

# 2014-2015 Graduate Calendar

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2013-2014 academic years, including the Summer Semester 2014, Fall Semester 2014 and the Winter Semester 2015.

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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## 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 <https://www.uoguelph.ca/registrar/>

## 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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## Biophysics

The organization and administration of the graduate program in biophysics are the responsibility of the Biophysics Interdepartmental Group (BIG). The group consists of those members of the graduate faculty whose research interests lie wholly or partly in biophysics. Biophysics spans all areas of the life sciences from molecular structure to human biology and uses the ideas and techniques of the physical sciences to solve biological problems. The specific sub-disciplines of BIG are molecular, cellular, structural, and computational biophysics.

### Administrative Staff

#### Director and Graduate Coordinator

Hermann Eberl (Mathematics and Statistics, MACN Rm. 508, Ext. 52622)

heberl@uoguelph.ca

#### Graduate Secretary

Cynthia Cheeseman (Science Complex, 1310, CPES Dean's Suite/BSc Academic Counselling Centre, Ext. 56176)

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### Graduate Faculty

#### Josef Ackerman

Professor, Integrative Biology

#### Madhur Anand

Associate Professor, Environmental Biology

#### France-Isabelle Auzanneau

Associate Professor, Chemistry

#### Christopher T. Bauch

Associate Professor, Mathematics and Statistics

#### Manfred Brauer

Associate Professor, Molecular and Cellular Biology

#### Leonid Brown

Associate Professor, Physics

#### David Chiu

Professor, Computing and Information Science

#### Marc Coppolino

Associate Professor, Molecular and Cellular Biology

#### James H. Davis

Professor, Physics

#### John Dawson

Associate Professor, Molecular and Cellular Biology

#### John R. Dutcher

Professor, Physics

#### Hermann Eberl

Associate Professor, Mathematics and Statistics

#### Douglas Fudge

Assistant Professor, Integrative Biology

#### Susan Glasauer

Assistant Professor, Land Resource Science

#### Todd Gillis

Assistant Professor, Integrative Biology

#### Steffen Graether

Assistant Professor, Molecular and Cellular Biology

#### Marc Habash

Assistant Professor, Environmental Biology

#### George Harauz

Professor, Molecular and Cellular Biology

#### Mark Hurtig

Professor, Clinical Studies

#### Lorraine Jadeski

Professor, Human Health and Nutritional Sciences

#### Matthew S. Kimber

Assistant Professor, Molecular and Cellular Biology

#### Cezar Khursigara

Assistant Professor, Molecular and Cellular Biology

#### Stefan W. Kycia

Associate Professor, Physics

#### Vladimir Ladizhansky

Associate Professor, Physics

#### Joseph Lam

Professor, Molecular and Cellular Biology

#### Anna T. Lawniczak

Professor, Mathematics and Statistics

#### Michael I. Lindinger

Associate Professor, Human Health and Nutritional Sciences

#### Jacek Lipkowski

Professor, Chemistry

#### Steven N. Liss

Professor, Environmental Biology

#### Alejandro Marangoni

Professor, Food Science

#### A. Rodney Merrill

Professor, Molecular and Cellular Biology

#### Suresh Neethirajan

Professor, Engineering

#### Michele Oliver

Associate Professor, Engineering

#### Joanne O'Meara

Associate Professor, Physics

#### K. Peter Pauls

Professor, Plant Agriculture

#### Peter Purslow

Professor, Food Science

#### Glen Pyle

Assistant Professor, Biomedical Sciences

#### Frances J. Sharom

Professor, Molecular and Cellular Biology

#### John Srbely

Professor, Human Health and Nutritional Sciences

#### Jeffrey J. Thomason

Professor, Biomedical Sciences

#### Lori A. Vallis

Assistant Professor, Human Health and Nutritional Sciences

#### Christopher Whitfield

Professor, Molecular and Cellular Biology

#### Robert Wickham

Assistant Professor, Physics

#### Alan Willms

Assistant Professor, Mathematics and Statistics

#### Janet M. Wood

Professor, Molecular and Cellular Biology

#### Rickey Y. Yada

Professor, Food Science

#### Simon Yang

Professor, Engineering

#### John Zettel

Assistant Professor, Human Health and Nutritional Sciences

### MSc Program

#### Admission Requirements

Students may be admitted to the MSc program in biophysics from a range of undergraduate programs, including physics, biology, biochemistry, microbiology, chemistry, mathematics, engineering, or computing science. To be considered for admission, applicants should meet the minimum requirements of a four-year honours degree with a 73% (B) average during the final two years of study. Applicants should briefly indicate their research interests and, if possible, their preferred advisors.

#### Degree Requirements

Students in the MSc program will be under the guidance of an interdepartmental advisory committee. A total of 1.5 credits are required, one of which is usually BIOP\*6000. In addition, all students are required to complete the seminar course BIOP\*6010. The advisory committee may require additional courses. An average of 70% (B-) or better must be obtained in the prescribed courses. Further information may be obtained from the chair of the group. When the course work is satisfactorily completed, the submission and successful defence of an appropriate thesis on an approved topic completes the requirements for the MSc in Biophysics.

### PhD Program

#### Admission Requirements

Applicants for the PhD program should have a recognized master's degree in an appropriate field, with a 77% (B+) average in their postgraduate studies. Applicants should briefly indicate their area of research interest and preferred advisor(s). It is often beneficial for applicants to talk with potential advisors before submitting an application.

Direct admission to the PhD program may be permitted for applicants holding a bachelor's degree with high academic standing. Students enrolled in the master's degree program who achieve a superior academic record and show a particular aptitude for research may be permitted to transfer to the PhD program. The application to transfer should be made to the chair of the biophysics program between the end of the second semester and the end of the fourth semester of work towards the master's degree.

### Degree Requirements

Students in the PhD program will be under the guidance of an interdepartmental advisory committee. For students who completed the MSc degree in a program other than Biophysics at the University of Guelph, a total of 1.0 graduate course credits are required, one of which is usually BIOP\*6000. For students who transfer directly into the PhD program from the MSc program in Biophysics, or who complete the MSc program in Biophysics at the University of Guelph, no additional course credits are required. In the case of students who enter the PhD program from the BSc degree, 1.5 graduate course credits are required, one of which is BIOP\*6000. In addition, all students are required to complete the non-credit seminar course, BIOP\*6010. The advisory committee may require additional courses for any student. An average of 70% (B-) or better must be obtained in the prescribed courses. As early as feasible, but no later than the final semester of the minimum duration, a PhD student is required to complete a qualifying examination to assess her or his knowledge of the subject. This examination should normally be taken within the first five semesters of registration as a PhD student. When the qualifying examination and the course work are satisfactorily completed, the submission and successful defense of an acceptable thesis on an approved topic completes the requirements for the PhD in Biophysics.

### Courses

<b>BIOP*6000 Concepts in Biophysics W [0.50]</b>	
This course will emphasize basic concepts in molecular, cellular and structural biophysics arising from key journal publications and their impact on present day research trends.	
<i>Department(s):</i> Dean's Office, College of Physical and Engineering Science	
<b>BIOP*6010 Biophysics Seminar U [0.00]</b>	
Public research seminar presented by all PhD students in the Biophysics program in yearly intervals after passing the qualifying exam. Students are required to attend all seminars presented during the semester in which they are registered for the course.	
<i>Department(s):</i> Dean's Office, College of Physical and Engineering Science	
<b>BIOP*6100 Scientific Communication and Research Methods in Biophysics U [0.50]</b>	
The development and refinement of the skills of scientific communication, emphasizing oral presentation and writing skills, in the context of developing a literature review or thesis proposal. All Biophysics students will normally take this within 4 semesters of entering the program.	
<i>Department(s):</i> Dean's Office, College of Physical and Engineering Science	
<b>BIOP*6950 Advanced Topics in Biophysics U [0.50]</b>	
This course provides opportunities for graduate students to study special topics in contemporary biophysical research under the guidance of graduate faculty members with pertinent expertise. Proposed course descriptions are considered by the Director of the Biophysics program on an ad hoc basis, and the course will be offered according to demand.	
<i>Department(s):</i> Dean's Office, College of Physical and Engineering Science	
<b>PHYS*7510 Cellular Biophysics U [0.50]</b>	
The physics of cellular structure and function; membrane theories, diffusion and active transport, bioelectric phenomena; intracellular motion, thermodynamics; selected topics of current interest and seminar.	
<i>Department(s):</i> Department of Physics	
<b>PHYS*7520 Molecular Biophysics U [0.50]</b>	
Physical methods of determining macromolecular structure: energetics, intramolecular and intermolecular forces, with application to lamellar structures, information storage, DNA and RNA, recognition and rejection of foreign molecules.	
<i>Department(s):</i> Department of Physics	
<b>PHYS*7540 Special Topics in Biophysics U [0.50]</b>	
Offered on demand	
<i>Department(s):</i> Department of Physics	
<b>PHYS*7570 Special Topics in Biophysics U [0.25]</b>	
Offered on demand	
<i>Department(s):</i> Department of Physics	

### Courses in Related Subjects:

#### Biomedical Sciences

BIOM*6110	[0.50]	Advanced Microscopy for Biomedical Sciences
BIOM*6160	[0.50]	Cellular Biology
BIOM*6190	[0.50]	Tissue Culture Techniques in Biomedical Sciences

#### Chemistry

CHEM*7360	[0.50]	Regulation in Biological Systems
CHEM*7370	[0.50]	Enzymes
CHEM*7380	[0.50]	Cell Membranes and Cell Surfaces
CHEM*7310	[0.50]	Selected Topics in Biochemistry

#### Computing and Information Science

CIS*6050	[0.50]	Neural Networks
CIS*6060	[0.50]	Bioinformatics
CIS*6080	[0.50]	Genetic Algorithms
CIS*6420	[0.50]	Soft Computing

#### Engineering

ENGG*6070	[0.50]	Medical Imaging
ENGG*6130	[0.50]	Physical Properties of Biomaterials
ENGG*6150	[0.50]	Bio-Instrumentation
ENGG*6560	[0.50]	Advanced Digital Signal Processing

#### Human Health and Nutritional Sciences

HHNS*6200	[1.00]	Research Methods in Biomechanics
HHNS*6440	[0.50]	Nutrition, Gene Expression and Cell Signalling

#### Mathematics and Statistics

MATH*6051	[0.50]	Mathematical Modelling
MATH*6071	[0.50]	Biomathematics
STAT*6761	[0.50]	Survival Analysis
STAT*6850	[0.50]	Advanced Biometry
STAT*6950	[0.50]	Statistical Methods for the Life Sciences

#### Molecular and Cellular Biology

MCB*6310	[0.50]	Advanced Topics in Developmental and Cellular Biology
MCB*6320	[0.50]	Advanced Topics in Microbiology
MCB*6360	[0.50]	Advanced Topics in Biochemistry and Molecular Biology
MCB*6370	[0.50]	Protein Structural Biology and Bioinformatics
MCB*6380	[0.50]	Structure and Function of Biological Membranes

#### Physics

PHYS*7010	[0.50]	Quantum Mechanics I *
PHYS*7020	[0.50]	Quantum Mechanics II
PHYS*7040	[0.50]	Statistical Physics I*
PHYS*7050	[0.50]	Statistical Physics II