

INTEGRATIVE BIOLOGY

The Department of Integrative Biology is comprised of faculty members in three overlapping fields and offers MSc and PhD degrees in:

- **Ecology**
- **Evolutionary Biology**
- **Comparative Physiology**

The three areas of emphasis focus on (but are not restricted to), experimental approaches in field and laboratory settings and a strong linkage between theoretical and applied investigations. The Department encourages students to pursue interdisciplinary research and, where appropriate, utilize faculty expertise from across campus on their advisory committees.

Research is focused on a wide variety of organisms (from microbes to plants to animals) at multiple levels of organization (from molecules and cells through to entire ecosystems). Basic research is being used as a foundation to address some of the most important regional and global issues.

See the department website (<https://www.uoguelph.ca/ib/>) for additional information.

Administrative Staff

Chair

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Graduate Faculty

This list may include Regular Graduate Faculty, Associated Graduate Faculty and/or Graduate Faculty from other universities.

Josef D. Ackerman

B.Sc. Toronto, MA SUNY, PhD Cornell - Professor
Graduate Faculty

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B.Sc. Dalhousie, M.Sc. Guelph, PhD Imperial College - Associate Professor
Graduate Faculty

Sarah Alderman

BA, PhD Guelph - Assistant Professor
Graduate Faculty

Timothy Bartley

B.Sc., PhD Guelph - Contractually Limited Faculty
Associated Graduate Faculty

Joey Bernhardt

B.Sc. Brown, PhD British Columbia - Assistant Professor

Graduate Faculty

Nicholas J. Bernier

B.Sc. McGill, Diploma Aquaculture Malaspina College, M.Sc. British Columbia, PhD Ottawa - Professor
Graduate Faculty

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B.Sc. British Columbia, M.Sc. Alberta, PhD Washington - Professor
Graduate Faculty

Christina M. Caruso

BA Oberlin College, PhD Illinois - Associate Professor
Graduate Faculty

Kathleen Clarke

BA/B.Ed., M.Ed. Brock, PhD OISE Toronto -
Associated Graduate Faculty

Karl A. Cottenie

M.Sc., MS, PhD K.U. Leuven - Professor
Graduate Faculty

Sherri Cox

DVM, MBA, PhD Guelph - Assistant Professor
Graduate Faculty

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B.Sc. Guelph, M.Sc. Queen's, PhD Guelph - Associate Professor
Graduate Faculty

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B.Sc., M.Sc. Windsor, PhD Washington - Retired Faculty, Integrative Biology, University of Guelph
Associated Graduate Faculty

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B.Sc., M.Sc., PhD Guelph - Retired Faculty, Integrative Biology, University of Guelph
Associated Graduate Faculty

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B.Sc., PhD Guelph - Professor, University of Manitoba
Associated Graduate Faculty

Maira Ferguson

B.Sc., M.Sc., PhD Guelph - Retired Faculty, University of Guelph
Associated Graduate Faculty

John M. Fryxell

B.Sc., PhD British Columbia -
Associated Graduate Faculty

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Graduate Faculty

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B.Sc. McGill, M.Sc., PhD Montreal - Assistant Professor
Graduate Faculty

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B.Sc., M.Sc. Guelph, PhD Simon Fraser - Professor
Graduate Faculty

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B.Sc. York, PhD Saskatchewan - Research Scientist, Environment and Climate Change Canada
Associated Graduate Faculty

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B.Sc. Victoria, M.Sc. British Columbia, PhD Toronto - Assistant Professor
Graduate Faculty

T. Ryan Gregory

B.Sc. McMaster, PhD Guelph - Professor
Graduate Faculty

Michael Griesser

B.Sc., M.Sc. Zurich, PhD Uppsala - Independent Group Leader, Biology, University of Konstanz
Associated Graduate Faculty

Cortland K. Griswold

B.Sc. Wisconsin, M.Sc. Toronto, PhD British Columbia - Professor
Graduate Faculty

Daniel Grunspan

B.S. Texas A&M, PhD Washington - Assistant Professor
Graduate Faculty

Mehrdad Hajibabaei

B.Sc. Tehran Azad, PhD Ottawa - Professor
Graduate Faculty

Robert Hanner

B.Sc. Eastern Michigan, PhD Oregon - Professor
Graduate Faculty

Brian Hayden

B.Sc., PhD Dublin - Assistant Professor
Associated Graduate Faculty

Paul D. N. Hebert

B.Sc. Queen's, PhD Cambridge, FRSC - Professor
Graduate Faculty

Andreas Heyland

B.Sc., M.Sc. Zurich, PhD Florida - Professor
Graduate Faculty

Myra Hird

BSW Windsor, MSW McGill, PhD Oxford -
Associated Graduate Faculty

Brian C. Husband

B.Sc., M.Sc. Alberta, PhD Toronto - Professor
Graduate Faculty

Shoshanah Jacobs

B.Sc. M.Sc. New Brunswick, PhD Ottawa - Professor
Graduate Faculty

Frederic Laberge

B.Sc., M.Sc. Laval, PhD Manitoba - Associate Professor
Graduate Faculty

Hafiz Maherali

B.Sc. McGill, M.Sc., PhD Illinois - Professor
Graduate Faculty

Elizabeth Mandeville

B.Sc. Yale, PhD Wyoming -
Associated Graduate Faculty

Georgia Mason

BA, PhD Cambridge - Professor
Graduate Faculty

Kevin S. McCann

BA Dartmouth, M.Sc., PhD Guelph - Professor
Graduate Faculty

Bailey McMeans

B.Sc, Middle Tennessee State, M.Sc., PhD Windsor - Assistant Professor, Biology, University of Toronto-Mississauga
Associated Graduate Faculty

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B.Sc. Queen's; PhD British Columbia - Associate Professor
Graduate Faculty

Steven G. Newmaster

B.Sc. Guelph, PhD Alberta - Associate Professor
Graduate Faculty

Ryan Norris

BES Waterloo, M.Sc. York, PhD Queen's - Associate Professor
Graduate Faculty

Tom D. Nudds

B.Sc., M.Sc. Windsor, PhD Western - Professor Emeritus
Associated Graduate Faculty

M. Alexander Smith

B.Sc., M.Sc. Trent, PhD McGill - Associate Professor
Graduate Faculty

Dirk Steinke

B.Sc., M.Sc. Konstanz, PhD Goethe - Associate Director, Centre for Biodiversity, University of Guelph
Associated Graduate Faculty

Katherine Stewart

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Associated Graduate Faculty

Andy Turko

PhD Guelph - Assistant Professor
Graduate Faculty

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B.Sc. Guelph, M.Sc., PhD Waterloo - Research Scientist, Environment and Climate Change Canada
Associated Graduate Faculty

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B.Sc., M.Sc. Manitoba, PhD British Columbia - Professor
Graduate Faculty

Quinn Webber

B.Sc., M.Sc. Winnipeg, PhD Memorial - Assistant Professor
Graduate Faculty

Patricia A. Wright

B.Sc. McMaster, PhD British Columbia - Retired Faculty

Associated Graduate Faculty

MSc Program

Admissions Requirements

To be considered, applicants must meet the requirements of a four-year honours science degree with a minimum 'B' (75%) average during the final two years (4 semesters) of undergraduate study. Each applicant must obtain the support of a faculty member willing to serve as their thesis advisor.

Admission may be granted in September, January or May. Completed applications should be uploaded at least one full semester (four months) before the expected date of admission. Applications from international students should be uploaded at least eight months prior to the expected date of admission.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

Admission Process

Graduate student applications to programs in the College of Biological Science are handled by the Office of the Associate Dean, Research (ADR). Before submitting an application, applicants are strongly encouraged to review the information found on the CBS-ADR website to learn more about the application process (<https://www.uoguelph.ca/cbs/academics/graduate/programs/>).

Complete application submission instructions may also be found on the Office of Graduate Studies (<http://www.uoguelph.ca/graduatestudies/apply/>) webpage or in the Graduate Calendar (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/admission/application-admission/>).

Program Requirements

Students must complete and defend an acceptable thesis. In addition, they must successfully complete courses totaling not fewer than 1.5 credits. These credits must include the mandatory course IBIO*6630 Scientific Communication

An acceptable MSc thesis comprises a scientifically defensible account of the student's research on a particular, well-defined research problem or hypothesis. Such research should begin with the practical expectation that it could be completed and the thesis defended in not more than six semesters. Paramount to the notion of acceptability of the thesis is its quality with respect to the underlying rationale (problem identification), the approach used to address the problem, and the evaluation of the results. Final acceptance of the MSc thesis need not imply that the work is sufficiently meritorious to warrant publication in scholarly media, though the majority of MSc research in the department is published.

The Department endorses the idea that graduate students in the Integrative Biology program should benefit from exposure to recent developments both within and between the major areas of emphasis. To that end, students may enrol in any of the regularly offered courses entitled "Special Topics in ..." Details of course content, format and evaluation will be available in the Office of the Chair of the Department one semester prior to the semester in which the course is offered.

In addition, the Department offers two "Advances in Integrative Biology" courses to provide students with the opportunity to study with individual faculty on specific topics in the faculty member's area of expertise. These courses may be taken by groups as either reading/seminar courses, or on an individual research-project basis. Students should approach individual faculty members to request supervision on individual research project courses. In addition, a student can register in an "Advances in Integrative Biology" course to combine a senior-level undergraduate course in ecology, evolutionary biology, or comparative physiology with an additional component – typically a major paper or research project. Students should approach individual faculty members that teach the senior-level undergraduate course, and in consultation with their thesis advisor.

PhD Program

Admissions Requirements

The admission and degree requirements of the PhD program are essentially those of the university. Most applicants will have a recognized Master's degree in a related field obtained with minimum academic standing of 'A-' (80%) in their postgraduate studies, and the endorsement of a potential thesis advisor. Under exceptional circumstances admission directly to a PhD program with an appropriate honours degree alone, or transfer from MSc to PhD program without completing the MSc thesis requirements, is also possible. Applications should be uploaded at least one full semester (four months) prior to the expected date of admission. Applications from international students should be uploaded at least eight months prior to the expected date of admission.

Each applicant must obtain the support of a faculty member willing to serve as their thesis advisor.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

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Program Requirements

The Integrative Biology program expects that the major part of the student's time will be devoted to research in fulfillment of the thesis requirement. For that reason, the Department does not require that PhD students with an MSc degree take any courses. Students entering directly into the PhD program are required to take 1.0 course credits, which must include IBIO*6630 Scientific Communication in their first or second semester. Furthermore, advisory committees may, from time to time, require that a student take some prescribed or additional courses. Regardless, PhD students are expected to contribute and participate

actively in the full academic life of the department, including regular attendance at departmental and inter-departmental seminars, and to provide leadership and counseling to undergraduate and MSc students.

PhD students will become candidates for the PhD degree upon successful completion of a qualifying examination with oral and written components, which should be conducted not later than the third semester of the PhD program. The exam evaluates students' knowledge in the general area of the intended research.

Submission and defence of an acceptable thesis complete the requirements for a PhD. An acceptable thesis comprises a report of the candidate's research on a particular and well-defined research problem or hypothesis. It should represent a significant contribution to knowledge in that field. Emphasis is placed on the quality of the work as judged by the expression of mature scholarship, critical judgment, and satisfactory literary style in the thesis. Thesis approval implies that the research is judged sufficiently meritorious to warrant publication in reputable, refereed journals in its field.

Collaborative Specializations

Neuroscience

The Department of Integrative Biology participates in the MSc/PhD collaborative specialization in neuroscience. Please consult the Neuroscience (<https://calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/neuroscience/>) listing for a detailed description of the MSc/PhD collaborative specialization.

One Health

The Department of Integrative Biology participates in the collaborative specialization in One Health. Master's and Doctoral students wishing to undertake thesis research or their major research paper/project with an emphasis on one health are eligible to apply to register concurrently in Integrative Biology and the collaborative specialization. Students should consult the One Health (<https://calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/one-health/>) listing for more information.

Toxicology

The Department of Integrative Biology participates in the master's/doctoral collaborative specialization in toxicology. The research and teaching expertise of these faculty include aspects of toxicology; they may serve as advisors for master's and doctoral students in Toxicology. Students choosing this option must meet the requirements of the Toxicology collaborative specialization, as well as those of their home department. Please consult the Toxicology (<https://calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/toxicology/>) listing for a detailed description of the master's/doctoral collaborative specialization.

Courses

IBIO*6000 Special Topics in Ecology and Behaviour Unspecified [0.50]

This is a course in which several faculty lecture and/or lead discussion groups in tutorials about advances in their broad areas, or related areas, of ecology and behaviour. Topics may include animal communication, optimal foraging, life-history evolution, mating systems, population dynamics, niche theory and food-web dynamics, and will depend on who is co-ordinating the course for that particular offering. The course includes lectures and seminars in which the students actively participate.

Department(s): Department of Integrative Biology

Location(s): Guelph

IBIO*6010 Special Topics in Physiology Unspecified [0.50]

This is a course in which several faculty lecture and/or lead discussion groups in tutorials about advances in their broad areas, or related areas, of physiology. Topics may include metabolic adaptation to extreme environments, behavioural and molecular endocrinology, and exercise and muscle physiology, and will depend on who is co-ordinating the course for that particular offering. The course includes lectures and seminars in which the students actively participate.

Department(s): Department of Integrative Biology

Location(s): Guelph

IBIO*6020 Special Topics in Evolutionary Biology Unspecified [0.50]

This modular course reviews books and/or other publications in the field of evolutionary biology, providing knowledge of progress in this area of biology. Topics may include epigenetics, phylogenetics, developmental basis of evolutionary change, and molecular evolution. The course includes lectures and seminars in which the students participate.

Offering(s): Annually

Department(s): Department of Integrative Biology

Location(s): Guelph

IBIO*6070 Advances in Integrative Biology I Unspecified [0.50]

This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in specialized fields of integrative biology under the guidance of graduate faculty. Courses may be offered in any of lecture, reading/seminar, or individual project formats. A minimum enrolment may be required for some course offerings.

Restriction(s): Instructor consent required.

Department(s): Department of Integrative Biology

Location(s): Guelph

IBIO*6080 Advances in Integrative Biology II Unspecified [0.50]

This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in specialized fields of integrative biology under the guidance of graduate faculty. Courses may be offered in any of lecture, reading/seminar, or individual project formats. A minimum enrolment may be required for some course offerings.

Restriction(s): Instructor consent required.

Department(s): Department of Integrative Biology

Location(s): Guelph

IBIO*6630 Scientific Communication Unspecified [0.50]

This course involves development and refinement of the skills of scientific communication, with emphasis on writing skills, in the context of developing a thesis proposal. This course is mandatory for MSc AND DIRECT ENTRY PhD students in the Department of Integrative Biology.

Department(s): Department of Integrative Biology

Location(s): Guelph