Implementation Report for the 2019-2020 Cyclical Review of Physics and Computer Science

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INTRODUCTION

This is the first implementation report for the cyclical review of the undergraduate and graduate programs in the Department of Physics and Computer Science that took place in 2019-2020. The full language for each recommendation from the External Reviewers' Report has been included, along with the corresponding information about implementation from the Final Assessment Report. For each recommendation, the unit has provided an update on the progress or action made toward the implementation of that recommendation, followed by comments from the relevant dean(s) and the Program Review Sub-Committee. Taking into account the updates provided by the unit and the comments from the dean(s), the Program Review Sub-Committee will review the report and determine if all recommendations have been implemented satisfactorily or if a subsequent report will be required.

RECOMMENDATIONS PRIORITIZED FOR IMPLEMENTATION IN FINAL ASSESSMENT REPORT

Full Recommendation from External Reviewers' Report: Recommendation #1: The general undergraduate Computer Science program could benefit from a professional accreditation review by the Computer Science Accreditation Council (www.cips.ca/accreditation). The approach uses an outcomes-based model and would facilitate a curriculum review and potentially motivate careful consideration of the goals of each of the programs being offered by the Department.
This recommendation was not prioritized in the Final Assessment Report.

Full Recommendation from External Reviewers' Report: With a six-fold increase in enrolment over the past five years, and relatively constant faculty resources, managing enrolment growth, probably by enforcing higher admission cut-offs for Computer Science programs is advisable.			
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**
Recommendation #2: With a six-fold increase in enrolment over the past five	Department, Office of the Dean of	n/a	September 2021

years, and relatively constant faculty resources, managing enrolment growth, probably by enforcing higher admission cut-offs for Computer Science programs is advisable.	Science, Recruitment and Admissions		

Unit Update: The department does not set the admission cut-offs; these are determined centrally by an institutional Strategic Enrolment Management Committee. The department would, however, support an increase in the admission cut-offs for undergraduate students in the Computer Science programs as one mechanism for maintaining overall enrolment numbers and program quality. We note that in the last two years, the department has hired two new lab instructors and four new faculty positions to support the overall enrolment increases in the Computer Science programs.

Science Decanal Comments: There is no doubt that the Department needs the University's help to manage its program's registrations. To that end, the cut-off average for admissions to its programs for the 2023-24 academic year was raised by 6 points. Also, to assist with the teaching of the increased class sizes, two new faculty positions were approved by the Provost and VPA for filling as soon as possible – likely January '24 starts. We are committed to monitoring the situation with registrations in the Computer Science programs to ensure a sustainable workload for the Department.

Program Review Sub-Committee Comments: The comments provided by both the Department and the Dean suggest that this recommendation has been addressed for the coming academic year, and that the broader issue of balancing enrolment growth and faculty resources for the Department is being monitored. No further updates on this recommendation are required.

Full Recommendation from External Reviewers' Report: The range of programs is extremely broad with nearly 11 different distinct undergraduate Computer Science degree forms. Although these are being delivered, there is overhead associated with operating this diversity and this requires administrative overhead (i.e., curriculum updates, calendar updates, student advising, scheduling challenges, sessional expertise, etc.). Additional support could be provided to support this diversity or a new structure could be developed to allow students to explore diverse interests without identifying unique degree forms.				
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**	**Additional Notes**
Recommendation #3: The range of programs is extremely broad with nearly 11 different distinct undergraduate Computer Science degree forms. Although these are being delivered, there is overhead associated with operating this diversity and this requires administrative overhead (i.e.,	Departmental and Faculty curriculum committees	n/a	August 2022	Integrated planning will help address this recommendation

curriculum updates, calendar updates, student advising, scheduling challenges, sessional expertise, *etc.*). Additional support could be provided to support this diversity or a new structure could be developed to allow students to explore diverse interests without identifying unique degree forms.				

Unit Update: The department sees the value in the current suite of Computer Science program options offered to undergraduate students and has not reduced its program complement since the cyclical program review. Since the cyclical program review took place, some of the student advising activities have been moved to the Dean of Science office, reducing the advising responsibilities on the department and undergraduate advisor. This recommendation is also related to Recommendation #8, and in this respect, the department has hired a second Administrative Assistant to help with the graduate programs. With these changes, the department feels that at present, the current complement of undergraduate program offerings is sustainable.

Science Decanal Comments: I recognize and applaud the efforts of the Department in their management of their programs while experiencing significant increases in student registrations. As noted by the Chair, and in the Dean's comment above, the Faculty is committed to providing sufficient supports with respect to staff and faculty member complement to ensure sustainable workloads. In this regard, the Science Advising office will be enhancing its operations to help reduce the workload of the current Undergraduate Program Advisor, and we are exploring the possibility of supporting a second such position. As noted above, the Faculty will be monitoring closely the developments within the Department and its programs.

Program Review Sub-Committee Comments: Both the Department and the Dean have suggested that the current complement of Computer Science programs being offered is appropriate, and that they are not interested in further consolidation of programs at this time. The committee is happy to hear that additional staff and faculty resources have been provided to the Department to support the enrolment growth its programs are experiencing. No further updates on this recommendation are required.

Full Recommendation from External Reviewers' Report: Course offerings should be produced, announced, and adhered to at least one academic year in advance as apparently required by Laurier. Note: This does not require teaching assignments but rather a commitment to the term in which the course will be offered to allow for students to plan their program. Both graduate and undergraduate students expressed concerns that courses appear to be available, but there is ultimately a much more limited offering available.			
Recommendation to be Implemented (from Final Assessment Report)	Responsibility for Implementation	Responsibility for Resourcing (if applicable)	Anticipated Completion Date

Recommendation #4: Course offerings should be produced, announced, and adhered to at least one academic year in advance as apparently required by Laurier. Note: This does not require teaching assignments but rather a commitment to the term in which the course will be offered to allow for students to plan their program. Both graduate and undergraduate students expressed concerns that courses appear to be available, but there is ultimately a much more limited offering available.	Department, Office of the Dean of Science	n/a	August 2021

Unit Update: The department has adopted some new communication practices with students since the cyclical program review to respond to this recommendation. The department communicates with students about the courses that will be offered in the current year when they are accepted into the program. Program websites have also been revised to identify only the courses that the department is planning to offer. We consider this recommendation to be completed.

Science Decanal Comments: This recommendation has indeed been addressed appropriately. Nonetheless, efforts will be made over the Fall'23 term to modify and update all FoS websites.

FGPS Decanal Comments: Assuming the Unit response includes graduate-level courses, then the recommendation has been addressed. FGPS Communications Coordinator, Jessica Hunt (jeshunt@wlu.ca), can assist with updates to graduate program websites.

Program Review Sub-Committee Comments: Based on the comments provided, this recommendation has been completed and no further updates on it will be necessary.

Full Recommendation from External Reviewers' Report: Offering a single set of Physics labs rather than differentiating them between calculus and non-calculus streams would decrease the support needed for the lab program allowing resources to be allocated elsewhere.			
Recommendation to be Implemented (from Final Assessment Report)	Responsibility for Implementation	Responsibility for Resourcing (if applicable)	Anticipated Completion Date
Recommendation #5: Offering a single set of Physics labs rather than differentiating them between calculus and non-calculus streams would decrease the support needed for the lab program allowing resources to be allocated elsewhere.	Department	n/a	August 2021

Unit Update: The department considered and discussed, but eventually decided not to implement this recommendation. There was much concern that a single set of Physics lab would increase the failure rate of students. The intent of this recommendation was to free up departmental resources, but for now, the department has the resources to continue offering the two differentiated sets of Physics labs. The calculus-based labs are intended for Physics majors and students with a strong Mathematics background. The non-calculus based labs are intended for non-majors. Over the years, these labs/courses have become very popular, with enrolments reaching 200 students. The department has also reduced the number of 400-level Physics courses with labs that it offers, which has also reduced the overall resources required to run the Physics labs.

Science Decanal Comments: I accept the position of the Department to not implement this recommendation, with the understanding that the issue will be monitored over the next couple of academic years.

Program Review Sub-Committee Comments: The committee acknowledges that while all of the review committee's recommendations should be given serious consideration, ultimately, it is not always in the best interest of the Department to implement all of them. Since there is agreement between the Department and the Dean not to implement this recommendation, no further reporting on it is required.

Full Recommendation from External Reviewers' Report: A complete Computer Science curriculum update is necessary, including the goal of understanding how defined learning outcomes are assessed both within courses and across the program. This could be undertaken in conjunction with an accreditation review and should be done primarily by full-time tenure-track faculty members. This can only be meaningfully achieved if sufficient time is made available for them to do this work and adequate administrative support is provided to allow it to be done cost effectively.			
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**
Recommendation #7: A complete Computer Science curriculum update is necessary, including the goal of understanding how defined learning outcomes are assessed both within courses and across the program. This could be undertaken in conjunction with an accreditation review and should be done primarily by full-time tenure-track faculty members. This can only be meaningfully achieved if sufficient time is made available for them to do this work and adequate administrative support is provided to allow it to be done cost effectively.	Department	n/a	August 2022

Unit Update: The department recognizes the importance of this recommendation and plans to conduct a review

of its Computer Science curriculum in advance of the department's next cyclical review. With the everchanging priorities of the pandemic, this recommendation was a challenging one to implement over the past couple of years. This curriculum review will be undertaken in stages and involve the department's Curriculum Committee. The curriculum review will involve examining and updating program learning outcomes, creating a curriculum map for the program, and soliciting student feedback on their experience with the current Computer Science curriculum. The department will also use the Association for Computing Machinery's curriculum recommendations as a resource for its curriculum review. It is anticipated that this recommendation will be completed by 2025.

Science Decanal Comments: There is no doubt that the Department has been very busy addressing immediate issues and concerns regarding the delivery of their programs, and so the timeline proposed for the adoption of the recommendation is appropriate and accepted.

Program Review Sub-Committee Comments: The committee supports the importance of this recommendation and is pleased to see that the Department has made more concrete plans to conduct a review of its Computer Science program curriculum in advance of its next cyclical review. The committee recommends that the Department complete this work on the timeline proposed, aiming to complete it by 2025. Support for this work is available through the Quality Assurance Office, who would be pleased to help facilitate the curriculum review processes recommended by the review committee. No further reporting on this recommendation is required.

Full Recommendation from External Reviewers' Report: Administrative support in the Department is currently minimal and probably insufficient. There is very little meaningful backup and much of this work is currently being done by much more highly paid administrators and faculty members, which undoubtedly impacts on their potential effectiveness. The Department needs a second administrative support person both due to the current workload and for meaningful backup.			
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**
Recommendation #8: Administrative support in the Department is currently minimal and probably insufficient. There is very little meaningful backup and much of this work is currently being done by much more highly paid administrators and faculty members, which undoubtedly impacts on their potential effectiveness. The Department needs a second administrative support person both due to the current workload and for meaningful backup.	Office of the Dean of Science	Office of the Dean of Science	

Unit Update: We are pleased to say that this recommendation has been completed and that a second

Administrative Assistant has been hired. This new staff position handles all matters related to our graduate programs.

Science Decanal Comments: Recommendation accepted and no further action required.

Program Review Sub-Committee Comments: The committee is happy to hear that the Department has been able to complete its administrative staff, thus completing this recommendation.

Full Recommendation from External Reviewers' Report: The faculty complement is highly supplemented by sessional instructors. Concerns about this approach are detailed in the report but given the expanding graduate program, the desire to become a comprehensive research university/department, and a substantially growing undergraduate body, it is critical that additional faculty be recruited. Failure to do so may cause current faculty to become a target for recruitment and if these are successful, the problem will only be exacerbated in a negative cycle.			
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**
Recommendation #9: The faculty complement is highly supplemented by sessional instructors. Concerns about this approach are detailed in the report but given the expanding graduate program, the desire to become a comprehensive research university/department, and a substantially growing undergraduate body, it is critical that additional faculty be recruited. Failure to do so may cause current faculty to become a target for recruitment and if these are successful, the problem will only be exacerbated in a negative cycle.	Dean of Science	Faculty of Science, Office of the Provost and Vice-President: Academic	July 1, 2022

Unit Update: The department understands the importance of this recommendation for maintaining the quality of its academic programs, especially in light of overall enrolment increases. Since the cyclical program review took place, there has been a net new four full-time faculty members hired into the department. This includes two replacements for retired faculty members in 2022, and four new faculty members, two hired in 2021, and another two that the department has been authorized to hire for July 1, 2023. These new faculty members provide support to the graduate programs, and also teach specialized undergraduate computer science courses. The department is encouraged by both the faculty and university-level commitment to hiring additional faculty to support the growth of its academic programs.

Science Decanal Comments: Again as stated above, attention is being paid to the delivery of the programs with the aim to maintain and assure quality. Given plans to increase program delivery in both Brantford and Milton, the issue of faculty complement will continue to be monitored and addressed appropriately.

Program Review Sub-Committee Comments: The committee is happy to hear that the intent of this recommendation has been addressed through the addition of several new faculty members since the cyclical program review took place, and that the issue of sufficient resourcing is being monitored by the Office of the Dean of Science. No further reporting on this recommendation is required.

Full Recommendation from External Reviewers' Report: Many research active faculty members receive external funding and the Department has recently brought some new young researchers on board. However, the success rate with external funding has decreased over time and based on comments from both faculty and administrators, we believe a mentoring program to assist faculty members in how to best present undergraduate HQP in NSERC applications would be beneficial. This could be done by recruiting more senior successful researchers or by finding innovative ways to draw on expertise from other schools in the area.				
Recommendation to be Implemented (from Final Assessment Report)	Responsibility for Implementation	Responsibility for Resourcing (if applicable)	Anticipated Completion Date	Additional Notes
Recommendation #10: Many research active faculty members receive external funding and the Department has recently brought some new young researchers on board. However, the success rate with external funding has decreased over time and based on comments from both faculty and administrators, we believe a mentoring program to assist faculty members in how to best present undergraduate HQP in NSERC applications would be beneficial. This could be done by recruiting more senior successful researchers or by finding innovative ways to draw on expertise from other schools in the area.	Department, Office of the Dean of Science	n/a	August 2022	To coincide with the planned restructuring of the Office of the Dean of Science

Unit Update: Beginning in September 2022, the department began a new practice of assigning a senior faculty member to serve as mentor for each new hire. The mentors help new faculty to navigate the process of supervising graduate students and applying for grants. We believe that this initiative satisfies the intent of this recommendation.

Science Decanal Comments: The Department has taken immediate and appropriate steps to address this issue. In addition, with the newly established position of Associate Dean, Research and Graduate Studies, the Dean's Office will be formalizing processes aimed at increasing research activity both within the Department and across the Faculty of Science.

FGPS Decanal Comments: This is an excellent initiative. FGPS has recently developed online resources that are relevant to this recommendation. These include: 'Best Practices in Faculty Membership', a comprehensive module available for faculty on MyLS, and the checklist 'Graduate Student – Advisor Resource for Discussing Important Topics and Setting Mutual Expectations':
https://lauriercloud.sharepoint.com/:w:/r/sites/faculty-of-graduate-and-postdoctoral-studies/_layouts/15/Doc.aspx?sourcedoc=%7BF327EC66-B925-4942-989D-395F505897F9%7D&file=Student-Advisor%20Resource.docx&action=default&mobileredirect=true&DefaultItemOpen=1

I also encourage the Unit to advise recent faculty hires to enrol in the Office of Research Faculty Mentorship and Development program:
https://lauriercloud.sharepoint.com/teams/office-of-research-services-initiatives/SitePages/New-Faculty-Mentorship-Program.aspx.

Program Review Sub-Committee Comments: The comments provided suggest that steps have been taking with in the Department to address the intent of this recommendation, and that additional institutional resources have also been developed, which will support its implementation. The Department is encouraged to make new faculty aware of the resources shared by the Dean of the Faculty of Science and the Dean of the Faculty of Graduate and Postdoctoral Studies. No further reporting on this recommendation is required.

Full Recommendation from External Reviewers' Report: A systematic internal grant application review process should be developed and to the greatest extent possible made mandatory. There appear to be some processes in place at Laurier but it is not always followed and/or may not be considered a serious requirement.				
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**	**Additional Notes**
Recommendation #11: A systematic internal grant application review process should be developed and to the greatest extent possible made mandatory. There appear to be some processes in place at Laurier but it is not always followed and/or may not be considered a serious requirement.	Department, Office of the Dean of Science	n/a	August 2022	To coincide with the planned restructuring of the Office of the Dean of Science

Unit Update: We believe that the new Associate Dean for Research within the Faculty of Science has

established an internal review process that aligns with the purpose of this recommendation. The department's faculty mentoring process described in the previous recommendation also contributes to the implementation of this one.

Science Decanal Comments: Indeed, as noted immediately above, the Faculty of Science will be developing and implementing a peer review system for grant applicants to engage and benefit from.

FGPS Decanal Comments: The Office of Research Services may also be able to provide support. Their Faculty Mentorship and Development program typically includes sessions on research grant applications, best practices for grant writing, etc.

Program Review Sub-Committee Comments: It sounds like this recommendation is being addressed at the Faculty and institutional levels, which seems appropriate. The Department should ensure that faculty members are aware of existing processes for the internal review of grant applications. No further reporting on this recommendation is required.

Full Recommendation from External Reviewers' Report: As a part of the curricular review, it is strongly recommended that the use of TA/IA resources should be considered. Both graduate students and faculty members indicate that these resources could be better used and would provide an important part of the overall training of young scholars.			
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**
Recommendation #12: As a part of the curricular review, it is strongly recommended that the use of TA/IA resources should be considered. Both graduate students and faculty members indicate that these resources could be better used and would provide an important part of the overall training of young scholars.	Department	n/a	For September 2021

Unit Update: A review of the courses in which the department currently uses Teaching Assistants and Instructional Assistants, and their responsibilities in these courses, will form part of the curriculum review described in our response to Recommendation #7.

Science Decanal Comments: In addition to the Departmental review, the Faculty of Science will be reviewing the processes involved in assigning GTAships, recognizing that this (like IA assignments) should be aligned more with undergraduate program delivery considerations, and not simply graduate student recruitment.

FGPS Decanal Comments: FGPS supports the approach of the Unit, with the assistance of the Faculty of Science, to address this recommendation.

Program Review Sub-Committee Comments: The review of how Teaching Assistants and Instructional Assistants within the Department are deployed should be considered as part of the unit's broader curriculum review processes discussed in response to Recommendation #7. The Department could consider conducting a survey or focus group of students who have held these roles as one source of data for this element of the curriculum review. As noted in the committee's response to Recommendation #7, no further reporting on this recommendation is required, but the Department is strongly encouraged to follow through with the curriculum review on the timeline suggested in #7.

Full Recommendation from External Reviewers' Report: Mechanisms to recognize success in grant competitions, publications, external awards should be noted and highlighted. This includes career accomplishments but equally importantly finding opportunities to recognize departmental faculty members through internal awards. By establishing an award nomination committee, the faculty members successes can be brought to the attention of various stakeholders at Laurier so the Department's contributions are fully recognized.				
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**	**Additional Notes**
Recommendation #13: Mechanisms to recognize success in grant competitions, publications, external awards should be noted and highlighted. This includes career accomplishments but equally importantly finding opportunities to recognize departmental faculty members through internal awards. By establishing an award nomination committee, the faculty members successes can be brought to the attention of various stakeholders at Laurier so the Department's contributions are fully recognized.	Department	Dean of Science	August 2022	To coincide with the planned restructuring of the Office of the Dean of Science

Unit Update: The department's Appointment and Promotions Committee (DAPC) effectively serves as an award nomination committee and has put forward suggestions for faculty members to nominate for internal awards in the past. We do not believe that further action is required on this recommendation.

Science Decanal Comments: To aid the activity of the DAPC, the Vice Dean (Academic) and Associate Dean (Research and Graduate Studies) will be establishing processes for promoting and encouraging opportunities for such recognitions with teaching and research activities, respectively.

FGPS Decanal Comments: Please contact FGPS Communications Coordinator, Jessica Hunt (jeshunt@wlu.ca), if there is interest in promoting faculty (and graduate student) research accomplishments on program web pages. Certainly this can also help with recruitment.

Program Review Sub-Committee Comments: The comments from both the Department and the deans identify faculty and institutional level solutions for this recommendation. The Department is encouraged to leverage the resources identified to ensure that faculty members are nominated for internal awards, where relevant, and that a mechanism exists to promote its research accomplishment. No further reporting on this recommendation is required. No further updates on this recommendation are required.

Full Recommendation from External Reviewers' Report: Growth in the current Master programs, particularly the research-based Master of Applied Computing, should be carefully managed and should only grow as the faculty resources available to supervise these students is made available. The program is relatively new and faculty members should be cautious to only take on the number of students that they can manage within their other obligations. It is strongly recommended that the growth be incremental until sufficient experience is in place in the department to know the program being delivered is of high quality.				
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**	**Additional Notes**
Recommendation #14: Growth in the current Master programs, particularly the research-based Master of Applied Computing, should be carefully managed and should only grow as the faculty resources available to supervise these students is made available. The program is relatively new and faculty members should be cautious to only take on the number of students that they can manage within their other obligations. It is strongly recommended that the growth be incremental until sufficient experience is in place in the department to know the program being delivered is of high quality.	Department, Faculty of Science	n/a	August 2022	To coincide with the planned restructuring of the Office of the Dean of Science

Unit Update: The concern highlighted in this recommendation is the faculty's capacity to supervise graduate students in the thesis-based option of the Master of Applied Computing program. Since the cyclical program review, the department has created additional options for degree completion in this program, and currently only takes in 5-6 thesis-based students a year. With the additional hires made within the department since the cyclical

program review took place, this number of thesis students has been manageable, and we do not consider their to currently be a capacity issue as it relates to the supervisory responsibilities associated with this.

Science Decanal Comments: As with all other Recommendations that pertain to faculty member activity/participation, the issue of graduate student supervisions will continue to be monitored by the Associate Dean (Research and Graduate Studies).

FGPS Decanal Comments: Based on the Unit Update, the Recommendation identifies a potential concern that has not (yet) materialized. Nonetheless, as identified in the Science Decanal comments, supervisory capacity does certainly need to be taken into consideration, and closely monitored, with respect to growth of research-based graduate programs.

Program Review Sub-Committee Comments: The comments provided demonstrate an awareness of this issue and a commitment to monitoring the supervisory capacity in the thesis-based option of the Master of Applied Computing program. Based on the responses provided, no further reporting is required.

Full Recommendation from External Reviewers' Report: Clarify and document regulations concerning student funding as it relates to student's ability to work beyond the duties associated with receiving this support. This includes both on-campus and off-campus work for both Canadian and international students. Ensure students and supervisors clearly understand these regulations and conform to them.			
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**
Recommendation #15: Clarify and document regulations concerning student funding as it relates to student's ability to work beyond the duties associated with receiving this support. This includes both on-campus and off-campus work for both Canadian and international students. Ensure students and supervisors clearly understand these regulations and conform to them.	Department, in consultation with the Faculty of Graduate and Postdoctoral Studies	n/a	Immediately

Unit Update: We note the university has clear guidelines concerning student funding available through the Faculty of Graduate and Postdoctoral Studies website: https://students.wlu.ca/registration-and-finances/graduate-funding-and-awards/employment-based.html We direct any graduate student questions about funding and work opportunities to this site, and ensure that supervisors are aware of these regulations as well. We do not believe that further action on this recommendation is required.

Science Decanal Comments: Indeed, this recommendation has been addressed appropriately by the Department and no further action is required.

FGPS Decanal Comments: Indeed, the current regulations concerning graduate student funding as it relates to graduate students seeking employment on- and off-campus are listed on the website noted above.

Program Review Sub-Committee Comments: The comments provided suggest that this information is readily available to students who require it. No further reporting is required.

Full Recommendation from External Reviewers' Report: Recommendation #16: The need for and motivation behind a BA in Computer Science does not appear to justify the addition of a new degree program. By addressing the challenges associated with math and based on feedback received, we believe offering the BSc in Computer Science is sufficient. Thus, we do not recommend offering a BA at this time.
This recommendation was not prioritized in the Final Assessment Report.

Full Recommendation from External Reviewers' Report: Offering a new online minor does not appear to be a high value initiative for the Department. If the University determines that this is of sufficient value, it should ensure additional resources are provided to allow the Department to offer a high quality online experience to non-Computer Science majors. Thus, we do not recommend offering an on line-minor in Computer Science at this time.
This recommendation was not prioritized in the Final Assessment Report.

Full Recommendation from External Reviewers' Report: To maintain the viability of Physics programming, the Department should seek programs that differentiate them from Physics programs available elsewhere, but which can be mounted with the limited teaching resources available in Physics. Because of the unique combination of Physics and Computer Science in a single department, one possibility would be a program that emphasizes computational techniques. This needn't be exclusive to Physics students, but would likely attract students with interests in the physical sciences.				
Recommendation to be Implemented (from Final Assessment Report)	**Responsibility for Implementation**	**Responsibility for Resourcing (if applicable)**	**Anticipated Completion Date**	**Additional Notes**
Recommendation #18: To maintain the viability of Physics programming, the Department should seek programs that differentiate them from Physics programs available elsewhere, but which can be mounted with the limited teaching resources available in Physics. Because of the unique combination of Physics and Computer Science in a single department, one possibility would be a program	Department	n/a	August 2022	To coincide with Recommendation #7

that emphasizes computational techniques. This needn't be exclusive to Physics students, but would likely attract students with interests in the physical sciences.				

Unit Update: Since the cyclical review took place, the department has concentrated on building the double major Physics and Computer Science program, which we believe differentiates us from other Physics programs in Ontario. This program combination does not require extra resources, requires less Physics electives to be offered, and its enrolment is three times the size of the single Honours Physics program. We do not believe that further action is required on this recommendation.

Science Decanal Comments: This recommendation has been addressed appropriately by the Department and no further action is required.

Program Review Sub-Committee Comments: Based on the comments provided, no further reporting on this recommendation is required.

Full Recommendation from External Reviewers' Report: Recommendation #19: The external reviewers were explicitly asked for a recommendation about undertaking a PhD program in Computer Science. We cannot, at this time, recommend that the Department start a doctoral program. The Masters programs are still in their infancy, the undergraduate student support is growing, and some additional resources are already needed to deliver the current programs. Thus, we believe that the department should demonstrate strong success with the current programs and incorporate undergraduate students into their research agendas to help build success in grant competitions.

It was noted in the Final Assessment Report that no further action on this recommendation was required.

ADDITIONAL COMMENTS

Unit: The years following the department's last cyclical program review were challenging ones in which to advance strategic priorities. Nevertheless, the department has made significant strides in addressing the recommendations made by the external review committee in 2020. Notably, the department has been able to augment both its full-time faculty and administrative staff; these additional resources have helped to address several of the issues noted in the cyclical program review. The only significant outstanding recommendation to complete, from the department's perspective, is to undertake a comprehensive curriculum review of the BSc in Computer Science program. Making headway on this recommendation was not possible during the pandemic due to other more urgent priorities, but the department is committed to completing this recommendation in advance of its next cyclical program review.

Dean of the Faculty of Science: Again, the Department (both staff and faculty members) is applauded for its herculean efforts to manage increasing student registrations, while working on delivery of its programs through the Laurier International College and on the Brantford and (planned) Milton campuses, in addition to making

modifications to its graduate programs that immediately resulted in increased registrations. The Faculty is committed to providing as much support as possible to all of these activities.

Dean of the Faculty of Graduate and Postdoctoral Studies: Having been in the role for the past year, I would like to acknowledge the institutional leading efforts of the department to modify the Master of Applied Computing program to make it more attractive to international graduate students. Based on confirmations at the time of this writing, this has been a huge success.

Program Review Sub-Committee: The committee is pleased to read that many of the recommendations made by the external review committee in 2019-2020 regarding additional resources needed by the Department to support its growth and student success have been implemented. Several of the other recommendations made are being addressed by Faculty and institutional level initiatives. The one major outstanding recommendation that the committee strongly encourages the department to complete is the curriculum review of its Computer Science programs (Recommendation #7). It is recognized that implementing this recommendation in the years following the cyclical program review would have been challenging, with many other competing priorities due to the pandemic. As one of the largest undergraduate programs at the institution, it is imperative that the Computer Science program curriculum is regularly examined and any necessary adjustments made to support student success. The committee determined that no further Implementation Reports would be required, but that the curriculum review should be completed, as discussed in this report, by 2025, in advance of the Department's next scheduled cyclical program review in 2026-2027.

Subsequent Report Required: No