Molecular Imaging Collaborative Specialization
Final Assessment Report &
Implementation Plan
May, 2020

Faculty / Affiliated University College	Schulich School of Medicine & Dentistry Faculty of Science
Participating Programs	Anatomy and Cell Biology (MSc and Ph.D) Chemistry (MSc and Ph.D) Biochemistry (MSc and Ph.D) Biology Medical Biophysics (MSc and Ph.D) Pathology and Laboratory Medicine (MSc and Ph.D) Microbiology and Immunology (MSc and Ph.D)
Date of Last Review	First review since inception
External Consultants	None –desk audit
Internal Reviewer	Thomas Drysdale,
Date of Site Visit	Various meeting dates and time set up by internal
Date Review Report Received	January 15, 2020
Date Specialization/ Faculty Response Received	March 22, 2020
Evaluation	**Good Quality with Report Due October 2021**
Approval Dates	SUPR-G: June 1, 2020 SCAPA: September 9, 2020 Senate (FYI only): September 18, 2020
Year of Next Review	Year of next cyclical review - 2025-2026

Overview of Western's Cyclical Review Assessment Reporting Process

In accordance with Western's Institutional Quality Assurance Process (IQAP), adopted on May 11,2011, revised June 22, 2012, this Final Assessment Report (FAR) provides a summary of the cyclical review, internal responses and assessment and evaluation of the **Molecular Imaging Collaborative Specialialization** delivered by the Schulich School of Medicine & Dentistry and the Faculty of Science.

This report considers the following documents:

- the self-study
- the internal consultants' report
- the response from the Director of the Specialization

The Final Assessment Report identifies the strengths of the specialization, opportunities for the specialization's enhancement and improvement, and details the recommendations of the consultants and prioritizes those recommendations that are selected for implementation.

The Implementation Plan details the recommendations from the Final Assessment Report that are selected for implementation, identifies who is responsible for approving and acting on the recommendations, any action or follow-up that is required and the timeline for completion.

The Final Assessment Report and Implementation Plan is sent for approval through SUPR-G and SCAPA, then for information to Senate and the Ontario Universities' Council on Quality Assurance and is made available on a publicly accessible location on Western's IQAP website The Final Assessment Report and Implementation Plan is the only document resulting from the Graduate cyclical review process that is made public, all other documents are confidential to the Specialization /School/Faculty and SUPR-G.

Defining a Collaborative Specialization at Western[1]

A Collaborative Specialization is an intra-university graduate field of study that provides an additional multidisciplinary experience for students enrolled in and completing the degree requirements for one of a number of approved masters and/or PhD programs. Students meet the admission requirements of and register in the participating (or "home") program but complete, in addition to the degree requirements of that program, the additional requirements specified by the Collaborative Specialization. The degree conferred is that of the home program, and the completion of the collaborative program is indicated by a transcript notation and/or adjunct qualifications to the degree.

Students are registered in the participating degree program, meeting the requirements of the participating program as well as those of the collaborative program.

A Collaborative Specialization must have:

• At least one core one-semester course that is foundational to the specialization and does not form part of the course offerings of any of the partner programs.

This course must be completed by all students from partner programs registered in the specialization and provides an opportunity for students to appreciate the different disciplinary

[1] Description retrieved from http://oucqa.ca/framework/1-6-definitions/.

perspectives that can be brought to bear on the area of specialization. This course may serve as an elective in the student's home program.

• Clear and explicit requirements for each Collaborative Specialization.

In programs requiring a major research paper, essay, or thesis, the topic must be in the area of the collaborative specialization. In course-only Master's programs, at least 30% of the courses must be in the area of specialization including the core course described above. Courses in the area of specialization may be considered electives in the home program.

• core faculty who are the faculty members in the participating home programs who have an interest and expertise in the area of the collaborative specialization (this may include faculty appointed 100% to an interdisciplinary academic unit).

• appropriate administrative and academic oversight/governance in place to ensure requirements associated with the specialization are being met.

Executive Summary (from the Self-Study – Volume 1)

Molecular imaging is a multidisciplinary field of research that brings together the following areas of expertise:

- molecular, cell and developmental biology;
- radiochemistry and synthetic and medicinal chemistry; and,
- diagnostic imaging.

Instituted in 2009, Western's Collaborative Graduate Specialization in Molecular Imaging supports a community of graduate students with interests in molecular and cell biology, chemical probe development and diagnostic imaging. Investment in the training of highly qualified personnel, such as graduate students, is required to provide a uniquely trained workforce for leading the innovations in biomedical research through molecular imaging. The aim is to train young scientists in a multidisciplinary environment who will go on to make significant advances in the discovery of new therapies of chronic diseases by the imaging of genes, molecules and cells *in vivo*.

Students have the opportunity to work with multidisciplinary research teams with a wide range of expertise in molecular biology, synthetic and radiochemistry and medical imaging. The specialization's faculty researchers are internationally recognized in their fields investigating:

- the molecular and cellular processes of cancer, diabetes, cardiovascular disease and muscular dystrophy;
- probes for imaging using a number of modalities such as positron emission tomography (PET), single photon emission computed tomography (SPECT), magnetic resonance imaging (MRI) and fluorescence; and,

- the development of micro-imaging technologies for animal models of disease, with the potential to translate their technologies into the clinic.

The graduate education experience includes: a course in Molecular Imaging and Medical Biophysics; a monthly journal club at which students present and critically evaluate the latest advances in the field; a seminar series with lectures from invited faculty both from and outside Western; and student travel stipends to attend the World Molecular Imaging Congress.

Innovative Features

- only program of its kind in Canada and one of four in the world
- recognized as a signature program at Western and aligns with the university's strategic plan
- uses Western's outstanding imaging facilities
- recruitment of excellent students who came to Western specifically for this program
- monthly student journal club at which students lead discussion on a recent advance in the discipline
- annual student travel grants to support research dissemination
- aligns with professional development programs at Western such as Own your future, MyGradSkills and Teaching & Learning Center initiatives.

Proposed Innovations

- increase internationalization of program by establishing student exchange programs and further develop collaborations with University of Michigan for a summer school program

Concerns identified

- lack of common national/international understanding of the term 'graduate specialization' when recruiting students to program
- lack of consistent maintenance of website and online presence
- need for ongoing administrative support

Review Process

For a Graduate Collaborative Specialization, an internal review is required consisting of a knowledgeable arm's-length reviewer from within the University. In this case the reviewer, Dr. T Drysdale, reviewed the Program's Self-Study and requested an additional document regarding the specialization's vision for the future.

Over the course of this review, the internal reviewer met with

- S. Dhanvantari & P. Foster, past and present Directors of the Collaborative Specialization
- Associate Dean (Graduate), Schulich School of Medicine & Dentistry
- Associate Dean (Graduate), Faculty of Science
- Graduate Chair, Chemistry
- Graduate Chair, Medical Biophysics
- Graduate faculty
- 10 graduate students/graduates

Following the onsite review, the reviewer submitted a comprehensive report of the findings which was sent to the Program Director for review and response.

These formative documents, including Volumes I and II of the Self-Study, the Internal Report, and the Program Response have formed the basis of this summative assessment report of the Molelcular Imaging Collaborative Graduate Specialization.

Strengths of the Specialization Identified by the Reviewer

- Mapping and articulation of Learning Outcomes
- Excellent faculty complement with a range of research and experiences
- Excellent collaboration between imagers and chemists
- Straightforward structure
- Strong foundational curriculum course
- Excellent library and research facilities
- Excellent students and completion rates

Areas of Concern Identified

- Lack of administrative resources to support this program specifically. Everything is handled by the Director who carries a significant research and teaching load
- No guarantee that annual financial support will continue each year
- Weak website presence
- Science presence handled by one graduate faculty

Reviewer's Recommendations

Reviewers' Recommendation	Specialization/Faculty Response
Develop an agreement and funding mechanism with university administration to ensure longevity and ongoing support for this specialization.	Agree that sustainable funding and administrative support would be most helpful to attend to the concerns identified above
Establish a temporal length of term for the Directorship and appoint a Steering Committee to support the administration of the program.	3-year Director's term and Advisory Committee (SAC) are in place
Update and maintain website presence	A person has now been appointed who will enhance and update the website
Create a database of graduate accomplishments	Excellent idea and currently in progress to be included on website
Review the faculty membership with a focus on recruiting new membership to ensure ongoing health	Agreed
Develop feedback mechanism from students about the foundational course	Agreed
Alignment and interactions with Stanford, Johns Hopkins and Michigan State should be further developed	Planning of the annual summer school is in progress. Continuing interactions are important to further development of the specialization.
Consider developing a 2nd foundational course for PhD students	Due to limited resources, attention is currently needed for continuing and then establishing the international relationships (above) and strengthening the undergraduate curriculum in Molecular Imaging.

Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. The Collaborative Graduate Specialization Chair/Director and/or Department Chair/Director, in consultation with SGPS and the Dean of the Faculty will be responsible for enacting and monitoring the actions noted in Implementation Plan. The details of progress made will be presented in the Deans' Annual Planning Document.

Recommendation	Proposed Action and Follow-up	Responsibility	Timeline
Encourage the University and Faculties to develop a funding mechanism to support the sustainability of collaborative specializations.	Director and Deans need to meet to devise a plan to support and ensure the secure administration of various collaborative specializations, and this one in particular. Funds currently allocated to the Specialization appear to be used to support student travel for research dissemination and it would be a shame to restrict those funds as currently used to support student success.	Director Dean of Schulich Medicine & Dentistry Dean, Science	October 2021
Review the faculty membership with a focus on recruiting new membership to ensure ongoing health	The current faculty in place are seen to be most suitable; the concern is for future planning and continuity. The Director and Advisory Committee should place this as a priority on their next agenda to ensure they have a strategic plan in place.	Director and Advisory Committee	January 2021

Develop feedback mechanism from students about the foundational course	The Director and Advisory Committee should develop a protocol for gathering student feedback about the effectiveness and efficacy of the foundational course.	Director Advisory Committee	January 2021

Other Opportunities for Specialization Improvement and Enhancement
None

Personnel Issues (Confidential and If Applicable)
None