

**Institute of Biochemistry**  
**Update on Unit Response to External Reviewers' Report & Action Plan**  
**Programs Being Reviewed: Biochemistry**  
**Completed by: Tyler Avis, Director**  
**Approved by Dean: Maria DeRosa, Dean of Science/February 23, 2023**

**Note: This document is made available for public posting on the Vice- Provost's website.**

**\*\*\* Denotes items that SQAPC would like the unit to pay particular attention to based on their past review of the original action item.**

External Reviewer Recommendation	Original Action Item	Owner & Timeline	Progress Update January 2023	Have calendar changes been initiated or completed (Not applicable/Yes/No), if Yes, when?
<p><b>1. Weakness (Faculty Complement):</b> It is essential, in the short-term, to continue to increase the critical mass of faculty with direct hires who are assigned to the Biochemistry Institute and its programs.</p>	<p>Biochemistry will continue to request Faculty (Professor and Instructor) positions as this is essential for the success of its programs and growth of the Institute. More specifically, at least three Faculty members over the next CPR cycle will be requested.</p>	<p>Director Beginning next fiscal year (2022-2023) and ongoing thereafter</p>	<p>Following acceptance of this implementation plan (December 2021), the Director requested a Faculty member (fulltime Professor) assigned directly to the Institute during the 2022-2023 budget cycle. This request was unsuccessful, as resources for a new hire were not available.</p> <p>In the current budget cycle (2023-2024), we have once again requested a Faculty member (fulltime Professor) assigned directly to the Institute. We do not yet have a response to this request.</p> <p>Nevertheless, three new Faculty members have been cross-appointed to the Institute since December 2021, indicating that the Institute is highly relevant and that new Faculty are eager to participate in its success.</p> <p>For the well-being of the Institute and to further bolster our chances of securing direct Faculty hires, the Institute plans to develop a long-term strategic plan to outline its vision for the next five to eight</p>	<p>Not applicable</p>

			<p>years. Central to this strategic plan will be opportunities for growth in teaching and research in a manner that is consistent with the University's Integrated Strategic Plan and the Faculty of Science's priorities. Development of a strategic plan will require several consultations with faculty members, staff, and students. It will bring together several new hires from the Departments of Biology and Chemistry who would otherwise not interact with each other. This team building exercise will clarify what Biochemistry at Carleton represents and define priorities and directions for future direct hires.</p>	
<p><b>2. Weakness (Physical Teaching Space):</b> Space planning on the campus is required. Increased capacity and modernisation for teaching laboratories and the addition of space for computer stations in Biochemistry is an urgent requirement. The additional teaching laboratory space should be located in close proximity to research labs and offices, preferably in the same building. Additional modern laboratory space is required for new faculty recruitment in Biochemistry. A meeting room and office space is essential for students. Ideally, a new or refurbished building to house and consolidate the teaching and research activities in the Biochemistry Institute/future Biochemistry Department in modern facilities is required. This building could also include the Biology teaching laboratories and provide for expansion of the Biology research labs.</p>	<p>Biochemistry will continue to lobby for physical space for the Institute. At present, the Institute of Biochemistry does not possess physical space of its own, which causes ongoing issues. This not only includes teaching space, but also research and office space for current and new Faculty members hired into the Institute (see Weakness (Faculty Complement) above). This is essential for the success of its programs and growth of the Institute. This could initially be space belonging to the Institute of Biochemistry, but shared within the physical space of the Departments of Biology and/or Chemistry. However, this system of lodging Institute members within the physical space attributed to its two associated Departments has been impractical, and even problematic, in the past. Biochemistry requires dedicated</p>	<p>Director and Dean of Science</p> <p>Summer 2021 and ongoing thereafter</p>	<p>We have asked for the following space since the acceptance of this implementation plan:</p> <ol style="list-style-type: none"> <li>1. Offices: we have an ongoing request for an office for an Instructor (100% appointed to Biochemistry). The Instructor has been employed at Carleton since July 2020. To date, office space has yet to be secured by the Institute for this employee. The Instructor is currently occupying an office attributed to the Department of Biology.</li> <li>2. Teaching laboratory: The Institute of Biochemistry does not currently possess the teaching laboratory space in which we run the laboratory portion of our courses. All teaching laboratory space used by the Institute is currently attributed to the Department of Biology.</li> <li>3. Research space: Two Faculty members (Professors) have the highest percentage of their official appointment to the Institute of Biochemistry. Therefore, Biochemistry is considered their 'home unit'. However, the physical space in which their research laboratories</li> </ol>	<p>Not applicable</p>

	space to improve student experience and growth of the Institute.		<p>are lodged are attributed to the Department of Biology.</p> <p>The abovementioned situations are being addressed by the Dean of Science, but are currently unresolved as resources to correct the issue are unavailable.</p> <p>The Institute of will continue to lobby for dedicated physical space with the Dean of Science for its essential activities and operations.</p>	
<p><b>3. Weakness (Student Space-Lack of Perceived Home):</b> A common meeting space is required urgently for Biochemistry students and this needs to be modern and have natural light for an uplifting experience.</p>	<p>Biochemistry will lobby for Student Meeting space as with Teaching and Research space (see Weakness (Physical Teaching Space) above). This will improve the student experience for the Biochemistry cohort. Other units in Science have been provided such spaces, but none exist for Biochemistry.</p>	<p>Director and Dean of Science</p> <p>Summer 2021 and ongoing thereafter</p>	<p>Similar to our response to recommendation 2 (above), students in the program do not only lack a physical meeting space, they do not have a physical home. The Dean of Science is addressing the issue, but at this time, there are no available resources for a Biochemistry student space/home.</p> <p>The Institute of will continue to lobby with the Dean of Science for dedicated physical space that can promote wellness and a sense of belonging in Biochemistry students.</p>	Not applicable
<p><b>4. Weakness (Curriculum Review):</b> A curriculum review that focuses on (i) teaching gaps and redundancies as there appears to be both considerable content overlap between year 2 and 3 courses and potential omissions; (ii) quantification of assessment methods as it is not clear if the learning outcomes of the program are being met. Students in the Biochemistry program should be involved on the Curriculum review committee together with faculty, and in the cyclic program review process.</p>	<p>The Institute of Biochemistry has recently established a Curriculum Committee which will assess a) teaching gaps and redundancies within the Biochemistry Programs and b) quantification of assessment methods for learning outcomes, both within programs and within courses. Students within the Biochemistry programs will be recruited in future Biochemistry Curriculum Committees and will continue to be recruited in Cyclic Program Review Committees.</p>	<p>Curriculum Committee and Director</p> <p>Action partly taken and ongoing thereafter</p>	<p>Inspired by the External Reviewers' Report, the Curriculum Committee began a curriculum review to modernize our curricula. These conversations will take time as they need to consider:</p> <ul style="list-style-type: none"> <li>- Our future strategic plan</li> <li>- Interests of new members of the Institute</li> <li>- Interests of our student population</li> <li>- Carleton priorities in job-readiness, EDI, indigenization, and sustainability</li> </ul> <p>Inevitably, these conversations will result in new and aspirational learning outcomes (LO) that will further drive curriculum changes. Curriculum mapping to identify gaps, redundancies, and appropriate artifacts for LO will be central to this</p>	No. Calendar changes to be initiated once this work is completed

			exercise. This is a multi-year process. Our goal is to have a new set of modernized LO in time for the 2024-25 CPR.	
<b>5. Weakness (Retention):</b> Rendering courses in years 3 and 4 that are more attractive to students will improve retention in the program.	Addition of a number of new courses to the third and fourth year of all Biochemistry programs have improved the overall variety. Addition of Biotechnology courses into the Biochemistry and Biotechnology program have also improved this program and distinguished it from other Biochemistry programs. However, the lack of available Full-Time Faculty has caused some courses to not be delivered on a yearly basis, if at all. Biochemistry will re-prioritize the delivery schedule of these courses and request addition CIs in the short term, although Full-Time Faculty (FTE) will be required to ensure consistency and stability in the delivery of these highly attractive courses. Additional courses will be discussed within the Curriculum Committee, to align the Institute's offerings with modern teaching and relevant topics for Biochemistry Programs.	Curriculum Committee and Director  Beginning Fall 2021 and ongoing thereafter	As part of efforts to modernize the curricula (see point #4), the Curriculum Committee identified minor curriculum changes relating to upper-year courses. Generally, the minor program changes aim to create space in our Biochemistry programs for courses that have proven (or will prove) to be popular with students. Some of the courses are more multidisciplinary in nature while others relate to current hot topics. These changes will help students tailor programs to their interests, which should help attract students and improve retention  Further modernizing our curricula will likely require major program changes that go beyond new combinations of existing BIOL and CHEM courses. It will require re-imagining existing courses with a modern twist and developing new courses that meet the needs of a modern biochemistry industry. It may also include creating a lower-level course that is unique to Biochemistry students to develop a sense of community. Ideas for new courses will stem from strategic planning, from the Faculty of Science's priorities, and new direct hires who meet those needs.	Yes. The minor changes in the 2022-2023 calendar were completed. The minor changes to the 2023-2024 calendar have been initiated.
<b>6. Concern (Assessment and Accommodations):</b> Develop policies and procedures to improve clarity for assessment and communication of accommodations for students.	Methods of assessment and accommodation for students should be assessed by the Biochemistry Curriculum Committee (see Weakness (Curriculum Review) above). Policies and procedures to improve clarity for assessment and communication of accommodations for students should be implemented into	Curriculum Committee and Director  Beginning Summer 2021-Fall 2021	The Faculty of Science, through the Office of the Dean of Science, has begun implementing that minimum course information be included in all Course Outlines provided to students. Among this information, assessment, accommodations, and the like are now indicated.	Not applicable

	<p>Biochemistry courses where they are lacking.</p>		<p>As examples of assessment clarity: Course Outlines must include due date for all course elements must be indicated and E-Proctoring statement.</p> <p>As examples of communication accommodations: Course Outlines must include the self-declaration form policy, information and guidance on late work (and whether there are penalties) as well as make-up tests and exams, and modality of learning for all elements of the course (online/in person, synchronous/asynchronous/blended or hybrid).</p>	
<p><b>7. Concern (Co-op Program):</b> If consistent, valuable and impactful experiences cannot be guaranteed for students in the co-op stream, the Institute should dissolve the co-op program.</p>	<p>All units within Science have the Co-op option in all of their programs. What should be sought after is to improve the number, variety, and quality of Co-op placements for Biochemistry students. This will involve working closely with the CU Cooperative Office to attain high quality placements, and successfully competing with other units both within and outside of the University to acquire them. Cooperative programs at other Canadian Universities should be analyzed for their procedures and successful practices should be implemented into the existing Biochemistry Co-op programs.</p>	<p>Co-op Coordinator and Director</p> <p>Ongoing</p>	<p>Little to no progress has been made on this front. The following tentative plan tackles two avenues for improving the quality of the co-op student experience.</p> <ol style="list-style-type: none"> <li>1) <b>Developing a working relationship with the co-op Business Development Team:</b> As a first step, the co-op advisor will develop a strong working relationship with the Business Development Team member dedicated to BSc programs. The Institute should aim to better understand who current employers are, and the types of positions available to all BSc students versus Biochemistry students. This information will be useful in supporting students during their search phase. Members of the Institute should also create a list of employers/contacts from their own networks to create new co-op offerings.</li> <li>2) <b>Better supporting our co-op students:</b> The co-op advisor should create a list of actions to take throughout the academic year to support students during their co-op experience. This includes regular check-in points during COOP 1000 (online modules), during student search phases (especially the first search phase), and</li> </ol>	<p>Not applicable</p>

			during placements. These frequent interactions will benefit students and the co-op advisor.	
<p><b>8. Opportunity (Creation of a Department of Biochemistry):</b> A Department of Biochemistry should be a long-term goal with the build-up of a critical mass of faculty.</p>	<p>An ultimate goal for the Institute. With other units in Science, this will depend upon direct hires of Faculty into the Institute of Biochemistry to generate a critical mass. Neuroscience started as an Institute within Science, and with a dedicated group of Faculty and Administrators, was able to attain Department status. Biochemistry lacks the critical mass of Faculty. The graduate Specialization in Biochemistry within the Grad Programs of Biology and Chemistry furthers this goal and will be further developed as full programs (rather than Specializations). The realization of Departmental status will allow standalone graduate programs (MSc/PhD) in Biochemistry and allow Faculty (specifically Professors) to be appointed 100% to Biochemistry, without the need to be cross-appointed to another Department in order to supervise Graduate Students.</p>	<p>Director</p> <p>Ongoing</p>	<p>This is a long-term goal of the Institute. Arguments for a critical mass of direct hires in the Institute of Biochemistry will be stronger once a longer-term vision of Biochemistry at Carleton has been articulated. Hosting consultations for the development of a strategic plan (2024-2030) is the first step towards that goal.</p>	<p>Not applicable</p>

**Biochemistry**  
**Update on Learning Outcomes Assessment Activities**  
**Programs Being Reviewed: Biochemistry**  
**Completed by: Tyler Avis**

**1. Who is responsible for the assessment of program learning outcomes?**

- Learning Outcomes Assessment Committee
- Undergraduate/Graduate and/or Curriculum Committee(s)
- All faculty in unit
- Other:

**2. Which program learning outcomes have been assessed since your last CPR? If no assessment activities were undertaken, please provide a rationale and describe what is required in order for assessment to take place moving forward.**

Since our last CPR, we evaluated two distinct Learning Outcomes (LO):

LO1 – Designs and conducts original research on a topic relevant to Biochemistry

LO4b – Communicates scientific information in writing using strategies appropriate for scientific audiences

For both LO, we used the main deliverable, the written theses, from the courses BIOC 4907 and BIOC 4908 as artifacts. The artifacts were generated by students in 2020-21, 2021-21, and 2022-23. Since the artifacts were evaluated all at once (January 2023), there has not yet been an opportunity to suggest course improvements for students to achieve LO1 and LO4b.

The LO Assessment Committee aims to share its observations with members of the Institute during an open consultation. Together, members of the Institute will formulate recommendations to better assist students in achieving LO1 and LO4b. Recommendations will aim to scaffold building blocks throughout the degree programs and achieve mastery in capstone courses.

**3. Did you follow your assessment plan? If not, how did your assessment plan change and why?**

We did not follow the initial assessment plan described in Cyclical Program Review Workbook (Volume I). We failed to implement a methodology to do so. Having now experimented with the evaluation of two LO, we feel more confident with the on-going assessment of LO. Concrete actions we have taken include creating a committee for the annual assessment of LO. The committee aims to host an annual one-day LO Assessment Retreat in the month of May to review student artifacts, evaluate LO, and formulate recommendations for improvement. The membership of the Institute will be invited to participate in the LO Assessment Retreat, such that more faculty members and staff can participate in conversations relating to course and program improvement. The committee is also open to novel methods of assessment that involves students, such as a program-level portfolio in which students regularly interact with program LO.

**4. What methods have been used to assess the program level learning outcomes? (check all that apply)**

- Reviews of examples of student work
- cuPortfolio
- Student surveys or focus groups
- Faculty retreats or discussion sessions
- Reviews of program curricula and courses (*includes efforts to align course and program learning outcomes*)
- Other \_\_\_\_\_

**Provide additional details if necessary:**

**5. What assessment activities are planned between now and your next CPR? Provide specific LOs and timeframes.**

The next CPR will be conducted during the 2024-25 academic year. Over the next two years, we will deviate from our proposed CPR workbook and evaluate LO that will be most telling for our on-going curriculum review. Therefore, we plan to evaluate the following LO at annual LO Assessment Retreats in May of each year: 2022-23: LO6b and LO6c; 2023-24: LO2 and LO3; 2024-25: LO4c and LO8. During this time, we will continue program review consultations to modernize our curricula in preparation for the 2024-25 CPR. The Institute of Biochemistry will host numerous consultations to discuss our future strategic plan, interests of new members of the Institute, interests of our student population, and Carleton priorities in job-readiness, EDI, indigenization, and sustainability. Inevitably, those conversations will result in new and aspirational LO that will further drive curriculum changes. Curriculum mapping to identify gaps, redundancies, and appropriate artifacts for LO will be central to this exercise. This is a multi-year process. While we will evaluate current LO as outlined above, our goal is also to have a new set of modernized LO in time for the 2024-25 CPR, which will be evaluated for the first time in 2025-26.