

Computer Science

Graduate and Undergraduate Review

Year 3 (2022) - FAR Implementation Report

(reviewed 2018/19)

Recommendation #1

The de facto admission average needs to be raised to 80%.

ARC Disposition of the Recommendation

ARC considers the recommendation to be not accepted. The de facto admission average is not under the sole control of the Department and cannot be set at a certain level in contradiction to provisions in the Faculty Handbook or university enrolment targets. ARC encourages the Department to investigate other measures (such as 2nd year entry) to address concerns of competitiveness and student quality as well as retention and student success.

Implementation Plan

Recommendation not accepted.

Comments 2020:

Although raising the student minimal entrance average would be detrimental to intake numbers (although it would improve retention rates), another option we are discussing is to require 2 high school mathematics credits for students entering any COSC Honours degrees (Honours, Honours Co-op, etc.). We would retain the current 1 HS mathematics requirement for students entering the 4-year with major program. This would better prepare Honours students for the mathematics requirements of the program.

Recommendation #2

Infusion of PLO 3b across program courses

ARC Disposition of the Recommendation

ARC considers the recommendation to be accepted and in the process of implementation. The Committee believes the Department is best-positioned to determine how to incorporate PLO 3b across program courses.

Implementation Plan (2nd Priority)

Responsible for approving:	Department
Responsible for resources:	Department
Responsible for implementation:	Department
Timeline:	Dean of Mathematics and Science to report by the end of academic year 2020/21

Actions	Responsibility	Year One*	Year Two	Year Three
Action #1 Identify appropriate technologies and resources appropriate to the goals studied in various artificial intelligence courses (and others).	Department	T	T	C

Comments 2020:

The ultimate responsibility for course content is the instructor. As new faculty join the department, new courses will be introduced, and appropriate technologies and resources will be considered and used when deemed appropriate, at the discretion of the instructor.

Comments 2021:

This recommendation is progressing. The department plans to hire two new faculty members in 2021. One faculty member has been nominated as a CRC Tier II in Bioinformatics/ Computational Biology (joint position with the Dept. of Biological Sciences). With these new positions, new advanced courses in the undergraduate and graduate program will arise. Naturally, new courses will address new technologies and resources in AI and other domains.

Comments 2022:

Since 2021, three new tenure-track hires have joined the Department. All three have research areas that may involve AI technologies in various extents. Furthermore, our CRC Tier II appointment is imminent (Spring 2022), and a new hire for January 2023 has been approved, which might involve AI. Therefore, we are very satisfied with the diversity of AI technology that is enriching our curriculum, now and into the future.

Recommendation #3

Inclusion of a required “Communication Skills for the Computer Scientist” workshop course

ARC Disposition of the Recommendation

ARC considers the recommendation to be accepted for consideration. The Committee believes the Department is best-positioned to determine how to incorporate communication skills into the curriculum, in conjunction with relevant campus resources.

Implementation Plan (2nd Priority)

Responsible for approving:	Department
Responsible for resources:	Department
Responsible for implementation:	Department
Timeline:	Dean of Mathematics and Science to report by the end of academic year 2020/21

Actions	Responsibility	Year One*	Year Two	Year Three
Action #1 The department will discuss this item at the next department retreat, tentatively planned sometime during 2020-21.	Department	D	T	C

Comments 2020:

The department is planning a department retreat during 2020-21, to discuss this and other matters, including curriculum revision. We have been waiting for additional new faculty to be hired, who will introduce fresh perspectives and ideas.

Note: Due to COVID-19 mitigation measures, this action item has been delayed, due to prohibition of group meetings, as well as postponement of faculty searches. Once meetings are allowed again and faculty interviews resume, this action item will proceed.

Comments 2021:

Although a department retreat is still unscheduled due to COVID-19 lockdown, the department discussed this item at a department meeting. In the future, a dedicated course in writing, communication, and presentation skills will be considered. In the meantime, two alternative ideas will be investigated. (i) A-to-Z Learning will be contacted to see if they can design one or two workshops for our students. Topics may include presentation skills and technical writing. (ii) A course WRDS 2P14 (COMM 2P14) was once available for students. Although it hasn't been offered since 2019, we will contact the home units to see whether reviving this course might be possible.

Comments 2022:

The ongoing pandemic continued to make a proper department retreat difficult during 2021/22. Also, as explained below, it is no longer necessary for us to contact A-to-Z Learning to discuss workshops, and we are no longer investigating WRDS 2P14 (COMM 2P14). We have changed our tactics on this item.

In 2021, a faculty member created a new 4-hour Scientific Communication Workshop. It was open to participation by year 4 undergraduates and graduate students in computer science. Various topics involving communication skills were presented, including academic writing, grant proposals for students, and the structure of scientific papers. A total of 20 students attended, which included almost all our graduate students, and a number of interested senior undergraduates. By all accounts, it was a great success. The plan is to offer this workshop annually, and possibly biannually - one workshop for computer science students, and another for graduate students from all departments in the Faculty of Mathematics & Science. New topics are planned, for example, presentation skills.

This workshop is an excellent resource for students, and it is the best way to address this recommendation. A voluntary workshop is preferable to a mandatory one. Students who are interested in the topic will attend, and we do not have to keep records of attendance that would be necessary for a mandatory course (which would be extra-curricular in any case, as we do not want to change our curriculum). Finally, many of our upper-year undergraduate and graduate courses have class seminars, and thus communication skills are intrinsic to our program. Brock's Career Zone and A-to-Z Learning have many special presentations and workshops throughout the year. Therefore, there are ample opportunities for students to improve their communication skills during their studies in our program, if they are willing to use the many opportunities available to them.

Recommendation #4

Hiring of new faculty members.

ARC Disposition of the Recommendation

ARC considers the recommendation to be not accepted as it lies outside of the Committee's jurisdiction. The Committee expects that the Department will proceed through normal channels of advocacy for these faculty resources.

Implementation Plan

Recommendation not accepted.

Recommendation #5

Renovation of the department's teaching lab space, equipment, and software.

ARC Disposition of the Recommendation

ARC recognizes the necessity of ongoing renovation of lab space, equipment and software, however the Committee considers the recommendation to be not accepted as it lies outside of its jurisdiction. The Committee expects that the Department will proceed through normal channels of advocacy for these resources.

Implementation Plan

Recommendation not accepted.

Comments 2020:

A Facilities Management committee approved \$25,000 per lab for cosmetic renovations of two of our undergraduate labs (J301, J310). The Dean has offered to top up the funding as well. Although more significant renovations are necessary, this help is appreciated. All the hardware in all our labs will be replaced in 2020, thanks to funding by the Dean and the Office of Research Service (for research and graduate hardware).

Comments 2021:

Although hardware purchases were frozen in 2020, we are resuming purchase of hardware for teaching and research. Our Dean has been very supportive of this effort, and has

contributed additional funds for the purchase of GPU computing hardware, as requested in the external review report for the PhD in Intelligent Systems and Data Science.

Comments 2022:

The Dean has continued with his generous support of the Department's computing needs. In 2022, a total of \$135,000 has been earmarked for the Department, which will permit us to: (i) Replace all the workstations in our J301 and J310 computing labs; (ii) purchase a few administrative computer servers; and (iii) purchase teaching hardware for high-speed GPU computing. The Department is in excellent shape with respect to its computing hardware for the coming years.

It must be mentioned that the Department investigated the renovation of its J301 and J310 computing labs during 2020/21. These labs have not been updated since the J-block was built in the mid-1990's, and are thus very dated in terms of layout, furnishings and appearance. Unfortunately, the University's Capital Planning and Project Management Office informed us that funding to renovate these labs would not be forthcoming for at least 9 years. This is very disappointing, and we hope that these labs will be renovated much sooner, given the importance of contemporary computing facilities in a computer science program. Antiquated 30-plus year old labs are not attractive selling points for Computer Science at Brock.

Recommendation #6

Development of a comprehensive plan for graduate training, research, and funding opportunities.

ARC Disposition of the Recommendation

ARC considers the recommendation to be accepted and in the process of implementation.

Implementation Plan (1st Priority)

Responsible for approving:	Department
Responsible for resources:	Department
Responsible for implementation:	Department
Timeline:	Dean of Mathematics and Science to report by the end of academic year 2019/20

Actions	Responsibility	Year One*	Year Two	Year Three
Action #1 The department will hold a retreat to fully consider this recommendation.	Department	D	D	D

Action #2 The department's plan for a future Centre of Intelligent Systems will be a means for supporting graduate training, research, and funding opportunities.	Department	T	T	O
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Comments 2020:

As with Recommendation #3, the department will discuss this item at a planned department retreat. The addition of newly hired faculty will help to infuse new ideas to possibly address this item. The Centre of Intelligent Systems will also help propel this initiative.

Note: Due to COVID-19 mitigation measures, this action item has been delayed, due to prohibition of group meetings, as well as postponement of faculty searches. Once meetings are allowed again and faculty interviews resume, this action item will proceed.

Comments 2021:

The department's proposal for a PhD in Intelligent Systems and Data Science (jointly with the Dept of Mathematics and Statistics) is about to be submitted to ARC. Together with new faculty hires, a new CRC, and a future Centre of Intelligent Systems, graduate research is growing, and this recommendation will advance further.

Comments 2022:

As mentioned in Recommendation #3, the pandemic continues to make a proper department retreat difficult. Hence discussions have carried on in committee and department meetings.

In Spring 2021, the Quality Council approved the PhD in Intelligent Systems and Data Science (jointly offered with the Department of Mathematics and Statistics). In February 2022, final budgetary approval was given for the program, and plans are to start the degree in Winter 2023. With our recent hires over the past few years, new research grants are being obtained, and funding and training of graduate students is growing. In the coming year, the Department will begin planning a Centre of Intelligent Systems. Thus we are very excited by the forward momentum of our Department's graduate programs and funding opportunities, and we expect this will increase in the coming years.

Recommendation #7

Highlighting the strategic importance of Computer Science.

ARC Disposition of the Recommendation

ARC considers the recommendation to be accepted and in the process of implementation. The Committee also recognizes the reviewers' recommendation in the contextual comments, to develop a long-term plan for faculty renewal. The Committee understands that advocacy for future faculty resources will need to proceed through normal channels.

Implementation Plan (1st Priority)

Responsible for approving:	Department
Responsible for resources:	Department
Responsible for implementation:	Department
Timeline:	Dean of Mathematics and Science to report by the end of academic year 2019/20.

Actions	Responsibility	Year One*	Year Two	Year Three
<p>Action #1</p> <p>The department successfully promotes our undergraduate programs at institutional and regional university fairs (OUF). Our intake of domestic and international students into our programs continues to grow. Interest in our MSc program also continues to be strong, especially amongst international applicants.</p>	Department	T	T	O
<p>Action #2</p> <p>The department continues to prepare for the new BSc in Data Science and Analytics program (jointly offered with Mathematics & Statistics, and Fac of Business). Progress in the joint PhD in Intelligent Systems and Data Science is also progressing. Both initiatives have the full support of the Dean.</p>	Department	T	T	O
<p>Action #3</p> <p>The department is planning the creation of a Centre of Intelligent Systems. Detailed planning will commence once the PhD proposal has been approved by ARC. The Centre will be a means for promoting the department's research, and the department's strategic importance to Brock.</p>	Department	T	T	O

Comments 2020:

The department is pleased to report that the Dean's office, as well as Research Office, have contributed funds to overhaul our computer hardware resources. Our undergraduate labs, graduate computing workstations, research cluster, and data storage, will be replaced by the end of Summer 2020. We greatly appreciate that the administration have recognized the strategic importance of computer science in this way.

Comments 2021:

Many recent developments are evidence of the strategic importance of computer science in the university. Two new faculty will be hired in 2021. A CRC position will be finalized in the near future (the candidate is a current department member, Y. Li). New programs such as the BSc in Data Science and Analytics, and PhD in Intelligent Systems and Data Science, are in advanced stages of submission. Faculty will be involved in the new engineering initiative in future years. A Centre of Intelligent Systems is planned. Student intake in the BSc

programs are healthy and should grow post-pandemic. Our MSc application numbers are higher than they've ever been (165 applications for Fall 2021).

Comments 2022:

In many respects, the University has strongly acknowledged the strategic importance of computer science during the past year. Besides 3 new tenure-track hires in 2021 (2 in Computer Science, and 1 cross-appointed with Engineering), a new tenure-track hire has been approved for 2022. The PhD in Intelligent Systems and Data Science has been given final approval, and we plan to start it in Winter 2023. The Dean has generously supported the resource needs of the department (see point #5).

Unfortunately, as discussed in Recommendation #5 (2022 comments), not all administrative offices at Brock acknowledge the strategic importance of computer science, and we must continue to use obsolete 30-year old computer labs for the next decade.

The Department is also struggling to protect its research space, which we use to support our graduate students and faculty research. This space was originally designated as faculty research lab space when we moved into the Mackenzie Chown J-Block in the 1990's, and we have always treated it as such. However, the space management office at Brock has redesignated it as "office space", despite our repeated objections. If we lose this research space, then the Department has been completely stripped of its research space -- which is an unfortunate and clear example of how the strategic importance of research in the Computer Science Department is not being recognized. This comes at a time when our PhD is about to begin. The Ph.D. proposal, which was approved by the Quality Council, had designated this space as a resource for the program.

In summary, this recommendation has been addressed as far as the Department can take it. We are hopeful that the strategic importance of computer science - both in teaching and research - will be recognized by all relevant parties at the University, given the ever-increasing interest of students in our undergraduate and graduate programs. We will continue to fight to retain our current research space and resources.

Recommendation #8

Grow the Department's graduate program.

ARC Disposition of the Recommendation

ARC considers the recommendation be accepted and in the process of implementation. The Committee recognizes that a Program Proposal Brief for a new PhD program is in the final stages of development.

Implementation Plan (1st Priority)

Responsible for approving:	Department
Responsible for resources:	Department
Responsible for implementation:	Department
Timeline:	Dean of Mathematics and Science to report by the end of academic year 2019/20

Actions	Responsibility	Year One*	Year Two	Year Three
Action #1 Two new faculty have joined the department in January 2020, and both members are research active and are admitting new MSc students. New hires, including a CRC Tier II, are expected in 2020-21. All these hires will result in growth to the existing graduate program.	Department	T	T	C
Action #2 The PhD in Intelligent Systems and Data Science (jointly with Dept of Mathematics and Statistics) is nearing submission to ARC.	Department	T	T	C
Action #3 A planned Centre of Intelligent Systems will help promote the graduate programs (see items #6 and #7)	Department	T	T	O

Comments 2020:

Above action items are self-explanatory.

Comments 2021:

Recent events have promoted the graduate program, and future events will continue to do so. Two new hires are planned for 2021. A CRC Tier II in Bioinformatics/Computational Biology has been nominated (Y. Li), which should be finalized in the near future. The PhD in Intelligent Systems and Data Science received strong support from external reviewers, and submission of the final proposal to ARC is imminent.

Some constraints to the growth of the graduate program have been identified, most notably, limited funding stipends from Graduate Studies, as well as decreasing office space for graduate students. With more faculty and a new PhD program, both these items will need to be addressed in the near future.

Comments 2022:

The PhD in Intelligent Systems and Data Science is poised to begin in Winter 2023, as final budgetary approval was obtained in February 2022. Our newest 5 hires over the past 2 years are supervising graduate students, and future hires will continue this trend. As of February 2022, we have over 200 applications for our MSc program, which is a record number. The total number of MSc students currently registered in our program is the highest it has ever been. By all measures, our graduate program is growing, and will continue to do so.

Unfortunately, our current research space that we have earmarked for the Ph.D. in Intelligent Systems and Data Science program is under sustained threat. There is strong and continued pressure to convert these labs into faculty office space, even though the approved

Ph.D. proposal clearly assigns this space as Ph.D. research space. If our graduate program is to grow, then the department's research resources that support our graduate research cannot be taken away from us.

Recommendation #9

CIPS accreditation.

ARC Disposition of the Recommendation

ARC considers the recommendation to be accepted for consideration.

Implementation Plan (3rd Priority)

Responsible for approving: Department
 Responsible for resources: Department
 Responsible for implementation: Department
 Timeline: Dean of Mathematics and Science to report by the end of academic year 2021/22.

Actions	Responsibility	Year One*	Year Two	Year Three
Action #1 Discussion of curriculum revisions will be an item of discussion at future department retreat.	Department	D	C	

Comments 2020:

Action item is self-explanatory.

Note: Due to COVID-19 mitigation measures, this action item has been as well as postponement of faculty searches. Once meetings are allowed again, this action item will proceed.

Comments 2021:

The department discussed this issue at a department meeting. The feeling is that we should not consider CIPS accreditation further at this time. Some factors behind this decision include a lack of resources (especially faculty numbers), and the potential loss of flexibility in our undergraduate curriculum that would arise with CIPS accreditation.

Comments 2022:

The 2021 comments are the final response to this recommendation.

Recommendation #10

Intra-department collaborations.

ARC Disposition of the Recommendation

ARC understands the recommendation to be referring to “inter” departmental collaborations from the context provided in the Reviewers’ Report. The Committee considers the recommendation to be accepted and in the process of implementation. To an extent, this is already current practice as described by the Department in its response.

Implementation Plan (1st Priority)

Responsible for approving: Department
 Responsible for resources: Department
 Responsible for implementation: Department
 Timeline: Dean of Mathematics and Science to report by the end of academic year 2019/20.

Actions	Responsibility	Year One*	Year Two	Year Three
Action #1 New and future hires (including CRC Tier II with Dept of Biological Sciences) will encourage interdepartmental collaboration.	Department	T	T	C
Action #2 Future Centre of Intelligent Systems will further promote collaborative research with other departments.	Department	T	T	O

Comments 2020:

As new faculty join the department, the chances of collaborative ties improve. The CRC Tier II with BIOL will further strengthen existing collaboration between Computer Science and Biological Sciences in bioinformatics research. Collaboration is an academic freedom issue, and hence is always at the discretion of individual faculty members.

Comments 2021:

With our new CRC in the future, collaboration with the Dept. of Biological Sciences will be boosted. Our new hires, past and present, also increase the possibility of inter-department collaboration. The new PhD in Intelligent Systems and Data Science, as well as BSc in Data Science and Analytics, will promote collaboration between the departments of computer science and mathematics & statistics. A future Centre of Intelligent Systems will also promote collaboration.

Comments 2022:

The CRC Tier II (with Biological Sciences) is expected to start in Spring 2022. Our new hires, as well as those in coming years, will increase the possibilities of inter-department collaboration. The new PhD in Intelligent Systems and Data Science has been given final budgetary approval, and is poised to commence. Planning is proceeding for a Centre of Intelligent Systems. All these factors improve the likelihood of inter-department research collaboration.

In summary, the research environment continues to promote inter-department collaboration between Computer Science and other departments at Brock. Research collaboration is ultimately the personal decision of individual faculty. When collaboration is beneficial to a faculty member's research program, then it can be pursued if desired.