional resources to improve course offerings, address faculty balance, and improve student support. This includes faculty hires in software engineering and to increase faculty diversity.

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- The CSS Program should become central to the UWB Science, Technology, Engineering, and Mathematics (STEM) initiative.
- We should work to resolve our disagreements with the UWB admissions office.

In the following sections of this letter, we examine in detail the major points of the committee's report and relate each to recent events, accomplishments, and ongoing activities by the program. We also present our argument for implementation of the Master of Science degree.

Diversity

As the committee notes, this is a national problem in the computer science profession and in CS education. The CSS Program is dealing with challenges surrounding recruiting and making a diverse student population successful in a number of ways. We have created two committees targeting curriculum planning for our own majors and non-majors. Our "Strategic Initiatives: Internal Curriculum Committee" is responsible for the former, including increasing student body diversity through outreach to lower division students — both UWB's current student pool and taking into account any changes in lower division population that may come in response to creation of UWB's Science and Technology (S&T) Program.

Among the action items for this committee over the next couple years are:

- Re-examining the CSS curriculum to consider the latest CS education research and the impact of course design and curriculum on diversity. This will include approaches such as incorporating group work and using specialized programming environments such as Alice for the first part of CSS 161 (the first computer science course for majors, often called "CS1").
- Developing resources to help faculty incorporate best practices into their classes to foster inclusiveness. This could include replacing subtle discouraging messages to women with encouraging ones, managing negative behavior by male students, and creating a friendly social environment in the classroom.
- Considering how we can create a culture of community service for the freshmen and sophomores to work with junior high or high school students who might otherwise not consider a computing career. This might involve creation of a 1XX class that could be used as a free elective.

Recruiting, admissions, and advising

We are in the process of examining how to more clearly communicate, to prospective students and other external constituencies, what the CSS Program offers. This could involve changing either the name of the program or the name of our BS degree.

The committee's report notes that our advising staff is stretched thin. Many changes are occurring on campus with the creation of the new S&T program. We plan to work with the administration to develop an approach to student "academic care" that spans recruiting and pre-admissions advising through graduation, career advising and alumni relations and encompasses all of the S&T majors. We hope that this will allow us to create a position in CSS that addresses the non-advising aspects of these functions, such as coordinating marketing (including our web site, program literature, and newsletter), maintaining relationships with industry and alumni, etc.

The bifurcated nature of UWB admissions, with a central organization targeting lower division and the program managing direct transfer and other program-level admissions and pre-admissions advising, is challenging. Because we view student advising as an integral part of the admissions process, we see it as essential that recruiters have a deep understanding of our curriculum. It is only at the program level that recruiter/advisors work closely with faculty, understanding not only *what* each class is, but also *why* our curriculum is the way it is and *how* each required and elective course — and indeed the whole curriculum — contributes to students' becoming computing professionals. This discipline-based advising approach has direct impact on transfer student recruitment, allowing our advisors to establish working relationships with

colleagues at partner community colleges that give us access to computer science classrooms, CS faculty, and CS advising sessions.

The result of this approach has been a history of enrollment in UWB CSS that is significantly better than US computer science departments overall, with less drop-off during the dot-com bust and faster recovery thereafter. This outperformance is due to the hard work and carefully developed network and methods of the CSS advising staff.

In addition, it is by participating in faculty meetings that staff are acculturated into the idea that the faculty control admissions requirements. Our faculty concur with the review committee that it is not good to turn an admission problem into a retention problem. Our student success data has improved over recent years, providing strong support for our faculty's decisions regarding admissions requirements. We do not believe that this campus wants enrollment pressures to lead to a situation in which administration and admissions staff are continually applying pressure on faculty to "chip away" at their admissions procedures.

We conclude, as implied by the committee, that improved communications between the program and admissions staff is key to not only avoiding this sort of adversarial relationship, but developing a cooperative and supportive one. To improve communications, the program and admissions have established quarterly staff meetings, which should go far toward eliminating misunderstandings. We plan to continue to work with the admissions office and S&T faculty to develop a solution that provides better communications and interoperation between general campus recruiting and admissions, on the one hand, and advising and admissions into the various S&T degree programs, on the other.

Finally, the CSS program is developing policies and curricula to admit interested freshmen immediately into the program. This will allow these students to begin taking computing courses during their first quarter at UWB.

Strategic Vision

We agree with the committee that our strategic planning document is dated and lacks specific actionable items. We have begun a strategic planning process that will guide faculty effort and focus requests for additional resources on high-priority goals. This work commenced with our program retreat at the beginning of the 2008–09 academic year. Our approach to developing this is as follows:

- We have tasked two internal committees with developing strategic priorities related to the curriculum for our own degrees and our curriculum for science and technology students outside of CSS.
- The Director and Associate Director are planning to expand our relationships with the community and local industry.
- The CSS faculty as a committee of the whole will be considering how CSS will fit in with the new S&T unit as that unit's structure is clarified.

BS in CSS; BA in Applied Computing

The committee report, in our minds, makes a strong case for CSS being able to hire one or more additional faculty to improve the strength of our software engineering curriculum (one of the signature features of UWB CSS) and the diversity of our faculty. We are developing a staffing plan that distributes faculty effort throughout the S&T program as an additional justification for CSS faculty hires.

In terms of curriculum, the committee raises the question of us using calculus as a prerequisite "problem solving skill" course. We would not use that phrase, preferring to consider calculus as important for developing abstract thought and mathematical maturity. Nevertheless, it is reasonable to question whether alternative courses would be acceptable substitutes. Generally speaking, discrete mathematics might fill that role. However, our curriculum integrates discrete math into our programming courses, to more closely connect its concepts to software development. Its use as an admissions prerequisite would require us to

restructure our curriculum. Additionally, there are few opportunities for students in community colleges to take discrete math, and thus few of our transfer students would be able, as a practical matter, to substitute this course for calculus. Finally, to eliminate calculus altogether as a prerequisite would move CSS outside the norm in this region (see the following table), where only one campus has dispensed with the second quarter of calculus for the BS, and thus should be approached cautiously. We do not believe that reduced calculus requirements should be the perceived differentiating factor for a BS in CSS degree.

School	**Degree**	**Math Requirements**
UWB	BS	Calc I and II
	BA	Calc I
UWS	BS in CS	Calc I, II, and III
Seattle Univ	BS	Calc I, II, and III
	BA	Calc I and II
Pacific Lutheran	BS	Calc I and II
	BA	Calc I and II
Univ of Puget Sound	BS	Calc I, Discrete Math
Seattle Pac Univ	BS	Calc I, II, and Diff. Eq.
	BA	Conceptual Calc only
Western WA Univ	BS	Calc I and II
WSU	BS	Calc I and II
	BA	Conceptual Calc, Discrete Math
UWT	BS	Calc I and Statistics
	BA	Calc I and Statistics

We agree with the committee's comments on introductory CS courses and have made a re-examination of this one of our strategic priorities. This is especially important in light of the imminent admission of science and technology students and direct freshman admission of CSS students, many of whom will likely want exposure to multiple areas of study before making a final decision on their major.

MS in CSS

The committee focused on the benefits of having MS students for faculty research and teaching assistance, and concluded that it is unlikely that a large enough number of students will opt for these activities to offset the effort needed to start the degree. We believe that the prominence given to these particular benefits is an artifact of the interview process with the committee, in which faculty tended to comment more on their perceptions of individual faculty benefits. We do not think that these completely encompass the benefits of the MS program. In particular, we believe that the primary benefits of the MS lie in the service it provides to the community and the relationships that it will allow CSS to develop with local industry. If graduate education in general is a public good, degrees in high demand areas such as the MS in CSS are especially so. Each year, we receive on the order of 150–200 inquiries from employees in local industry regarding our MS degree. The ability to earn a Master's degree would benefit their professional development and foster much needed skills in the local workforce. Therefore, we continue to believe that the MS in CSS can contribute something of great importance to the region, to UWB, and to CSS.

Campus-wide initiatives: Four-Year Format

We agree enthusiastically with the committee's notes about UWB's move to a four-year curriculum. CSS is aggressively pursuing the integration of computer science into the overall UWB curriculum. Though the program only has 8 2/3 faculty lines, we have devoted, each year, at least one full line's worth of teaching load to lower division courses outside of CSS.

CSS is also unique among the UWB programs in having mounted a program-based 1XX and 2XX curriculum aimed at both prospective majors and non-majors. For the latter group, we have developed or are developing

three courses: CSS 105, which is a survey course for non-majors, CSS 106, which is a course on computer animation for non-majors, and a ten-credit, freshman year "Discovery Core" course within the Center for Undergraduate Studies and Programs, which combines an introduction to computer science with English composition content. Additionally, we are planning to offer direct admissions to freshmen to the program starting in fall 2009. The committee mentions some excellent ideas on how we could contribute to non-majors' education, and these are exactly the kinds of things that we will be pursuing as we continue to examine our CSS 105, 106, Discovery Core, and other offerings.

Campus-wide initiatives: STEM

We agree completely with the importance of being central to S&T development. CSS faculty are taking the lead in creation of the new Electrical Engineering degree and the S&T Program. Our "Strategic Initiatives: External Curriculum Committee" will be developing proposals this year regarding how computing education can best be integrated into the overall S&T curriculum, as part of an ongoing conversation between CSS and that new program. Action items for that committee include:

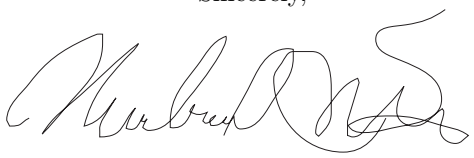
- Partnering CSS faculty with science faculty to help create computational science curricula.
- Examining the best approach to teaching computing to S&T majors. This could include teaching specific languages, such as MATLAB, either as standalone courses or courses in which it is applied to problems in data analysis or linear algebra. We are also looking into the possibility of multiple introductory programming sequences, such as a traditional one for CSS and Applied Computing majors, one using a scripting language like Python for science majors, and one using robotics for Electrical Engineering majors.
- Investigating how we can create a campus-wide approach to "computing across the curriculum".
- CSS currently teaches the only technical communications course at UWB. We will be considering how we might create an introduction to technical writing and an advanced technical writing course for all S&T students, and whether this course should be offered by CSS or as an interdisciplinary science class.

CSS will not only have an impact on planning for S&T; the S&T program will affect how our own students learn. In light of this, our "Strategic Initiatives: Internal Curriculum Committee" will be studying modifications to how we teach our introductory core classes. This includes developing an understanding of how we might change our curriculum in a future in which there are a significant number of S&T lower division students on campus.

To summarize, with only one notable exception, we agree completely with the committee's report. We plan to propose to the administration the allocation of additional staff and faculty lines, and an increase in marketing resources, in response to this report. Great change is in process at UWB; we believe that CSS's

central role in this change will justify these additional investments.

Sincerely,



Michael Stiber

cc: Kenyon Chan, UWB Chancellor
Susan Jeffords, UWB Vice Chancellor for Academic Affairs
David Canfield-Budde, Academic Program Specialist, The Graduate School