



**MSC & PHD
BOREAL ECOSYSTEMS
AND AGRICULTURAL
SCIENCES**

HANDBOOK 2026-2027

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Section One - Introduction

The boreal ecosystem dominates much of Canada's landscape, with approximately 10-12% of our landscape comprised of boreal peatland and 78% of our forests characterized as boreal forests. These two components of the boreal ecosystem play important economic and ecosystem service roles in our province, nationally and globally. Boreal ecosystems contain many of our nation's natural resources. Research on natural and human impacts in boreal systems is growing regionally, nationally and globally given the need for sustainable food security in the north and the susceptibility of boreal systems to human impacts such as climate change.

The Masters and Doctorate in Boreal Ecosystems and Agricultural Sciences (BEAS) programs are coordinated by the School of Science and the Environment at Grenfell Campus, Memorial University of Newfoundland. The master's program is a two-year thesis-based program which combines course learning and the completion of a thesis. Students will also have opportunities to participate in research assistantships (RAs) and teaching assistantships (TAs). The doctorate is a 4-year program comprised of a course in Issues in Boreal Ecosystems and Agricultural Sciences (BEAS 6000), a graduate research seminar (BEAS 6001) (Appendix B), a comprehensive examination, a research seminar and a thesis.

The BEAS program is designed to develop core competencies by providing students the opportunity to develop advanced knowledge and skills in theoretical and technical advances, equipped with a strong focus on plant, soil, land and water resources in the context of sustainable boreal agriculture and forestry. This program will focus on developing personal, methodological and advanced skills within an interdisciplinary context including the acquisition of quantitative and qualitative skills relevant to their area of specialization.

MSc – Learning Outcomes

Upon successful completion of the Master of Science in Boreal Ecosystems and Agricultural Sciences (MSc-BEAS) program, students will be able to demonstrate:

-  An advanced understanding of the concepts and principles governing boreal ecosystems and agriculture;
-  Advanced professional writing skills to allow conceptualization and development of comprehensive research programs, e.g., critical evaluation of scientific literature, formulation of research questions, hypothesis development, development and evaluation of research protocols and methodology; data collection, handling, analysis and interpretation, and as well as dissemination strategies;
-  Ability to conduct independent research projects under controlled and field conditions to answer research questions in areas such as agronomy, plant science, climate change, soil science/microbiology, ecology and land & water resources;
-  Understanding, and operational knowledge to carry out analytical activities on both laboratory and field equipment relevant to their area of specialization;
-  Ability to analyse and interpret the factors that can contribute to food security

and ecosystem sustainability in the context of climate change; and

- ✚ Ability to apply relevant knowledge, skills and technologies to assess issues and offer solutions to applied and environmental problems related to crop production/cropping systems, ecology and management practices in boreal ecosystems.

PhD – Learning Outcomes

Upon successful completion of the PhD (BEAS) students will be able to demonstrate:

- ✚ Advanced understanding of the concepts and principles governing natural and impacted boreal ecosystems;
- ✚ Advanced research methods, analytical techniques, and communication skills allowing effective dissemination of research through peer reviewed publications and oral and poster-based presentations at national and international conferences;
- ✚ An ability to reach out and work with community partners on issues of relevance;
- ✚ Be capable of planning and executing an independent research program;
- ✚ Relevant knowledge, skills and technologies to understand and investigate issues and develop practical solutions related to management of boreal ecosystems; and
- ✚ Leadership as scholars in academic institutions, research sectors in industry, government, NGOs, or other institutions.

Key Program contacts

Core Faculty

Dr. Lakshman W. Galagedara, B.Sc. (Peradeniya); M.Agr. (Obihiro); Ph.D. (Guelph)

Graduate Officer (BEAS)

Professor – Environmental Science (ENVS) & Boreal Ecosystems and Agricultural Sciences (BEAS)

Office No.: AS3020 | Phone: (709) 639-2565 | Email: lgalagedara@mun.ca

Dr. Mumtaz Cheema, B.Sc. (agricultural science), M.Sc., PhD (agronomy) (University of Agriculture, Faisalabad, Pakistan), Postdoc (Iowa State University of Science and technology, IA, Ames, US).

Professor – Boreal Ecosystems and Agricultural Sciences (BEAS)

Office: AS244 | Phone: (709) 639-6533 | Email: macheema@mun.ca

Dr. Adrian Unc, B.Sc. (Timisoara), M.Sc., Ph.D. (Guelph), Postdoc (Ottawa) Professor, – Environmental Science (ENVS) & Boreal Ecosystems and Agricultural Sciences (BEAS)

Office: FC2020 | Phone: (709) 637-7153 | Email: aunc@mun.ca

Dr. Cory Wallace, B.Sc. (British Columbia); Ph.D. (Wilfrid Laurier)

Assistant Professor – Environmental Science (ENVS) & Boreal Ecosystems and Agricultural Sciences (BEAS)

Office: AS222 | Phone: (709) 637-3014 | Email: cwallace@mun.ca

Affiliated Faculty

Dr. Camille Ouellett-Dallaire, PhD

Assistant Professor – Environment and Sustainability

Office: FC 2026 | Phone: (709) 639-7598 | Email: couelletedall@mun.ca

Dr. Chad Cuss

Assistant Professor – Environmental Inorganic/Geochemistry School of Science and the Environment

Office: AS 251 | Phone: (709) 639-2500 | Email: ccuss@mun.ca

Dr. Christina Smeaton, B.Sc. (Memorial-Grenfell Campus), M.Sc., Ph.D. (Windsor), Post-doctoral research (Waterloo)

Assistant Professor – Environmental Science

Office: AS 226-C | Phone: (709) 639-2549 | Email: csmeaton@mun.ca

Website: <https://christinasmeaton.weebly.com/>

Dr. Dmitry Sveshnikov, M.Sc. (Moscow), Ph.D. (Kiel)

Associate Professor – Environmental Science/Biology

Office: AS 213 | Phone: (709) 639-6528 | Email: dsveshnikov@mun.ca

Dr. Jianghua Wu, B.Sc. (Nanjing University), M.Sc. (Nanjing University), GIS Graduate Certificate (University of Southern California) Ph.D. (McGill)
Professor – Environmental Sustainability
Office: AS 2022 | Phone: (709) 639-2735 | Email: jianghuaw@mun.ca | [Web Page](#)

Dr. Julie Sircom
Associate Professor – Environmental Science
Office: AS 3015 | Phone: (709) 639-6515 | Email: jsircom@mun.ca

Dr. Karen Doody, B.Sc. Hons (Dalhousie), Ph.D. (McGill)
Assistant Professor – Environmental Science (Chemistry)
Office: AS 3010 | Phone: (709) 637-7310 | Email: u06kmd@mun.ca

Dr. Mano Krishnapillai, B.Sc. (Peradeniya), M.Phil. (Postgraduate Institute of Agriculture), Ph.D. (Manitoba)
Associate Professor – Environmental Science
Office: AS 3018 | Phone: (709) 637-6272 | Email: n62mk@mun.ca
Website: <http://www.grenfell.mun.ca/mkrishna>

Dr. Morteza Haghiri, B.Sc., M.Sc. (Tehran/Iran), Ph.D. (Saskatchewan)
Professor – Environment & Sustainability (Economics)
Office: AS 394 | Phone: (709) 637-7166 | Email: mhaghiri@mun.ca

Dr. Peter Stewart, BA, (Memorial), Ph.D. (McMaster)
Associate Professor – Program Chair (Psychology)
Office: AS 340 | Phone: (709) 639-2504 | Email: r9ps@mun.ca

Dr. Robert Gallant, Ph.D. (Waterloo)
Associate Professor – Computational Mathematics
Office: AS 3028 | Phone: (709) 639-2564 | Email: h79rpg@mun.ca

Dr. Sean Boyle, B.Sc. (Brock), PhD (Laurentian)
Assistant Professor – Environmental Science (Biology)
On Leave for the Spring & Fall 2025 Semester
Office: AS 215 | Phone: (709) 637-2883 | Email: spboyle@mun.ca

Dr Shagufta Shetranjiwalla
Assistant Professor – Environment-Chemistry, School of Science and the Environment
Office: AS 240 | Phone: (709) 639-2502 | Email: sshetranjiwa@mun.ca

Adjunct Faculty

Dr. Erin Fraser, B.Sc. (Toronto), M.Sc., Ph.D. (Western Ontario) Professor
– Environmental Science/Biology
Email: efrase4@uwo.ca

Other Affiliated and Adjunct Faculty can be found at: [Faculty + Staff | Grenfell Campus | Memorial University of Newfoundland](#)

Office of Research and Graduate Studies Staff

Dr. Todd Hennessey
Interim Director Office of Research and Graduate Studies
Office: FC 4027
Phone: 709-639-6533
Email: b2jth@mun.ca

Nadia Simmons
Graduate Programs Administrator, Grenfell Campus
Office: FC 4025B
Phone: 709-639-6585
Email: nadiaz@mun.ca

Debbie Pike
Intermediate Secretary
Office: FC 4020
Phone: 709-637-7193
Email: demchugh@mun.ca

Lan Ma
Research Financial Service Officer, Grenfell Campus
Office: AS 320
Phone: 709-639-7596
Email: f99lm@mun.ca

Akseli Virratvuori
Grants Facilitation Officer Graduate Studies
Office: FC 4022
Phone: 709-216-7373
Email: aavirratvuor@mun.ca

Grenfell Campus Directory

[Welcome | Grenfell Campus | Memorial University of Newfoundland \(mun.ca\)](#)

School of Grad Studies (SGS) - St. John's Campus Contacts

[School of Graduate Studies Contacts](#)

Section Two - Program Structure

MSc- BEAS Program Flow Year 1

Fall	Winter
BEAS 6000 - Issues in Boreal Ecosystems and Agricultural Sciences	BEAS 6002 – Advanced Quantitative Research Methods for the Natural Sciences
BEAS 6001 – Graduate Research Seminar	
1 Elective from Table 1 to be completed in the Fall or Winter Semester	
	Thesis proposal Thesis research begins

Year 2

Fall	Winter	Spring
Thesis research continues	Completion of thesis research Thesis writing begins	Submit thesis for examination Seminar presentation of Thesis

Note: This chart reflects the normal program outline for full-time students, individual programs may vary.

PhD- BEAS Program Flow

- 1) Issues in Boreal Ecosystems and Agricultural Sciences (BEAS 6000)
- 2) Graduate Research Seminar (BEAS 6001) (Appendix B)
- 3) Comprehensive Examination Procedure and Timeline (*To be completed before the end of the 7th semester*)
 - a) **Sub-discipline Notification (3 months before the oral exam)** - The supervisor notifies the candidate, with copies to the Graduate Officer and co-supervisor (if applicable).
 - b) **Formation of the Examination Committee** - Soon after notifying the sub-discipline, the Graduate Officer, in consultation with the supervisor, appoints the examination committee. Within 4–5 weeks of the sub-discipline notification, the committee finalizes the paper/report title.
 - c) **Title Notification (6 weeks before the oral exam)** - The Chair informs the candidate of the approved title, with copies to the examination committee.
 - d) **Submission of Paper/Report (within 4 weeks)** - The candidate submits the completed paper/report to the examination committee.
 - e) **Committee Review (10 days)** - The committee reviews the submission to confirm it is suitable to proceed to the oral examination.
 - f) **Oral Examination (within 3 months of sub-discipline notification)** - The oral exam is held within the 3-month window. If scheduled earlier, written (email) confirmation from the candidate is required.
- 4) Research seminar
 - a) The research seminar must be completed in the semester immediately preceding the thesis-defense semester.
- 5) Thesis

*Students who have completed the course work for the MSc (BEAS) will not be required to re-take these two courses. However, students may be required to take additional courses in consultation with the student's thesis supervisory committee to fill the gaps related to the research project if required.

1. In order to continue in the School of Graduate Studies and in order to qualify for a Masters or PhD degree, a candidate shall obtain an A or B grade in each program course.
2. When it has been determined, on the basis of consultation with the candidate, the instructors in graduate courses, and the thesis or report Supervisor, that a candidate's work has fallen below a satisfactory level, the Supervisor or the Head of the academic unit may recommend to the Dean that such a candidate be required to withdraw from the program.

Elective Courses

These courses are offered on a rotating basis at Grenfell Campus. Please consult the Graduate Officer to determine which courses are offered in the upcoming academic year.

Other special topic and reading courses offered in the past

BEAS 6053: Issues in Fertility of Boreal Soils

BEAS 6054: Applied Hydrogeophysics

BEAS 6051: Applied Bioinformatics

BEAS 6055: Machine Learning from Data

BEAS 6056: Stable Isotope Techniques for Estimating Origins of Migratory Animals in the Canadian Boreal Biome

Research Area	Course code	Course name
Plant Science	BEAS 6020	Management of Crop Nutrition
	BEAS 6021	Organic Farming for Sustainable Agriculture
	BEAS 6022	Plant Biochemistry
	BEAS 6023	Plant Physiology
Soil and Land Resource	BEAS 6030	Chemical Speciation Modeling for Environmental Matrices
	BEAS 6031	Soil Functions: Soil as a Bioreactor
	BEAS 6032	Environmental Soil Physics
	BEAS 6033	Soil and Water Conservation
Water Resources	BEAS 6040	Advanced Groundwater Management
	BEAS 6041	Applied Hydrology
	BEAS 6042	Soil and Groundwater Remediation
Other	BEAS 6052	Statistical Model Building in Boreal Ecology
	BEAS 6058	Introduction to Life Cycle Assessment

BEAS 6057: Soil Biogeochemistry

BEAS 6059: Theoretical Ecology

BEAS 6060: Applied Analytical Chemistry

BEAS 6050: Colloids and Natural Nanoparticles in Aquatic Systems

Section Three – Research Facilities

Boreal Ecosystem Research Facility (BERF)

The BERF facility houses 4 state of the art laboratories, all located in the Forest Center building (FC). The labs (FC1010, FC1012, FC1013 and FC4019) are equipped with high-level research resources able to support federal, provincial, university and private sector research priorities in forestry, agriculture, and the environmental sector. The focus of the research conducted in the BERF labs are soils, plants, air, and water based on the multidisciplinary expertise of faculty members (agronomist, soil scientist, plant/crop scientists, agriculturist/forester/ecologist and hydrologist). Learn more about the [Boreal Ecosystems Research Facility](#).

To conduct research experiments under controlled environment, one walk in growth chamber and two low temperature growth chambers are available at Grenfell Campus, MUN.

Western Agriculture Center and Research Station

Field research trials are conducted at Western Agriculture Center and Research Station (WACRS) , Pasadena, approximately 40 km away from Grenfell Campus. The research is managed by the Department of Fisheries, Forestry and Agriculture (DFFA), Government of NL and Grenfell Campus MUN researchers and research scientists from DFFA have established research collaboration to carry out graduate student's research and individual faculty research projects at WACRS.

BERF Research Support

There are 2 Laboratory Research Coordinators who oversee lab safety, maintenance, and organization of the BERF facility, including equipment's operation and maintenance. Laboratory Research Coordinators are available to provide support for students working in the BERI labs from Monday to Friday, during regular working hours, and are located in FC1014.

Currently, Dr. Tao Yuan (Analytical Chemist) and Dr. Natalia Sveshnikova (Molecular Biology) are providing research and operational support in the BERI labs.

From the student perspective

Students are required to complete 2 online safety courses (SC-1807-001 and SC-1808-001) prior of having an in-person safety walk (BERF and RecPlex) with one of the BERF Laboratory Research Coordinators.

Those 2 courses (Laboratory Safety and WHMIS) and the in-person safety walk are the minimum safety requirement to work in one of the BERF labs, which means all students who are currently working in the labs, have had all 3 courses done in their first week at Grenfell.

Functional Foods Sensory Lab (FFSL)

The FFSL examines "functional foods" – natural or processed food products with known health benefits beyond basic nutritional needs, such as the antioxidants in blueberries, eggs enhanced with omega 3 fatty acids or the probiotics associated with yogurt.

The FFSL includes computerized sensory analysis systems and software with multiple lighting and video recording capabilities, freezers and coolers, small food processors, specialized instrumentation for testing food properties and small equipment for food preparation (vacuum-package machine, temperature/energy controlled microwave, sous-vide machine, slow cooker), as well as a cryo-microtome for producing thinly sliced samples for spatial, qualitative and quantitative nutrient or contaminant analyses. The lab has unique analytical capacity to discern the chemical determinants of consumers' sensory perception of taste, aroma, texture, colour, overall acceptance and preferences for the evaluated food.

Section Four – Thesis

The Masters' thesis describes research completed during the student's academic program at Memorial University and should demonstrate an ability to carry out research and to organize results.

Guidelines for Formatting and Submitting your thesis

Guidelines for formatting your thesis and the submission process are available online, [Theses and reports | School of Graduate Studies | Memorial University of Newfoundland](#).

Students should submit a draft of their thesis to their supervisory committee for approval 2-6 weeks before the deadline for submission of thesis for examination and make necessary revisions on the advice of the supervisory committee.

Students should also submit an Application for Graduation through [Memorial Self-Service](#) under the Graduation menu option.

Students should submit an electronic copy to the supervisor in PDF and Microsoft Word versions.

Thesis examination may take up to 6 weeks or longer. In order to ensure an arms-length examination process, contact with examiners during this time is limited to the Office of the Dean of Graduate Studies. Information on the possible outcomes of a thesis examination, time limits for revisions, and re-examination procedures can be found in the [2026-2027 University Calendar](#). Required revisions and corrections are made by the student in consultation with the supervisory committee.

The final version of a thesis found acceptable with or without corrections shall be submitted to the University within six months of the date on which the thesis and examiners' reports are returned to the student's academic unit.

For final submission, all graduate students are required to produce one electronic copy of their thesis to the Head of their academic unit.

The final version of your thesis should be in PDF/A format (needed for the long-term archiving of electronic theses) and **use the following naming convention: lastname_firstname_middlename_finalsubmissionmonthandyear_degree.pdf** (e.g., **Smith_John_James_122013_PhD.pdf**).

Once approved by the Head of the academic unit, the electronic copy of the thesis and any associated supplementary files should be uploaded to the University Library using the e-thesis submission form on my.mun.ca portal. A confirmation email will be sent to your @mun.ca email account once you have successfully submitted your thesis.

If required, a completed Request to Include Copyright Material form should be uploaded along with the thesis as a supplementary file.

Students must maintain their graduate registration until all academic requirements for their degree including thesis corrections have been met.

Thesis Submission Timeline

Doctoral Thesis Examination and Oral Defence Procedures

Pre-Submission			
Step	Time Req'd	Candidate/Academic Unit	SGS
1	2-6 weeks ²	Candidate submits a draft of the thesis to the supervisory committee for approval and applies online to graduate through Memorial Self-Service .	
2		Head/Graduate Officer contacts potential examiners (with advice from supervisors).	
Submission/Examination			
3	1 day	Head/Graduate Officer/Delegate forwards PDF thesis, Supervisory Approval Form , Appointment of Examiners Form , using Hybrid or Remove Defence) and Change of Program Form (if applicable) to SGS.	SGS acknowledges receipt of the attachments and verifies completion of program requirements.
4	1-2 working days		SGS sends the appointment letter, forms and thesis to the examiners.
5	4 weeks		SGS records and monitors the examination process. ¹
6	1-2 working days		SGS receives the examiners' reports; notifies the academic unit of decision to proceed to defence by email and confirms defence date.
Oral Defence			
7	1-2 working days	SGS	SGS sends web conferencing link to the student, examination committee, supervisory committee, and academic unit when defence is confirmed.
8	1-5 working days		SGS arranges the defence and appoints the Chair; prepares and posts notice of the defence of MUN Events and SGS Events Calendar.
9	Day of defence		SGS hosts pre-meeting and defence; candidate is notified of the outcome after the defence.
Post Defence			
10	Minor revisions - 6 months; Major revisions - 12 months	Candidate makes the required corrections in consultation with the supervisor; submits final version in PDF/A format to the Head of the academic unit for approval.	
11		Once the final version of thesis is approved by the Head of the academic unit, the candidate submits the final thesis in PDF/A format, the Request to Include Copyright Material form, if required, and a metadata file to sgs@mun.ca . Head submits the Recommendation for the Award of a Graduate Degree Form to SGS.	SGS records the date of receipt as the "Program Complete" date.
12			SGS clears successful candidate academically for convocation and automatically issues a letter to the candidate via MUN email.

¹ Candidates should be aware that examining a thesis is offered as a professional service courtesy by examiners. The actual time require may therefore vary considerably (and in some cases extend beyond four weeks). In order to ensure the impartiality and integrity of the arm's-length examination process, only the School of Graduate Studies may be in contact with examiners during this time.

The thesis Examination and Oral Defence Procedures form is available here [Doctoral Examination Procedures](#).

Section Five - Comprehensive Exams (for PhD Students)

The comprehensive examination will be held upon completion of all course work, and must be completed no later than the seventh semester of the student's program ([Comprehensive Examinations](#)). The examination will consist of both written and oral components. As part of the process, the student will be required to write a paper on the theoretical background of his or her research project. The comprehensive examination will assess the material related to this paper as well as fundamental concepts in the context of boreal ecosystems. The topic for the paper will be assigned by the Examination Committee, which will also determine the submission deadline for the paper, and the date of the examination. The Graduate Officer will communicate the paper topic and relevant guidelines to the student at least six weeks before the examination, if possible, but no later than four weeks in advance. The student will have four weeks to write and submit the paper. The Examination Committee then have two weeks to review the paper and determine whether student may proceed to the oral examination. This paper will form the basis of a public seminar.

During the oral examination, the Examination Committee will ask questions related to the paper, its subject matter, and its broader relevance to Boreal Ecosystems and Agricultural Sciences. The student will be notified of the designated sub-discipline by their supervisor a minimum of three months prior to the anticipated oral examination date, allowing sufficient time to prepare for the comprehensive examination. In addition, each candidate will also be required to prepare and present one public seminar (to members of the SSE) on the topic of his/her thesis during their four-year degree period. Students are required to submit a thesis present their final thesis to members of the SSE and satisfactorily defend their thesis in an oral examination following the SSE presentation. The thesis is expected to be an original and substantial contribution to research in the areas of his/her relevant research project. The thesis examination committee will be comprised of: one external examiner (from outside MUN), one internal examiner (from a related program within MUN), two supervisory committee members, and a chair (drawn from BEAS program members who are not members of the supervisory committee).

Section Six – Important Dates and Deadlines

Please find important dates at the following site: [Important dates and deadlines | Office of the Registrar | Memorial University of Newfoundland \(mun.ca\)](#).