CCAM Response: Computer Science

Response and Implementation

On receipt of the report the members of the unit will meet in committee for discussion. The Dean and the unit head will then meet with CCAM to review the report. Based on the report, comments received from CCAM and any University planning and priority documents, the unit will then prepare a response. The response will address the issues raised and clearly outline priorities and future directions and initiatives for the unit over the next three to five years. As such it should be prepared in close partnership with the Dean. The response will be transmitted to CCAM which may comment on it. The response and any comments from CCAM will inform the faculty's long-term planning. The Provost or AVP (Academic) will provide a formal written response to the report from the unit.

Follow-up

Five years after the review (and mid-way before the next review) CCAM will initiate a follow-up with the unit. The unit will be invited to prepare and submit a brief report in which members of the unit comment on the consequences of the review and initiatives undertaken in response to it and respond to any comments from CCAM. In particular they will be asked to describe initiatives and plans for the coming three to five years until the next review takes place. The follow-up will be reported to Executive of Council and the report and any comments from CCAM will be made available on request.

	Initial Follow-up	18 Months	Year 5	Goal
U of R Strategic Plan 2015-2020				
Student Success			Computer science had grown to over 1000 declared majors. Our course-based M.Sc. program had attracted many international and local students. Our graduates are in very high demand in all sectors of the economy. The majority of students graduated from our programs work locally in Regina and in other places of Canada, making significant contributions to Canadian economy.	
Research Impact			Computer Science has an excellent research profile in several fields, such as Artificial Intelligence, Data Mining, Knowledge Discovery, Human-Computer Interaction, Rough Sets, Granular Computing, Three-way Decision, and many more. The majority of faculty members hold Tri-Council, MITACS, and/or industrial grants. We have one Tier 2 research chair.	
Commitment to Communities			Computer Science held summer programs on robotics for high school students. Members of the department provided interviews and gave talks to general public regarding Computer Science in general and AI in particular.	
Indigenization & Sustainability			Computer Science worked closely with the First Nations University of Canada. We shared our teaching materials with instructors at FNUC. Some of our graduate students worked as TAs at FNUC.	

U of R Strategic Plan 2020-2025				
Discovery			Computer Science has very large undergraduate and graduate programs. We have excellent researchers in many fields. Computer Science hosts many international visiting scholars and visiting research students. All these provide an excellent environment for students in learning, discovering, and connecting to the world. In 2021, Computer Science and Mathematics & Statistics created a joint undergraduate program in Data Science. In 2020, Computer Science redeveloped the non-thesis side of our graduate programs into competitive professionally-focused programs (Data Science, Human-Centred Computing) with strict curricula and enrollment limits. Computer Science has a high reputation in the world with respect to its research. We have attracted a very large body of international students from different parts of the world.	The department will promote excellent teaching and research. The department will fine-tune the new undergraduate program in Data Science, and two professionally-focused M.Sc. programs (i.e., Data Science, Human-Centred Computing). The department will explore new ways to strengthen our existing programs and new initiatives to create new programs.
Truth and Reconciliation			The department encourages its members to attend various workshops, as well as studying related materials. The department works closely with First Nations University of Canada to support their delivery of CS courses.	The department will consider incorporating more indigenous knowledge into course materials. The department will make extra efforts in recruiting indigenous students into our undergraduate and graduate programs.
Well-Being & Belonging			There is a high level of collegiality in Computer Science. We have created healthy and productive environments for faculty, staff, postdocs, graduate students, students, visiting scholars, and visiting students. The Department of Computer Science is a respectful place where everyone is valued and supported, every voice is heard, and every initiative is encouraged. During the earlier time of COVID-19, the department held weekly meetings for sharing ideas and experiences about remote teaching. Serving our students is always the top priority of the department.	The department will promote the importance of a respectful working place and emphasize the values of EDI (equity, diversity, and inclusion).
Environment & Climate Change			Members of the department are involved with activities and initiatives related to Environment & Climate Change (e.g., Buying Locally Grown Food).	The department will investigate the options of putting more Environment & Climate Change related information and examples into our course materials.
Impact & Identity			Computer Science has many internationally known researchers. We have one Tier 2 Canada Research Chair and an industry-funded Chair in AI (SaskPower). Our faculty members and students have produced a large volume of top-quality publications. The majority of faculty members hold research and/or industry grants. In particular, two new assistant professors successfully obtained their NSERC Discovery Grant. In 2021, researchers at Stanford University released their list of the top 2% of research scientists by career impact. Computer Science at the University of Regina had 4 of our 16 tenured and tenure-track faculty members on that list, fully 25% of our members. This is well above the performance of other computer science departments or other units at the University of Regina.	The department will emphasize excellent teaching and outstanding research. The department will further build up our strengths in teaching and research in order to create more opportunities for our students and to make solid contributions to our university's position in research excellency. The department plans to renew the CIPS accreditation.

			Our new professionally-focused M.Sc. programs are very successful and will further build our reputation around the world. The department is accredited by the Canadian Information Processing Society (CIPS) and is the longest continually accredited Computer Science program in Canada.	
External Review Report				
Recommendation 1 That the Faculty of Science considers increasing the allocated resources to the Department of Computer Science to be commensurate with the significant increase in enrollment, or in the absence of increased resources, the Faculty considers a mechanism for controlling the number of majors in Computer Science by, for example, requiring a higher minimum incoming admission average before guaranteeing that a student gets their first preference of a major at the time of admission.			This recommendation was made on the basis of 400 declared majors with 16 faculty members. Since then, the student body has grown to over 1000 declared majors, with the faculty complement initially dropping to 14 full time tenured or tenure-track members, and returning to 16 in 2021. The Faculty of Science has worked closely with the Department of Computer Science to allocate what resources are available within the constraints of the University, including • one tenure-track faculty position in 2019 (filling a retirement), • one tenure-track faculty position in 2020 (filling a retirement), • one industry-funded named faculty position in 2021, • one three-year term faculty position 2018-2021, • one three-year term lecturer (2019-2022), • two three-year term lecturers (2021-2024), and • three PDF positions. Class sizes and waitlists have grown dramatically, and the department's ability to offer the courses students need for their programs has, in some cases, been compromised. Because of high enrolment, Computer Science has had to lean very heavily on sessional instruction, with many semesters employing more sessional-taught courses than faculty-taught courses. In 2021, Computer Science moved to implement Competitive Admission, with the hope that this will begin to bring enrolment numbers back down to reasonable levels. Computer Science closed a loop-hole in the Diploma in Computer Science that allowed a student who already had a CS degree to take this program. This resulted in a reduction in students in this program. Computer Science supported the creation of a general Diploma in Science, which has taken the pressure off our diploma program. An additional measure the department took was to restrict the enrolment of students into the course-based masters program, as we developed the new professionally-focused master's programs in Data Science and Human-Centred Computing.	The department will work with the Faculty of Science towards a healthy growth of our programs aligned with the growth of the faculty body.
Recommendation 2 That the Department of Computer Science collaborates with the			The BASc program is already well supported by the Department of Computer Science where possible. Computer Science offers many courses taken by SSE students.	Computer Science believes that closer collaboration between the CS and Engineering would benefit both, but that a new model for this collaboration may need to be reimagined.

Faculty of Engineering and Applied Science to jointly offer the BASc in Software Systems Engineering.			Computer Science met with Engineering several times in an attempt to build closer relationships. In an effort to help build this collaboration, the engineering program chair and the computer science department head worked together on a "quick sheet" to help people understand the similarities and differences between the two units (see Appendix A). A study was performed in 2018 to measure the alignment between the courses and offerings of the BASc SSE and the BSc SSD programs. SSE has accreditation requirements that prevent closer collaboration (Computer Science Professors cannot teach courses in the BASc program, because the engineering accreditation requires that these courses be taught by professional engineers.). Although it was determined that there was some overlap, individual faculty members within the Department of Computer Science felt that there was enough diversity between the two programs to have them remain separate. Computer Science supports the engineering programs at the graduate level. Many graduate students in Engineering take computer science courses.	Computer Science will have more conversations with Engineering with respect to the possibility of a joint program.
Recommendation 3 That the Department of Computer Science starts offering the online Master's of Health Information Management program.			In 2018, Computer Science hired an excellent faculty member to frontline the development of this program, and 4 faculty members were re-tasked to help build and develop this program. Significant effort was expended to learn the MHIM curriculum and build courses that would satisfy the requirements of the industry. In 2019, after deep consultation with the faculty member, the department, and university administration, it was decided that this program would have a more cogent home in the Johnson-Shoyama Graduate School of Public Policy, where a Masters of Health Administration program already existed. The new faculty member's appointment was transferred out of Computer Science and into JSGS, and the program was archived within the Department of Computer Science.	
Recommendation 4 That the prime space currently allocated to the CS and Math undergraduate clubs be reallocated to graduate student space of the Department of Computer Science.			This has been done. The space that once was the computer science front office, and for years was allocated to CS and Math undergraduate clubs, is now the research space for a Canada Research Chair in Machine Learning, who supports a very large cohort of graduate students working collaboratively with many members of the Department. Graduate research space remains heavily constrained and at a premium within the department.	
Recommendation 5 That the Faculty of Science and the Department of Computer Science perform a space reallocation exercise to ensure that the allocation of research space is commensurate with current needs and graduate student			This has been done in an informal and piecemeal way. Incoming faculty members have been granted space, and existing space has been confirmed to be well utilized. In individual cases, space has been reallocated from one research area to another, with a focus on specific timely needs.	A full space audit would be a worthwhile pursuit in the near future.

enrollment in each research area.				
Recommendation 6 That the Faculty of Science and the Department of Computer Science reconsider their decision to only offer a guarantee of one year of financial support for PhD students and devise longer term funding packages of a minimum of three years of support.			This constraint primarily hinges on access to guaranteed faculty- and university- level support. There have been several challenges in this area. University-level graduate support from FGSR is generous but unpredictable, therefore, it is difficult to guarantee more than one year of graduate support from this source. Departmental support in the form of TA work is also flexible and fluid but difficult to guarantee. One possible way forward would be to encourage incoming graduate students to teach courses, which would help guarantee longer-term funding as well as help to mitigate the high enrolment and lack of faculty resources. The two new professional M.Sc. programs bring a large inflow of funding to Science. As a result, we have been given two PDF positions to support the delivery of these programs.	The one-year guarantee continues to be a challenge for recruiting top tier graduate students, and will be looked at again. If we expand our two professionally-focused programs, there will be more incoming funding. The department plans to work with the Faculty of Science on the possibility of new scholarships for our graduate students by using some the funding generated.
Recommendation 7 That the Office of the Vice-President encourage and support the faculty members of the Department to prepare and submit applications to funding agencies such as NSERC and MITACS. In addition, it is recommended that the Faculty of Science takes a leading role in assisting the faculty members of the Department to establish research partnerships with private and public sector organizations.			Computer Science is very proud of the research performance of its faculty, and research productivity by various metrics has improved significantly over the past 5 years. The university's NSERC cohort program has allowed new members to be successful in their NSERC discovery grant applications, and has allowed some long-time members to re-establish themselves on the NSERC roles. CS faculty members have also been successful in several NSERC Alliance and MITACS grants over the past few years. The Faculty of Science has worked closely with the Department of Computer Science to build several industry funding opportunities, including several industry-funded post-doctoral fellows as well as an industry-funded research chair.	
Recommendation 8 That the Department of Computer Science establish an Awards committee (or individual) whose responsibility is to nominate or arrange for nominations of faculty members for University, national, and international awards.			This has been done. Administration roles were rebalanced in 2020 to address this somewhat. The department has 1000 declared majors and 16 faculty members. Each faculty member already has an abnormally high administration load. Adding more administrative roles is a challenge.	
Recommendation 9 That the Faculty of Science and the Department of Computer Science explore			As enrolments continued to grow through 2019, standard class sizes were established to prevent unconstrained class size growth. All graduate courses had very high enrolment over the last 5 years, and the class sizes were restricted to 20 graduate students in 2020 in order to help balance	With the new professionally-focused M.Sc. programs, it may be necessary to revisit this recommendation again in the near future.

establishing a policy for teaching load differentiation that takes into account the levels of graduate student supervision and administration of major research grants.			teaching load. Computer Science has recently instituted "course architects." Faculty members are responsible for individual courses often taught by sessionals. The course architect oversees the curriculum and content for the courses, ensuring some level of teaching quality from offering to offering and sessional to sessional. This additional teaching-focused administrative role applies to all faculty members and is not compensated. This is another example of the increased administrative load on the department when there are so many students and so few professors.	
Recommendation 10 That the Department of Computer Science be granted the permission to hire a tenure- track faculty member in the upcoming 2017 – 2018 hiring season.			This has been done, and we hired an excellent assistant professor.	
Recommendation 11 That the Department's operating budget be increased to reflect the level of activity and student enrollment in the Department.			The department continues to operate over budget. The department's budget is spent almost entirely on TA support for classes.	

Appendix A: Comparison of Software Systems Engineering and Computer Science

As the newest accredited engineering discipline in Canada, Software Engineering is primarily the application of engineering principles to the design and development of software systems. Software Systems Engineering at the University of Regina provides an undergraduate education that includes fundamental concepts from both Electronic Systems Engineering and Computer Science with a focus on the design, implementation and maintenance of software systems. Software Engineering is a disciplined and systematic approach to software development that includes the engineering, programming and management skills required to lead software development teams in the creation of software systems that meet development schedules, design requirements and software quality standards. Graduates of the Software Systems Engineering program earn a Bachelor of Applied Science (B.A.Sc.) in Software Systems Engineering. The program is accredited by the Canadian Engineering Accreditation Board (CEAB) which enables graduates to register with any engineering provincial regulator and work towards obtaining the lawful status of Professional Engineer (P.Eng.).

- Craig Gelowitz, Program Chair, Software Systems Engineering

Computer Science is a long-standing discipline of academic study which addresses the fundamental mathematical and scientific principles behind the design, operation, application and implementation of computational processes and computing machinery. Computer Science explores theoretical topics like algorithms, information, and computation; implementation topics like hardware architecture, operating systems and networks; and applications like game design, artificial intelligence, and data science. Computer Science at the University of Regina is a broad exploration of mathematical and computational topics which provide a foundational background for a growing variety of real-world careers and

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academic pursuits. Computer Scientists are in high demand, being employed in all industries to solve modern information-based problems, or starting companies to create products and services that were previously unimagined. Computer Scientists work in interdisciplinary teams to bring computational thinking to bear on economic, industrial, social and scientific problems. Graduates of the Department of Computer Science earn a Bachelor of Science (B.Sc) in Computer Science or Software Systems Development, with areas of concentration that include Business or Creative Technologies; as well as a combined major in Computer Science and Mathematics, with a new program in Data Science currently in development. The department is accredited by the Canadian Information Processing Society (CIPS) and is the longest continually accredited Computer Science program in Canada.

- David Gerhard, Department Head, Computer Science

	Year 6	Year 7	Year 8	Year 9	Year 10	**Goal**
U of R Strategic Plan 1						
Goal A						
Goal B						
Goal C						
Goal D						
U of R Strategic Plan 2						
Goal A						
Goal B						
Goal C						
Goal D						
Goal E						
External Review Report						
Recommendation A						
Recommendation B						
Recommendation C						
Recommendation D						
Recommendation E						
Recommendation F						
Recommendation G						
Recommendation H						