

# 2010-2011 Graduate Calendar

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2010-2011 academic years, including the Fall Semester 2010, the Winter Semester 2011 and the Summer Semester 2011.

For your convenience the Graduate Calendar is available in PDF format.

If you wish to link to the Graduate Calendar please refer to the [Linking Guidelines](#).

The University is a full member of:

- The Association of Universities and Colleges of Canada

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The logo for the University of Guelph, featuring the text "UNIVERSITY of GUELPH" in a stylized font.The tagline "CHANGING LIVES IMPROVING LIFE" in a bold, sans-serif font, set against a yellow background.

Revision Information:	
July 2, 2010	Initial Publication
November 2, 2010	Revision
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## **Disclaimer**

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The Office of Graduate Studies has attempted to ensure the accuracy of this on-line Graduate Calendar. However, the publication of information in this document does not bind the university to the provision of courses, programs, schedules of studies, fees, or facilities as listed herein.

## **Limitations**

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The University of Guelph reserves the right to change without notice any information contained in this calendar, including any rule or regulation pertaining to the standards for admission to, the requirements for the continuation of study in, and the requirements for the granting of degrees or diplomas in any or all of its programs.

The university will not be liable for any interruption in, or cancellation of, any academic activities as set forth in this calendar and related information where such interruption is caused by fire, strike, lock-out, inability to procure materials or trades, restrictive laws or governmental regulations, actions taken by the faculty, staff or students of the university or by others, civil unrest or disobedience, Public Health Emergencies, or any other cause of any kind beyond the reasonable control of the university.

The University of Guelph reaffirms section 1 of the Ontario Human Rights Code, 1981, which prohibits discrimination on the grounds of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, handicap, age, marital status or family status.

The university encourages applications from women, aboriginal peoples, visible minorities, persons with disabilities, and members of other under-represented groups.

## **Introduction**

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### **Collection, Use and Disclosure of Personal Information**

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Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) [http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90f31\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90f31_e.htm). This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes. Certain personal information is disclosed to external agencies, including the Ontario Universities Application Centre, the Ministry of Training, Colleges and Universities, and Statistics Canada, for statistical and planning purposes, and is disclosed to other individuals or organizations in accordance with the Office of Registrarial Services Departmental Policy on the Release of Student Information. For details on the use and disclosure of this information call the Office of Registrarial Services at the University at (519) 824-4120 or see <http://www.uoguelph.ca/registrar/registrar/index.cfm?index>.

### **Statistics Canada - Notification of Disclosure**

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For further information, please see Statistics Canada's web site at <http://www.statcan.gc.ca> and Section XIV Statistics Canada.

### **Address for University Communication**

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Depending on the nature and timing of the communication, the University may use one of these addresses to communicate with students. Students are, therefore, responsible for checking all of the following on a regular basis:

#### **Email Address**

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The University issued email address is considered an official means of communication with the student and will be used for correspondence from the University. Students are responsible for monitoring their University-issued email account regularly.

#### **Home Address**

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Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through the Office of Graduate Studies.

#### **Name Changes**

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The University of Guelph is committed to the integrity of its student records, therefore, each student is required to provide either on application for admission or on personal data forms required for registration, his/her complete, legal name. Any requests to change a name, by means of alteration, deletion, substitution or addition, must be accompanied by appropriate supporting documentation.

### **Student Confidentiality and Release of Student Information Policy Excerpt**

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The University undertakes to protect the privacy of each student and the confidentiality of his or her record. To this end the University shall refuse to disclose personal information to any person other than the individual to whom the information relates where disclosure would constitute an unjustified invasion of the personal privacy of that person or of any other individual. All members of the University community must respect the confidential nature of the student information which they acquire in the course of their work.

Complete policy at <http://www.uoguelph.ca/policies>.



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## Integrative Biology

The Department of Integrative Biology is comprised of faculty members in three overlapping areas of emphasis: Ecology, Evolutionary Biology and 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.

The Integrative Biology Graduate Program offers MSc and PhD degrees. The faculty members associated with the three areas of emphasis are:

- **Ecology (ECO)** - Ackerman, Cottenie, Crawford, Fryxell, MacDougall, Maherali, McCann, McLaughlin, Newmaster, Norris, Nudds, Robinson, Turetsky
- **Evolutionary Biology (EVO)** - Adamowicz, Boulding, Caruso, Crease, Danzmann, Ferguson, Fu, Gregory, Griswold, Hajibabaei, Hanner (CLF), Hebert, Husband, McAdam, Smith
- **Comparative Physiology (PHY)** - Ballantyne, Bernier, Fudge, Gillis, Heyland, Laberge, McDonald, Van Der Kraak, Wright

(CLF) Contractually Limited Faculty

Faculty in Integrative Biology also participate in the interdepartmental programs in Aquaculture, Bioinformatics Biophysics and in the collaborative programs Neuroscience and Toxicology.

### Administrative Staff

#### Chair

Moira Ferguson (2480 Science Complex, Ext. 53598)  
mmfergus@uoguelph.ca

#### Graduate Coordinator

Teresa Crease (1455 Science Complex, Ext. 52723)  
tcrease@uoguelph.ca

#### CBS Graduate Secretary

Mary Anne Davis (3480 Science Complex, Ext. 56094)  
mdavis@uoguelph.ca

#### CBS Graduate Admissions Secretary

Karen White (3479 Science Complex, Ext. 52730)  
cbsgrad@uoguelph.ca

### Graduate Faculty

#### Josef D. Ackerman

BSc Toronto, MA SUNY, PhD Cornell - Associate Professor

#### Sarah J. Adamowicz

BSc Dalhousie, MSc Guelph, PhD Imperial College - Assistant Professor

#### James S. Ballantyne

BSc, MSc Guelph, PhD British Columbia - Professor

#### Nicholas J. Bernier

BSc McGill, Diploma in Aquaculture Malaspina College, MSc British Columbia, PhD Ottawa - Associate Professor

#### Elizabeth G. Boulding

BSc British Columbia, MSc Alberta, PhD Washington - Associate Professor

#### Christina M. Caruso

BA Oberlin College, PhD Illinois - Associate Professor

#### Karl A. Cottenie

MSc, MS, PhD Katholieke - Assistant Professor

#### Stephen S. Crawford

BSc Guelph, MSc Queen's, PhD Guelph - Assistant Professor

#### Teresa J.D. Crease

BSc, MSc Windsor, PhD Washington - Professor and Graduate Co-ordinator

#### Roy G. Danzmann

BSc, MSc Guelph, PhD Montana - Professor

#### Moira M. Ferguson

BSc, MSc Guelph, PhD Montana - Professor and Chair of Integrative Biology

#### John M. Fryxell

BSc, PhD British Columbia - Professor

#### Jinzhong Fu

BSc Nankai, MSc Chinese Academy of Sciences, PhD Toronto - Associate Professor

#### Douglas S. Fudge

BA, MAT Cornell, MSc Guelph, PhD British Columbia - Assistant Professor

#### Todd E. Gillis

BSc, MSc Guelph, PhD Simon Fraser - Assistant Professor

#### Ryan Gregory

BSc McMaster, PhD Guelph - Associate Professor

#### Cortland K. Griswold

BSc Wisconsin, MSc Toonto, PhD British Columbia - Assistant Professor

#### Mehrdad Hajibabaei

BSc Tehran Azad, PhD Ottawa - Assistant Professor

#### Paul D.N. Hebert

BSc Queen's, PhD Cambridge, FRSC - Professor

#### Andreas Heyland

BSc, MSc Zurich, PhD Florida - Assistant Professor

#### Brian C. Husband

BSc, MSc Alberta, PhD Toronto - Professor and Associate Dean of Academic, College of Biological Science

#### Frederic Laberge

BSc, MSc Laval, PhD Manitoba - Assistant Professor

#### Andrew MacDougall

BA Dalhousie, MSc York, PhD British Columbia - Assistant Professor

#### Hafiz Maherali

BSc McGill, MSc, PhD Illinois - Associate Professor

#### Andrew G. McAdam

BSc McGill, MSc Western, PhD Alberta - Assistant Professor

#### Kevin S. McCann

BA Dartmouth, MSc, PhD Guelph - Associate Professor

#### D. Gordon McDonald

BSc Western Ontario, MSc, PhD Calgary - Professor

#### Robert L. McLaughlin

BSc Windsor, MSc Queen's, PhD McGill - Associate Professor

#### Steven G. Newmaster

BSc Guelph, PhD Alberta - Associate Professor

#### Ryan Norris

BES Waterloo, MSc York, PhD Queen's - Assistant Professor

#### Thomas D. Nudds

BSc, MSc Windsor, PhD Western Ontario - Professor

#### Beren W. Robinson

BSc, MSc Dalhousie, PhD Binghamton - Associate Professor

#### M. Alexander Smith

BSc Trent, MSc Trent, PhD McGill - Assistant Professor

#### Merritt R. Turetsky

BSc Villanova, PhD Alberta - Assistant Professor

#### Glen J. Van Der Kraak

BSc, MSc Manitoba, PhD British Columbia - Professor and Associate Dean of Research, College of Biological Science

#### Patricia A. Wright

BSc McMaster, PhD British Columbia - Professor

### MSc Program

The Integrative Biology Graduate Program offers MSc degrees in each of three major areas of emphasis (fields): ecology, evolutionary biology and 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. Applicants 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 arrive at least one full semester (four months) before the expected date of admission. Applications from international students should arrive at least eight months prior to the expected date of admission.

### 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, you are strongly encouraged to view the "Before you Apply" . webpage on the ADR Future Student's site. NOTE: The name of a potential advisor(s) is required in order to complete the submission summary.

On-line applications, required documents and instructions can be found on the Office of Graduate Studies webpage or in the Graduate Calendar.

Completed applications should be submitted to the CBS Graduate Admissions Secretary.

### Degree 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 (0.50 credit)

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 "Advances in ...". A selection of subjects is given in each of the course descriptions below. 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 "Topics in Advanced 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; faculty members may be petitioned by students to offer, or may advertise, "Topics in Advanced Integrative Biology" courses at least one semester prior to the semester in which the course is to be offered.

The department also offers Special Topics courses that combine a senior-level undergraduate course in ecology, evolutionary biology, or comparative physiology with an additional component – typically a major paper or research project. These courses are coordinated by a single faculty member who should be consulted for more information.

### PhD Program

The Integrative Biology Graduate Program offers PhD degrees for studies in each of the three major areas of emphasis (fields): ecology, evolutionary biology, and comparative physiology. The 3 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 received at least one full semester (four months) prior to the expected date of admission. Applications from international students should arrive at least eight months prior to the expected date of admission.

### Admissions 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, you are strongly encouraged to view the "Before you Apply" webpage on the ADR Future Student's site. NOTE: The name of a potential advisor(s) is required in order to complete the submission summary.

On-line applications, required documents and instructions can be found on the Office of Graduate Studies webpage or in the Graduate Calendar

Completed applications should be submitted to the CBS Graduate Admissions Secretary.

### Degree 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 take any courses. Even so, students entering directly into the PhD program are strongly encouraged to take IBIO\*6630, Scientific Communication (0.50 credit) in their first 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 it is judged sufficiently meritorious to warrant publication in reputable, refereed journals in its field.

### Courses

#### Ecology

##### IBIO\*6000 Advances in Ecology and Behaviour U [0.50]

This is a modular 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. The course includes lectures and seminars in which the students participate. Offered annually.

##### IBIO\*6040 Special Topics in Ecology U [0.50]

Students will explore aspects of ecology not otherwise covered in existing graduate courses. A program of study will be developed with a faculty advisor according to the student's requirements. Research papers, laboratory work and/or written and oral presentations may be required.

#### Evolutionary Biology

##### IBIO\*6020 Advances in Evolutionary Biology U [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. Offered annually.

##### IBIO\*6060 Special Topics in Evolution U [0.50]

Students will explore aspects of evolution not otherwise covered in existing graduate courses. A program of study will be developed with a faculty advisor according to the student's requirements. Research papers, laboratory work and/or written and oral presentations may be required.

##### IBIO\*6100 Molecular Evolution U [0.50]

This course is designed to provide students with an appreciation for the uses of molecular data in the study of evolutionary processes. An overview of the principles of molecular data analysis using a phylogenetic approach will be given. In addition, the importance of incorporating evolutionary history into biodiversity research and other applied topics will be emphasized. Laboratory sessions will be devoted to practical training in analytical tools using specialized computer software, and for student presentation of independent research projects. The course will involve practical training in molecular data analysis using a phylogenetic approach and discussion of current topics from the primary literature.

#### Comparative Physiology

##### IBIO\*6010 Advances in Physiology U [0.50]

A modular course format in which several faculty members lecture and/or lead discussion groups in tutorials on advances in their areas, or related areas, of physiology. Topics may include metabolic adaptation to extreme environments, behavioural and molecular endocrinology, and exercise and muscle physiology. The course includes lectures and seminars in which the students participate. Offered annually.

##### IBIO\*6090 Special Topics in Physiology U [0.50]

Students will explore aspects of physiology not otherwise covered in existing graduate courses. A program of study will be developed with a faculty advisor according to the student's requirements. Research papers, laboratory work and/or written and oral presentations may be required.

#### General

##### IBIO\*6070 Topics in Advanced Integrative Biology I U [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. Course topics will normally be advertised by faculty one semester prior to their offering. Courses may be offered in any of lecture, reading/seminar, or individual project formats. A minimum enrolment may be required for some course offerings.

##### IBIO\*6080 Topics in Advanced Integrative Biology II U [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. Course topics will normally be advertised by faculty one semester prior to their offering. Courses may be offered in any of lecture, reading/seminar, or individual project formats. A minimum enrolment may be required for some course offerings.

##### IBIO\*6630 Scientific Communication U [0.50]

The development and refinement of the skills of scientific communication, emphasizing writing skills, in the context of developing a thesis proposal. This course is mandatory for MSc students in the Department of Integrative Biology.

AQUA\*6550 [0.50] Aquaculture