

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**

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 Program Coordinator

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Graduate Admissions Assistant

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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

Sarah J. Adamowicz

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

Nicholas J. Bernier

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

Elizabeth G. Boulding

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

Christina M. Caruso

BA Oberlin College, PhD Illinois - Associate Professor
Graduate Faculty

Karl A. Cottenie

M.Sc., MS, PhD K.U. Leuven - Associate Professor and Associate Dean,
Graduate Studies
Graduate Faculty

Stephen S. Crawford

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

Teresa J.D. Crease

B.Sc., M.Sc. Windsor, PhD Washington - Professor
Graduate Faculty

Margaret Docker

University of Manitoba - Professor
Associated Graduate Faculty

Moira Ferguson

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

Joanna Follings

B.Sc., M.Sc. Guelph - Cereals Specialist, Ontario Ministry of Food and Rural Affairs
Associated Graduate Faculty

John M. Fryxell

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

Jinzhong Fu

B.Sc. Nankai, M.Sc. Chinese Academy of Sciences, PhD Toronto - Associate Professor
Graduate Faculty

Todd E. Gillis

B.Sc., M.Sc. Guelph, PhD Simon Fraser - Professor and Associate Dean (Graduate Studies and Research), College of Biological Science
Graduate Faculty

Elizabeth Gow

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

T. Ryan Gregory

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

Cortland K. Griswold

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

Mehrdad Hajibabaei

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

Robert Hanner

B.Sc. Eastern Michigan, PhD Oregon - Associate Professor
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

Brian C. Husband

B.Sc., M.Sc. Alberta, PhD Toronto - Professor and Associate Dean (Academic), College of Biological Science
Graduate Faculty

Shoshanah Jacobs

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

Frederic Laberge

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

Andrew MacDougall

BA Dalhousie, M.Sc. York, PhD British Columbia - Professor
Graduate Faculty

Hafiz Maherali

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

Elizabeth Mandeville

B.Sc. Yale, PhD Wyoming - Assistant Professor
Graduate Faculty

Georgia Mason

BA, PhD Cambridge - Professor
Graduate Faculty

Kevin S. McCann

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

Robert L. McLaughlin

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

Amy Newman

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 Ontario - Professor Emeritus
Associated Graduate Faculty

Beren W. Robinson

B.Sc., M.Sc. Dalhousie, PhD Binghamton - Associate Professor
Graduate Faculty

Astrid Schwalb

B.Sc. Konstanz, M.Sc. Potsdam, PhD Guelph - Assistant Professor, Texas State University
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

B.Sc., M.Sc., PhD Northern British Columbia - Associate Professor, University of Saskatchewan
Associated Graduate Faculty

Gérald Tétreault

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

Glen J. Van Der Kraak

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

Chris Wilson

B.Sc. Queen's, M.Sc. Windsor, PhD Guelph - Research Scientist, Ontario Ministry of Natural Resources & Forestry
Associated Graduate Faculty

Patricia A. Wright

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

MSc Program

The Integrative Biology Graduate Program offers MSc degrees in each of three major fields of emphasis:

1. ecology;
2. evolutionary biology; and
3. comparative physiology.

The three areas of interest 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.

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 (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

The Integrative Biology Graduate Program offers PhD degrees for studies in each of the three major fields of emphasis:

1. ecology;
2. evolutionary biology; and
3. comparative physiology.

The 3 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.

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.

Admissions Process

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

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.

Interdepartmental Programs

Faculty in Integrative Biology also participate in the interdepartmental programs in Bioinformatics (calendar.uoguelph.ca/graduate-calendar/graduate-programs/bioinformatics/) or Biophysics (calendar.uoguelph.ca/graduate-calendar/graduate-programs/biophysics/)

Collaborative Specializations

Faculty in Integrative Biology also participate in the collaborative specializations in One Health (calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/one-health/), Neuroscience (calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/neuroscience/) or Toxicology (calendar.uoguelph.ca/graduate-calendar/collaborative-specializations/toxicology/).

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