



Four Year Report (2023)

Neuroscience Undergraduate Programs (reviewed 2017-19)

A. Summary of Review

1. This review was conducted under the terms and conditions of the IQAP approved by Senate on May 25, 2016.
2. The academic programs offered by the Centre for Neuroscience which were examined as part of the review were:

BSc (Honours) Neuroscience
 BSc (Honours) Neuroscience Co-op
 BSc with Major in Neuroscience

3. The Review Committee consisted of two external reviewers: Mary Olmstead (Queen’s University) and Elena Choleris (University of Guelph) and an internal reviewer, Jan Frijters (Brock University).
4. The site visit occurred on September 16-18, 2018.
5. The Final Assessment Report was approved by Senate on April 10, 2019.
6. The reviewers assigned the programs the following outcome categories:

Program(s)	Excellent Quality	Good Quality	Good Quality with Concerns	Non-Viable
BSc (Honours) Neuroscience		X		
BSc (Honours) Neuroscience Co-op			X	
BSc with Major in Neuroscience		X		

7. The next review of the undergraduate and graduate programs in the Centre for Neuroscience will be in 2025/26.

B: Recommendations

Recommendation #1

Replace retiring faculty with new faculty who can contribute to the Neuroscience program.

ARC Disposition of the Recommendation

ARC considers the recommendation to be not accepted as it lies outside of the Committee's jurisdiction. It is expected that the Centre will proceed through normal channels of advocacy for faculty resources.

Implementation Plan

Recommendation not accepted.

Explanation of Actions Taken, Status and Results:

A number of core and founding members of the Neuroscience program have retired since the last program review was conducted - including Dr Stefan Brudzinski (Psychology), Dr Joffre Mercier (Biological Sciences) & Dr. Robert Carlone (Biological Sciences). Despite the fact that the Neuroscience program has no control over retirement replacements and new hires in individual departments, these two departments have recently hired 3 new Neuroscience researchers that have subsequently become core members of the Neuroscience program. These include Drs Paula Duarte Guterman and Charlis Raineki (Psychology) and Dr Stephen Glasgow (Biological Sciences).

Recommendation #2

Restructure administrative reporting

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: Centre

Responsible for resources: Centre

Responsible for implementation: Centre

Timeline: Dean of Mathematics and Science to report by the end of academic year 2019/20 after consultation with the Deans of Social Sciences and Applied Health Sciences

Actions Taken	Year Action Started	Year Action Complete
Action #1 Implement agreed plan for a meeting of NEUR program updates, etc. at 6-month intervals between the Deans of Mathematics and Science, Social Sciences and Applied Health Sciences and the Director of Neuroscience	2020	2020

Explanation of Actions Taken, Status and Results:

The Neuroscience Director meets with the Dean of FMS twice per month (once as part of the FMS Chairs / Directors meeting and once on an individual basis). The Director also reaches out to all 3 Deans (FMS, AHS and SoS) on a biannual basis (~every 6 months) to provide updates on the program and to enquire whether a meeting is required. The most recent detailed report of the program, including enrollments and a list of new members, was sent out in December 2022.

Recommendation #3

Assign specific space to the Neuroscience program

ARC Disposition of the Recommendation

ARC considers the recommendation to be not accepted as it lies outside of the Committee’s jurisdiction. It expected that the Centre will proceed through normal channels of advocacy for space resources.

Implementation Plan

Recommendation not accepted.

Explanation of Actions Taken, Status and Results:

The Neuroscience program now has a dedicated Neuroscience administrative office that is located in F block of McKenzie Chown (F218). New office furniture and a new computer for the temporary Administrative Assistant was purchased by the Dean of FMS. This is now a physical space for administrative meetings with students in the program.

Recommendation #4

Establish a permanent Administrative assistant position.

ARC Disposition of the Recommendation

ARC considers the recommendation to be not accepted as it lies outside of the Committee’s jurisdiction. It expected that the Centre will proceed through normal channels of advocacy for administrative resources

Implementation Plan

Recommendation not accepted.

Explanation of Actions Taken, Status and Results:

Until January 2022, the only administrative support given to the Neuroscience program was a 0.15 load provided by the Administrative Assistant of the Physics Dept (located in a separate area of McKenzie Chown complex). Pending the retirement of this Administrative Assistant, the Dean of FMS provided a full-time, but temporary (one year contract) position on Jan 3rd 2022, which was subsequently extended to April 30th 2023, using the Dean’s discretionary funds. A request to convert this to a full-time permanent position is currently pending in the 2023 budget.

Recommendation #5

Institute a capstone research course.

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: Centre
 Responsible for resources: Centre
 Responsible for implementation: Centre
 Timeline: Dean of Mathematics and Science to report by the end of academic year 2019/20 after consultation with the Deans of Social Sciences and Applied Health Sciences

Actions Taken	Year Action Started	Year Action Completed
Action #1 The Centre is pursuing the input from the Dean of Mathematics and Science regarding the development of a Capstone Course for NEUR Majors, but not Honours, degree students and developing a UPC submission	2020	2021

Explanation of Actions Taken, Status and Results:

The capstone research course for NEUR Honours majors was already comprised of the NEUR Honours thesis courses: NEUR 4F90, 4F91 and 4F92, for which the Director is the co-ordinator. Since Y1, the Director has been meeting with the Honours thesis students as a group to facilitate providing them with essential information about their Honours courses, and information about various research programs at Brock (to showcase the research of various Faculty members). The Director also holds group meetings with the thesis students, during which they conduct research presentations and have discussions about the research being conducted by their peers within the different streams of the program.

Although discussions between the Director and the Dean took place about the possibility of incorporating a Neuroscience capstone course for the “BSc with Major” program students (who do not take the capstone Honours courses), this was deemed unfeasible at this time, given the fact that the NEUR faculty members have home departments in which they already have full teaching loads. Until such time as funding for either a stipend or full-time NEUR position can be identified for our program, the option of a capstone course for Majors will be postponed.

Recommendation #6

Assign a faculty Advisor dedicated to the Neuroscience program.

ARC Disposition of the Recommendation

ARC considers the recommendation to be not accepted as it lies outside of the Committee’s jurisdiction. It expected that the Centre will proceed through normal channels of advocacy for administrative resources

Implementation Plan

Recommendation not accepted.

Explanation of Actions Taken, Status and Results:

Since January 2022, a faculty (FMS-based) Advisor has been partially dedicated to the Neuroscience program. This is currently a contract position using the Dean’s (FMS) discretionary funds, and in addition to the NEUR program, this advisor is also responsible for BSc Sciences, BTEC, BCHM, and CHEM programs, and has about 25 to 30% of their time available for the NEUR program. Initially a 1-year contract position, this advising position has been extended till April 30th 2023. After this date, it is currently unknown how much advising support the program will receive from the Faculty.

Recommendation #7

Increase participation in the Neuroscience program.

ARC Disposition of the Recommendation

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

Implementation Plan (2nd Priority)

Responsible for approving:	Centre
Responsible for resources:	Centre
Responsible for implementation:	Centre
Timeline:	Dean of Mathematics and Science to report by the end of academic year 2020/21 after consultation with the Deans of Social Sciences and Applied Health Sciences

Actions Taken	Year Action Started	Year Action Completed
Action #1 The Centre has submitted a proposal to UPC for the new stream in Environmental Neuroscience, in addition to a review of course offerings/options every 6 months.	2020	2020

Explanation of Actions Taken, Status and Results:

The new Environmental stream is now in the Undergraduate calendar and has been regularly updated and refined over the last 2 years of APC submissions. New courses have also been added to all NEUR streams to reflect changes in participating members of the program and to update the streams with newer courses being offered in the various departments that contribute courses to the NEUR program. Some of these new courses are required courses, and others are additional options to meet criteria of the program.

Ten new participating faculty members from across all 3 Faculties have also been added to the program over the last 4 years:

Faculty of Applied Health Sciences: S. Beaudette, V. Fajardo - Kinesiology; N. Sze - Health Sciences;

Faculty of Social Sciences: P. Duarte Guterman, C. Raineke - Psychology; E. Panda - Child and Youth Studies; R. Plummer - Environmental Sustainability.

Faculty of Mathematics and Science: J. Simone (Adjunct), S. Glasgow - Biological Sciences; W. Marshall - Mathematics and Statistics.

From the Faculty of Mathematics and Science, there are now contributing members from Biological Sciences, Computer Science, Mathematics and Statistics; from the Faculty of Applied Health Sciences, members from Kinesiology, Health Sciences, and from the Faculty of Social Sciences, members from Psychology, Applied Linguistics, Child and Youth Studies, Environmental Sustainability.

C. Unit Summative Analysis and Evaluation

1. To what extent has the Centre achieved the improvements suggested by the reviewers?

The Centre has achieved most of the recommendations set out by the reviewers, even some of those that were beyond the ARC committee's jurisdiction (due to their financial implications). For example, we have finally attained physical space for the Neuroscience program (administrative office space) and obtained temporary full-time administrative support and increased advising support. Unfortunately, with these support positions being contract positions only, whether or not these will be converted into permanent positions in the upcoming year is not known, and as such these improvements to the status of the program are currently only temporary. We have also mostly been successful in replacing retiring NEUR members with new hires that are Neuroscientists in the various departments.

In terms of the ARC committee's acceptance of reviewer items, we have successfully grown the program (new Environmental Neuroscience stream) and also participation in the program. Member participation has grown (despite retirements) from 26 in 2019 to 33 in 2023 and our student enrollment in the program has also grown substantially over 4 years. The Director of Neuroscience has also been providing bi-annual updates to the Deans of all 3 participating Faculties.

The one recommendation that has not been fully met is that of implementing a capstone course, as we do not currently have one for the Neuroscience B.Sc. with Major stream. A dedicated research course was not considered required for the Honours thesis students, whose Honours research IS their capstone course. However, we have expanded the role of the Honours Co-Ordinator (Director) in these thesis courses to provide more information to the students and to give them an opportunity to discuss and present their research to one another. The ability to generate a capstone course for the non-thesis students (BSc with Major) is hindered by the fact that all participating members of this program (including the Director) already have full teaching loads in their home departments.

2. What overall impact has it had on the Centre's programs?

The incorporation of the new Environmental Neuroscience stream into the program has so far had little impact on enrollment, as only one student is currently enrolled in this stream. However, the increase in participation in the program by new faculty members has enabled the incorporation of new and updated courses into the various streams, as well as an increase in the number and diversity of available research thesis supervisors for the various NEUR streams.

3. Is the Centre adopting a process of continuous quality improvement for its programs?

Prior to each annual APC submission, the Director checks for the presence of obsolete courses, and consults with the internal advisors of our various streams (and members of other departments involved in the rollout of required or optional courses) for suggestions for calendar changes and/or for recommendations for new courses. The numerous meetings with Honours thesis students (orientation meetings and research presentation meetings) also ensures optimal quality within these capstone courses.

We have previously had some issues with the placement of our co-op students, but the former Director of the program had discussions with Brock's co-op office, who was working hard at providing us with a more dedicated mentor to work on these placements. This is an area of our program that needs continual monitoring and further improvement and quality assessment.

4. How well do the programs now align with Brock University strategic priorities?

Our responses are based on the four strategic priorities:

1. Provide a transformational and accessible academic and university experience;

Our program permits a unique and integrated approach to Neuroscience - particularly in terms of our innovative approach and in being transdisciplinary - incorporating degree selections through 5 streams (Neurobiology, Neuropsychology, Neurocomputing, Neuromotor, and our new Environmental stream). Many streams allow integrated crossover between courses in Social Science and FMS (Environmental, Neuropsychology and Neurobiology). We include representation by 33 faculty members, with courses from three faculty divisions (Mathematics and Sciences, Social Sciences, Applied Health Sciences) and from nine Departments (Biological Sciences, Computer Science, Mathematics & Statistics, Psychology,

Child & Youth Studies, Applied Linguistics, Kinesiology, Health Sciences, and Environmental Sustainability). This diversity allows for ‘core’ knowledge in Neuroscience, and also ‘specialized’ knowledge in the various streams and for a unique opportunity for our future Neuroscientists.

These features of the program support the goals and action plans of the Strategic Plan by “increasing experiential learning” and “providing an engaging campus experience”. In addition to many of our courses incorporating a lab-based approach to the discipline, our program also offers a Co-op option for all five streams which promotes an additional work-based experiential application beyond that which is acquired in the classroom and lab.

In terms of addressing the Strategic Action Plan and goal of “ensuring students receive timely and proactive support services”, this will strongly depend on the continuous support for the program with dedicated academic advising and administrative positions (currently only temporary contract positions awaiting budgetary approval as permanent positions).

2. Building research capacity across the University;

All of our members are involved in innovative lab-based research programs involving both undergraduate and graduate students and hold substantial and numerous national research grants to fund these research programs.

Given the interdisciplinary nature of our program, spanning 3 Faculties, our undergraduate students are exposed to different research fields and have the opportunity to interact widely with faculty (and their graduate students), in a highly collaborative manner. Cooperative research, knowledge sharing, and research production is well grounded and integrated into our program, for thesis and non-thesis students alike.

In terms of meeting the goal stated in the Strategic Plan “to nurture a culture of research and creative excellence” we have many members who are (or were) Canada Research Chair (CRC) recipients, at either Tier 2 (5 members) or Tier 1 (1 member) levels. Other members have also been recipients of the NSERC Accelerator award. In terms of recognition in the wider research community, at least 4 of our members served on Tri-council grant panels at the national level; including NSERC Discovery grant and RTI evaluation panels, and CIHR project grant evaluation panels. A large number of our members (at least 9) are also serving on respected scientific journal editorial boards, some as reviewing or associate board members, and another as Editor-in-Chief. We also have various members who have held Director and/or President leadership positions of various Provincial and National Societies and Boards.

The research strength of our members is evident in the various invitations and recognitions listed above, and these members provide excellent training for undergraduate students in our programs, both during summer research internships, volunteer lab positions and Honours thesis mentoring.

3. Enhancing the life and vitality of our local region and beyond;

Our faculty and students are involved in the community and beyond through the very nature of our Co-op programs (in each of the 5 streams), which can be realized locally within their own home communities, or further afield. In addition, our students have many opportunities to engage in the application of their knowledge through projects, placements and/or volunteer options that are available through our various faculty labs and their connections to the community. These can include mental health (e.g., Pathstone Mental Health [a Public Health/mental health program for pediatrics]; Outpatient Mental Health - NHS), aging & neurodegenerative disease (e.g., Alzheimer's Society, Heart & Stroke), regeneration & spinal cord injury and brain injury rehabilitation.

4. Fostering a culture of inclusivity, accessibility, reconciliation, and decolonization;

All members of our program who hold successful Tri-council research grants (CIHR, NSERC and SSHRC) are now required to provide evidence of actively fostering equality, diversity and inclusion in their research labs, both in terms of hiring and research opportunities.

Other evidence of this includes members who are highly committed to communicating issues based on immigrant experience, racism and sexism in various public media (newspapers / radio).

Within the courses of our Neuroscience program, faculty members strive to address issues of inclusivity, accessibility and truth and reconciliation; some specific examples of these are:

- NEUR 3P39 - discussions of the statistics of language death for indigenous languages;
- NEUR 3P87 - discussions of the importance of including sex and gender in the biological variables of behavioural neuroscience research.
- NEUR 3P59 - students receive extra credit for volunteering to work with elders in long term care as a measure of inclusivity and accessibility in health care.
- PSYC 3P20 -examining the role of memory in the truth and reconciliation process.

5. How does this review and its results position the programs as the Centre moves into the next review cycle?

The results of this review places the NEUR program streams in a strong position to continue improving the rigour of the program, the multi-disciplinary nature of the various streams within the program, and to continue providing an opportunity for growth in terms of student participation, as well as interest in this program from faculty members across 3 Faculties and 9 separate departments.

The biggest concern for the continued growth and success of the NEUR program are aspects of the external reviewers' recommendations that could not be approved by ARC, such as the need for physical space, and the need for dedicated advising and administrative support, all of

which have been made available by the Dean of FMS on a temporary basis over the last 12 months, but are likely to be lost with the severity of the required budget cuts this upcoming year. Without these fundamental supports “on the ground” for this program, further success and growth are not likely feasible.

D. ARC Final Summary

In final summary of the 2017-2019 cyclical academic review of the programs offered by the Centre for Neuroscience, ARC has determined the following:

1. That the Reviewers’ Recommendations have been addressed satisfactorily.
2. That the Centre has established a direction for next steps as it prepares for the next review cycle.
3. That the Centre has achieved a broad-based, reflective and forward-looking self-assessment.