



Neuroscience
**Final Assessment Report &
Implementation Plan**

Faculty / Affiliated University College	Schulich School of Medicine & Dentistry
Degrees Offered	BSc
Modules Reviewed	Honours Specialization in Neuroscience
External Reviewers	<p>Dr. Kim Hellemans Associate Dean, Faculty of Science Carleton University</p> <p>Dr. Gunnar Blohm Professor, Centre for Neuroscience Studies Queen's University</p>
Internal Reviewers	<p>Dr. Jeff Wood Associate Dean, Undergraduate Studies Western Engineering</p> <p>Shaurya Karky 4th year Mechanical Engineering student and member of SUPR-U</p>
Date of Site Visit	March 29 and 31, 2022
Evaluation	Good Quality
Approval Dates	<p>SUPR-U: June 29, 2022 ACA: September 7, 2022 Senate (for information only): September 16, 2022</p>
Year of Next Review	Year of next cyclical review: 2029-2030

Overview of Western’s Cyclical Review Assessment Reporting Process

In accordance with Western’s Institutional Quality Assurance Process (IQAP), the Final Assessment Report (FAR) provides a summary of the cyclical review, internal responses and assessment and evaluation of the undergraduate module delivered by the Neuroscience Program at the Schulich School of Medicine and Dentistry.

This FAR considers the following documents:

- the program’s self-study brief;
- the external reviewers’ report;
- the response from the program; and
- the response from the Dean’s Office.

The FAR identifies the strengths of the program, opportunities for program enhancement and improvement, and details the recommendations of the external reviewers – noting those recommendations to be prioritized for implementation.

The Implementation Plan details the recommendations from the FAR that have been selected for implementation, identifies who is responsible for approving and acting on the recommendations, specifies any action or follow-up that is required, and defines the timeline for completion.

The FAR (including Implementation Plan) is sent for approval through the Senate Undergraduate Program Review Committee (SUPR-U) and ACA, then for information to Senate and to the Ontario Universities’ Council on Quality Assurance. Subsequently, it is publicly accessible on Western’s IQAP website. The FAR is the only document resulting from the undergraduate cyclical review process that is made public; all other documents are confidential to the Program/School/Faculty and SUPR-U.

Executive Summary

The undergraduate program offers a four-year Honours Specialization (HSP) in Neuroscience Bachelor of Science degree (BSc) and was first initiated in 2012 with the first class graduating in 2015. The Program is highly interdisciplinary with many participating faculty from across campus and the affiliated teaching hospitals. A competitive program, only thirty students are admitted to the Program in year two and progress as a cohort to year four.

To inform the self-study for this program review, data collected from annual student focus groups, along with feedback from regular meetings with student leaders, accompanied a dedicated SWOT Analysis undertaken by the Neuroscience Program Committee. In addition, a review of program learning outcomes as well as a curriculum mapping exercise were completed.

The external reviewers shared a positive assessment of the Neuroscience Program. They offer a suite of constructive considerations for further program enhancement and conclude their report with eight recommendations.

Strengths and Innovative Features Identified by the Program

- Inter-disciplinarity and involvement of faculty from across campus.
- Robust course picklists that allow students to choose courses of interest but still maintain the interdisciplinarity and comprehensive philosophy of the program.
 - o Excellent course options covering a broad range of neuroscience topics and approaches.
- Student progression through the HSP to graduation as a class cohort – contributing to the formation of strong connections thereby improving communication, social bonds, and academic support.
- Strong sense of community across program faculty, staff and students.
- High level of student involvement and participation in the program through student organizations (WUNS and SSC).
- Excellent administrative support from both the Neuroscience and BMSUE offices.
- Newly established Western Institute of Neuroscience.

Concerns and Areas of Improvement Identified by the Program

- Competition for resources, including seats in courses, space, and faculty for research projects, that will likely increase given the recent increase in undergraduate enrollment.
 - o Availability of physical laboratory space is a concern in the short term.
- Nearly all program courses are offered through other departments and access must be negotiated.
- Need to increase the Computational Neuroscience offerings in the program and modernizing the statistics courses, as well as the Research Methods in Psychology.
- Seeking additional experiential learning opportunities for students in the community will increase the practical focus of the program.

Review Process

As part of the external review, the review committee, comprising two external reviewers, one internal reviewer and a student reviewer, were provided with Volume I and II of the

self-study brief in advance of the scheduled review and then met virtually (due to pandemic restrictions) over two days with the:

- Acting Vice-Provost of Academic Programs
- Vice-Provost (Academic Planning, Policy and Faculty)
- Director of Academic Quality and Enhancement
- Vice Dean, Basic Medical Sciences
- Associate Dean, Basic Medical Sciences Undergraduate Education (BMSUE)
- Undergraduate Director – Neuroscience
- Program Coordinator
- Manager and Coordinator of (BMSUE)
- Associate Chief Librarian
- Program Faculty
- Program Students

Following the virtual site visit, the external reviewers submitted a comprehensive report of their findings which was sent to the Program and Dean for review and response. Formative documents, including Volumes I and II of the Self-Study, the External Report, and the Program and Decanal responses form the basis of this Final Assessment Report (FAR) of the Neuroscience Program. The FAR is collated and submitted to SUPR-U by the Internal Reviewer with the support of the Office of Academic Quality and Enhancement.

Summative Assessment – External Reviewers’ Report

The external reviewers shared that *“Western neuroscience is a well-functioning and exciting program at a human scale that creates a real community feel among students. Staff, students, and faculty alike all commented on a close knit and collaborative community, a highly active undergraduate student group, and students that are high achieving and highly successful.”*

Strengths of the Program

- Flexible and multidisciplinary curriculum.
- Open house initiatives in 1st and 2nd year that promote the program and clearly communicate prospective career opportunities.
- Western Undergraduate Neuroscience Society (WUNS) does an excellent job tracking alumni and connecting them back to current students in the program.
- International exchange opportunities for students.
- Smooth operations thanks to great relationships with current department heads and faculty deans.
 - o Excellent support staff whose work has been lauded by all members of the program.

- Small class sizes (~30) which is great for learning and community building.

Areas of Concern or Prospective Improvement

- More direct and explicit program components that take into account the job market and current industry / government needs.
- Research project guidance should include a detailed timeline for different research project steps, i.e., when literature review should be done, when data collection should start and end, etc.
 - o Clarity regarding the process of how to find a thesis topic/supervisor and when/how to approach laboratories etc.
- Increased community engagement opportunities (e.g., community-embedded capstone projects) as well as increased opportunities for internships to increase students' job readiness and provide job market experiences for students.
 - o Better guidance about how students can secure summer internships.
- A more direct line of communication for students to raise program-related issues would be recommended, potentially through WUNS.
- Fixed office hours with instructors and the program coordinator would be desirable.
- Teaching lab equipment is outdated and needs modernizing.
- Increased tracking and reporting program performance measures.
- Lack of data or discussion pertaining to EDI.
- Ensure bursaries and scholarships are available to students who are members of equity-deserving groups would ensure such students are not further disadvantaged by having to rely on part-time employment outside of schoolwork.
- Perceived precarity around the individual departments' commitments to cover neuroscience course teachings and student thesis project supervision.

Summary of the Reviewers’ Key Recommendations and Program/Faculty Responses

The following are the reviewers’ recommendations in the order listed by the external reviewers. Recommendations requiring implementation have been marked with an asterisk (*).

Reviewers’ Recommendations	Program / Faculty Response
<p>1. Engage in a job market needs assessment to understand how the program can be tailored to meet market needs. *</p>	<p>Program: The Program Committee will design and send a survey to recent graduates (last 5 years) to collect information about current employment, skills acquired in the program that are being put to use, skill gaps they feel the program could have met. The program does provide information to prospective and current students about career paths taken by former grads, but this will be expanded to promote greater awareness of existing resources (e.g., Coffee and Careers talks, Science to Business network). To support this, the program will create a careers resource on the Neuroscience Program website. Furthermore, the Program Director and Administrator will communicate with the recently created Experiential Learning Coordinator to identify relevant career events for students as well as job market needs to inform learning outcomes and course selections.</p> <p>Faculty: In agreement. The program has provided some excellent suggestions to address this need including surveying former students and working with the newly hired experiential learning coordinator. In addition to these suggestions, the program will work with the science careers and internships office to help identify the job market needs.</p>
<p>2. Revise and use exit surveys to improve the program. *</p>	<p>Program: The Program Director and Administrator currently meet annually with 4th year students in the spring to receive feedback on their experiences in the program – feedback is then discussed at Neuroscience Program Committee meetings. Many aspects of the program have improved as a result of the student input. The Program will add to this process by creating a formal exit interview. As the BMSUE program also surveys all graduates in Schulich, the Program will coordinate so as not to create overlap.</p> <p>Faculty: In agreement.</p>

<p>3. Improve the process for securing 4th year project supervisors as well as clarity about expectations and responsibilities related to deadlines and project outcomes. *</p>	<p>Program: The Western Undergraduate Neuroscience Society (WUNS) does run thesis information sessions, which the Director attends. These include information about securing a supervisor, what the process of doing a thesis looks like in different labs, “tips and tricks”, and an open Q&A. However, the Neuroscience Program Director and Administrator can work with WUNS to create a timeline of annual events such that the timing is appropriate, that students know well in advance when the events are to occur, and that 2nd and 3rd year students are encouraged to attend. This would also enable the Program to ensure that other relevant information is clearly communicated in a timely fashion (e.g., timelines for USRA and other summer research opportunities, application procedures for graduate school and scholarships, etc.). This will help ensure better institutional memory over transitions in WUNS leadership. The Program Director and Administrator will work closely with the existing WUNS co-presidents in the development of this material.</p> <p>The syllabus for the honours course did include expectations for students and supervisors, as well as rough timelines for various milestones. To build on this, the Director will introduce a memorandum of understanding, based on similar materials used in the Physiology/Pharmacology Honours thesis course, which is to be discussed by the student and supervisor, and signed by the student, supervisor, and Director. The 4th year course format will be altered to increase the in-person frequency. This will enable coverage of more topics and enhance discussion and interaction amongst students and between students and supervisors (e.g., EDI-D topics, career trajectories, transferable skills to industry, and increased support for the thesis).</p> <p>Faculty: The program has several excellent ideas to improve this problem. The neuroscience website, which lists 95 faculty members, could be used as a starting point to help students find a supervisor. One potential contributing factor are the challenges of an interdisciplinary program without a home department. It is very likely that all or almost all faculty listed on the website take undergraduate 4th year research students, but their departments usually require them to take a student from their program first.</p>
<p>4. Improve international exchange and internship opportunities.</p>	<p>Program: These are coordinated and communicated through BMSUE and not the program office. The Neuroscience Program does not have any funding to further support these opportunities but will continue to work with BMSUE to advertise these opportunities to Program students.</p> <p>Faculty: The BMSUE office will work with Western International to see if any new exchange opportunities can be made available. This will likely take some time as formal partnerships are required. The internship program is run through the science careers and internship office. While growing every year, this program seems to be undersubscribed by students considering the clear benefit (paid, career related employment for between 8-16 months). A suggestion to improve communication of these events is for the program to continue to work with the student society (WUNS) to promote these opportunities.</p>

<p>5. Increase mechanisms for students to receive feedback on their learning. Also, ensure that mechanisms exist for student concerns about the program to be heard. *</p>	<p>Program: In the 2nd year course, the course coordinator will offer scheduled office hours with advance notice on a regular basis to increase course contact. For the 3rd year course, there is continuous assessment throughout the course, with instructors offering to meet with students to consult about presentations (and the majority of students do take up this offer). The Program office will consult with students at the outset of the course to determine whether they would like instructors to offer set times in addition to the scheduled meetings, and communicate to instructors that one or two set times during their module may increase accessibility.</p> <p>The Program Committee will explore putting an undergraduate neuroscience student on the Neuroscience Program Committee to provide a student perspective and further feedback on planned initiatives, presuming any conflict of interest can be managed. This may be an existing member of WUNS.</p> <p>The Director does, and will continue to, meet with the co-presidents of WUNS and the representative on the Science Student Council at least 2-4 times per year, in addition to attending various information and feedback sessions already scheduled throughout the year, to provide a direct line for student concerns.</p> <p>Faculty: The program has some excellent suggestions to support student feedback. Possibly the most impactful would be the addition of a student representative to the undergraduate neuroscience program committee.</p>
<p>6. Consider integrating alternative capstones and community-engaged learning projects.</p>	<p>Program: These alternatives are absolutely desirable and also very labour-intensive to offer. The Program Director and Administrator will coordinate with central Schulich efforts, supported by the Experiential Learning Coordinator, to ensure access to these opportunities for neuroscience students.</p> <p>Faculty: The Faculty currently has two community engaged learning courses (in biochemistry of cancer and interdisciplinary medical sciences). In 2022-2023, these 0.5 credit courses will be expanded to 1.0 credit capstone courses. This will act as a pilot for other programs in the Faculty. In this model, instructors from each of the programs co-teach the in-class portion of the course and the experiential learning coordinator helps find community partners relevant to the discipline. The Faculty hopes that this is a model for other programs and that hopefully neuroscience will be able to join in this effort in either the 2023-24 or 2024-25 academic years.</p>
<p>7. Ensure adequate teaching resources such as well-equipped lab spaces for 2000-level courses and active learning spaces for 3000-level courses.</p>	<p>Program: The 3000-level course was indeed able to obtain a WALs room this year, and the Program will continue to advocate for this. The other lab resources are managed centrally.</p> <p>Faculty: Laboratory equipment is also a challenge for other programs as they aren't typically approved in budget requests. The Faculty is very fortunate to be able to get some equipment through a science student donation fund administered by the science student's council. This is the avenue through which most laboratory equipment is purchased. The neuroscience program is encouraged to apply to this donation fund every year (as needed). If there</p>

	<p>are other resources needed to support expansion, the Program can work with the Faculty to include these in future budget requests.</p> <p>There are indeed limited laboratory spaces within Schulich and scheduling these spaces is complicated. The neuroscience faculty have been great in working with the BMSUE office to schedule their labs. The lab course is offered in a space suitable to the needs of the course.</p>
<p>8. Better integrate EDIIA considerations into the curriculum and pedagogy. EDIIA indicators should be tracked by the program. It is also recommended that specific bursaries / scholarships are made available for equity-deserving groups. *</p>	<p>Program: The Program agrees that this is a significant gap to be remedied and will coordinate with Schulich's efforts to obtain EDIIA tracking information from former and current students. In terms of content, the course coordinators at the 2nd, 3rd, and 4th year level will consult to add and enhance EDI-related content. The Program will aim to develop a module on EDI-issues in research in the 2nd year course (e.g., implicit bias research and students could run themselves on implicit association tests).</p> <p>Faculty: In agreement. The program has some excellent ideas to incorporate EDIIA content into their program and highlight locally developed resources. EDIIA indicator data are usually not available and at times students may not wish to disclose this information to the faculty. The program may wish to include an anonymous component to their exit survey/interview to collect as much of this information as possible. The Faculty will investigate the possibility of bursaries/scholarships to equity deserving groups.</p>

Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. The Department Chair, in consultation with the Dean of the Faculty/Affiliated University College will be responsible for monitoring the Implementation Plan.

The number of recommendations prioritized for implementation has been reduced as some have or are already being actioned, as described in the program and faculty responses above. As a result, the recommendations not appearing in the implementation table are recommendations #4, 6 and 7.

Recommendation	Proposed Action and Follow-up	Responsibility	Timeline
<p>Recommendation #1 Engage in a job market needs assessment.</p>	<p>Develop and administer a survey to recent graduates. Re-administer survey as needed in future years.</p> <p>Develop career resources webpage on the Neuroscience Program website.</p> <p>With the support of the Experiential Learning Coordinator and the Science Careers and Internships Office, identify relevant job market needs and career events.</p>	<p>Program Committee Experiential Learning Coordinator</p>	<p>Survey development by December 2022; Pilot administration by September 2023.</p> <p> By December 2022</p>
<p>Recommendation #2 Revise and use exit surveys/interviews to improve the program.</p>	<p>Develop and administer formal exit interview process.</p>	<p>Program Director Program Administrator</p>	<p>By September 2023</p>

<p>Recommendation #3 Improve the process for securing 4th year project supervisor as well as clarity about expectations and responsibilities related to deadlines and project outcomes.</p>	<p>Develop annual timeline and hold events during the academic year with WUNS to help keep students informed. Amend the 4th year honours course outline for the upcoming academic year to make the expectations and timelines clear.</p>	<p>Program Director Program Committee WUNS Co-Presidents</p>	<p>By September 2022</p>
<p>Recommendation #5 Increase mechanisms for students to receive feedback on their learning and ensure that mechanisms exist for student concerns about the program to be heard.</p>	<p>Changes to the 2nd and 3rd year course (e.g., set Office hours and increased number of check-in meetings) for the upcoming academic year. Program Committee to discuss alterations to the membership of the committee to include a student role.</p>	<p>Program Committee</p>	<p>By September 2022 By December 2022</p>
<p>Recommendation #8 Better integrate EDIIA considerations into the curriculum and pedagogy. Track EDIIA indicators and make available specific bursaries / scholarships for equity-deserving groups.</p>	<p>Initiate a dedicated discussion at upcoming Program Committee meetings and outline an actionable EDI strategy which may include:</p> <ul style="list-style-type: none"> - Development of a module on EDI-issues in research in the 2nd year course. - Development and promotion of more local resources as part of all neuroscience courses (e.g., Council on Reforming Equity, Diversity, and Inclusion for Trainees (CREDIT)). - Integrate anonymous mechanisms to collect EDIIA information from students (e.g., in exit surveys). - Investigate the possibility of bursaries/ scholarships to equity deserving groups - Evaluate and update EDI strategy items annually. - Consider adding the topic of EDIIA as a standing item at each Program Committee meeting. - Share and co-develop EDI best practices with other graduate programs. 	<p>Program Committee Dean's Office</p>	<p>By September 2023</p>

Other Opportunities for Program Enhancement

- Consider actively discussing options for greater hybrid course delivery.
- Administrative support staff is scattered across campus; staff would greatly benefit from a common shared space that would enhance their sense of community as well as streamline work efficiency and workplace satisfaction
- With regards to library resources: Consider 1) integrating more advanced information literacy courses, that go beyond search and keywords, to cover tools and tool development; 2) clearer communication of services offered by the library; and 3) better integration of library support into the undergraduate curriculum.
- Consider more neuroscience-specific course options to allow students to gain more depth and breadth, such as statistics for neuroscientists, data neuroscience.
- Better coordination of timetabling to remove scheduling conflicts and ensure reserved seats for neuroscience students (in courses offered by other departments).