Collaborative Specialization in Musculoskeletal Health Research
Final Assessment Report & Implementation Plan
October 2020

Faculty / Affiliated University College	Schulich School of Medicine and Dentistry
Participating Programs	Biomedical Engineering Chemical and Biochemical Engineering Electrical and Computer Engineering Mechanical and Materials Engineering Health and Rehabilitation Sciences Kinesiology Chemistry Anatomy and Cell Biology Biochemistry Epidemiology and Biostatistics Medical Biophysics Microbiology & Immunology Pathology & Laboratory Medicine Physiology and Pharmacology Anthropology
Date of Last Review	First review since inception
External Consultants	None –desk audit
Internal Reviewer	David Litchfield, Vice-Dean, Research & Innovation, Schulich School of Medicine & Dentistry
Date of Site Visit	September 24-25, 2019
Date Review Report Received	3/7/2020
Date Specialization/ Faculty Response Received	6/12/2020
Evaluation	**Good Quality**
Approval Dates	SUPR-G: January 18, 2021 SCAPA: February 3, 2021 Senate (for information only): February 12, 2021
Year of Next Review	Year of next cyclical review – 2026-2027

Overview of Western's Cyclical Review Assessment Reporting Process

In accordance with Western's Institutional Quality Assurance Process (IQAP), adopted on May 11, 2011, and revised June 22, 2012, this Final Assessment Report provides a summary of the cyclical review, internal responses and assessment and evaluation of the **Collaborative**

Specialization in Musculoskeletal Health Research (CMHR).

This report considers the following documents:

- the program's self-study – Volume 1
- the internal reviewer's report
- responses to the reviewer's report by the Department and Faculty Dean's Office.

This Final Assessment Report identifies the strengths of the program, opportunities for program enhancement, and prioritizes the recommendations of the external consultants. 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 Program/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

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

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 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

The Collaborative Specialization in Musculoskeletal Health Research (CMHR) was approved to commence in 2012 and has multiple participating Departments and Schools at Western including the Faculties of **Engineering** (Biomedical Engineering, Chemical and Biochemical Engineering, Electrical and Computer Engineering, Mechanical and Materials Engineering; **Health Sciences** (Health and Rehabilitation Sciences and Kinesiology); **Science** (Chemistry); the **Schulich School of Medicine & Dentistry** (Anatomy and Cell Biology, Biochemistry,

Epidemiology and Biostatistics, Medical Biophysics, Microbiology & Immunology, Pathology & Laboratory Medicine, Physiology and Pharmacology); and **Social Sciences** (Anthropology). The CMHR is affiliated with Western's *Bone and Joint Institute* and is recognized as one of Western's four *Clusters of Research Excellence*.

This multi-Faculty training program is unique in Canada and has been developed to provide trainees in undergraduate, master's, doctoral, and postdoctoral studies with the research and leadership skills necessary to develop transdisciplinary projects focused on bone and joint disorders. The long-term goal is to enable discoveries in musculoskeletal (MSK) research and to translate this new knowledge into improvements in disease prevention, health care, policy and commercialization.

The program's key objectives are:

i) to foster the development of future leaders in MSK health research;
ii) to enhance the number of trainees involved in transdisciplinary MSK health research; and,
iii) to support the career advancement of trainees in master's and doctoral programs.

CMHR provides its graduate students, referred to as trainees, with the scientific and leadership skills necessary to build transdisciplinary teams focusing on integrated approaches for the management of MSK conditions.

CMHR has been involved in regular, ongoing review of its programming since its inception that includes hosting workshops, town halls and open forums for feedback from trainees and faculty members. When developing the self-study brief, the CMHR utilized findings from these ongoing reviews and identified that its top priority would be to secure long-term sustainable funding.

Strengths/Innovative Features of the Program (as identified in the Program Brief)

- only program of its kind in Canada
- Recognized as one of Western's four *Clusters of Research Excellence*
- a comprehensive program that supports the training of MSK researchers at multiple levels from undergraduate through to postdoctoral studies
- students receive an annual stipend of ~$500 for professional development on top of other funding
- maintains ongoing evaluation of program content with students and faculty that has developed into continuous innovations including the development of a partnership with

the Ivey International Centre for Health Innovation to implement case-based workshops and learning modules.
- Hosts regular seminar series, retreats, conferences, trainee-led workshops, Ivey training modules
- Encourages professional development activities for trainees which are embedded as milestones and program requirements

Opportunities for development of the Program (as identified in the Program Brief)

- Secure sustainable funding vital to continued programming that will catalyze new research interactions and transdisciplinary research initiatives on campus.

Review Process

For a Graduate Collaborative Specialization, an internal review is required consisting of a knowledgeable arm's-length reviewer from within the University. The reviewer reads Volume I (the Program's Self-Study) and Volume II, and then engages in an onsite review.

Prior to his review, the internal consultant met with the Associate Vice Provost of the School of Graduate & Postdoctoral Studies to review the parameters of the review process for Collaborative Graduate Programs. He then received the self-study brief prepared by the program's co-directors in advance of his onsite visit.

During the visit, interviews were held with:

- CMHR program co-directors
- Faculty Mentors from the Training and Education Committee encompassing various departments
- Graduate Faculty and Chairs in affiliated departments
- MA and PhD students/trainees in the program
- Associate Dean of the Schulich School of Medicine and Dentistry

The reviewer also toured facilities used by the program, including the Skeletal Biology Laboratory, the Dental Sciences Building, the Biomedical Imaging Research Facilities, the Robarts Research Institute; the Wolf Orthopedic Biomechanics Laboratory, the Fowler Kennedy Sports Medicine Clinic at the 3M Centre; ADEISS (industry partner of the BJI), National Research Council Building, Western University Research Park; and the 3rd Floor Laboratories, Amit Chakma Engineering Building.

The internal reviewer then submitted a comprehensive report of his findings which was sent to the Graduate Chair and the Dean for review and response.

These formative documents, including Volumes I and II of the Self-Study, the External Report, the program response and the Dean's response, have formed the basis of this summative assessment report, collated and submitted to SGPS and the Senate Graduate Program Review Committee (SUPR-G) by the Internal Reviewer.

Summative Assessment – Reviewer's Report

The Collaborative Specialization in Musculoskeletal Health Research is a strong program that offers unique inter-disciplinary training opportunities to a diverse spectrum of graduate students. The CMHR capitalizes on research strengths across the areas of Basic biological and biomedical sciences, Physical sciences and engineering, Clinical investigation, as well as Health services and social, cultural, environmental and population health that represent the research themes of the BJI. The program offers a number of enrichment opportunities for trainees both related to interdisciplinary research in musculoskeletal health and in terms of professional development. Based on the quality of the training program, it can be envisaged that the CMHR prepares students for future careers in areas such as academia, industry (including the areas of biomedical imaging and medical devices), clinical investigation, health care delivery, rehabilitation, and health policy.

The [Collaborative Specialization in Musculoskeletal Health Research] CMHR represents a vibrant inter-disciplinary training program that offers rich training opportunities for graduate students.

Strengths of the Program

- Learning Outcomes that align with Western's Strategic Plan and the Western Doctoral Learning Outcomes
- Diverse expertise of highly capable faculty researchers across five Faculties with common focus in MSK; specifically, about 70 faculty members from five participating Faculties have supervisory privileges for trainees within the CMHR with expertise across each of the research themes
- Strong and stable enrolment of students
- Additional funding support to students
- Competent administrative team overseeing and constantly reviewing the program
- Inclusion of excellent professional development requirements for students

Areas of Concern Identified

- Thorough consideration of measures for assessment would further illustrate that Learning Outcomes are achieved by all trainees in the CMHR.

- Wide variety of faculty expertise but supervision currently is covered by only a few of the 70 members. Wider distribution could capitalize on the strengths and breadth of the interdisciplinary connections that are available.
- Encourage students to participate in the University's Own Your Future program
- Long-term funding of the program

Reviewer's Recommendations

The following are recommendations for consideration by the internal reviewer with the program's response in the right column.

Reviewers' Recommendations	**Faculty Response**
1. Ensure that the CHMR has adequate resources to sustain the role of Program Administrator.	Agreed – There is a plan to have funds committed and in place by January 2021.
2. Strengthen (and ideally expand) the group of faculty supervisors and mentors that are engaged in program delivery and oversight to ensure that the demands of sustaining the program extend beyond a small core of heavily invested individuals.	Agreed - Currently 20 of the 70 affiliated faculty members are teaching in the program providing breadth. The program course structures continue to evolve to include additional faculty involved in teaching and supervision.
3. Continue to develop and implement the communications plan as described in the appraisal brief to continue to raise the profile of the CMHR particularly to enhance recruitment from students outside Western.	Ongoing Focus - Over the last 4 years, an average of 48% of CMHR trainees completed their previous training from institutions other than Western. During the same period, recruitment of international trainees grew from 11 to 22%. The program continues to seek the best recruits locally, nationally and internationally through various means such as conferences and research institutes. Recently 125 trainees from across Canada attended a forum hosted by CMHR which enhances the program's visibility nationally.

Reviewers' Recommendations	Faculty Response
4. Align activities with other initiatives that are emerging related to career development (such as Own Your Future - OYF) within the community.	Ongoing Focus - All CMHR trainees are required to participate in additional programming through the Ivey Centre for Health Leadership (at least 2 of 4 workshops offered each year). Most trainees also participate in outreach activities organized by the Trainee Leadership Committee (TLC) and/or assist in undergraduate research trainee workshops. The program will work with supervisors and the TLC to encourage the development of individualized plans that balance CMHR requirements with the trainee's career goals.
5. Given the inter-disciplinary nature of the program, it is envisaged that the program could be very well positioned for funding from training programs such as NSERC – CREATE and/or programs that could emerge through the CIHR Strategic Planning Process.	The program co-Directors, with support from the Training and Education Committee will continue to pursue all opportunities available through the tri-council or otherwise to sustain the CMHR and partner to create opportunities for our trainees. For example, several CMHR trainees are also members of NSERC CREATE programs (i.e. CONNECT! NSERC CREATE Program in Soft Connective Tissue Regeneration/Therapy) or the CIHR funded Canadian MSK Rehab Research Network (hosted at Western). CMHR co-Directors will continue to monitor all funding opportunities to take advantage of any opportunities suited for large transdisciplinary training programs. Through the Bone and Joint Institute, CMHR co-Directors have also been working with Western's External Relations team (as detailed above) to secure ongoing support for the program.

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
1. Ensure that the CHMR has adequate resources to sustain the role of Program Administrator.	Provide confirmation that this has occurred	• CMHR Co-Chairs • Deans of participating faculties • SGPS	January 2021
2. Strengthen (and ideally expand) the group of faculty supervisors and mentors that are engaged in program delivery and oversight to ensure that the demands of sustaining the program extend beyond a small core of heavily invested individuals.	Refine program oversight and delivery structures/mechanisms with a focus on strengthening and expanding the number of faculty who are *actively engaged* in the program (e.g. through teaching and supervision)	• CMHR Co-Chairs • Training & Education Committee	January 2023
3. Given the inter-disciplinary nature of the program, it is envisaged that the program could be very well positioned for funding from training programs such as NSERC – CREATE and/or programs that could emerge through the	Ensuring sustainable funding for such a successful program is critical to its longevity and health. Assurance of funding will be vital to catalyze new research interactions and transdisciplinary research initiatives on campus. Parties need to	• CMHR Co-Chairs • Training & Education Committee • CMHR faculty • SGPS • Deans of participating Faculties	January 2023

Recommendation	Proposed Action and Follow-up	Responsibility	Timeline
CIHR Strategic Planning Process.	meet to develop an appropriate funding model including internal institutional resources and through external awards.		

Other Opportunities for Specialization Improvement and Enhancement
None

Personnel Issues (Confidential and If Applicable)
None