The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2019-2020 academic year, including the Summer Semester 2019, Fall Semester 2019 and the Winter Semester 2020.

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:

• Universities of Canada

Contact Information:

University of Guelph
Guelph, Ontario, Canada
N1G 2W1
519-824-4120

Revision Information:

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<td>Initial Publication</td>
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<td>June 28, 2019</td>
<td>Revision 1</td>
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<td>September 2, 2019</td>
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<td>Revision 3</td>
</tr>
<tr>
<td>January 28, 2020</td>
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</tr>
</tbody>
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Disclaimer
The Office of Graduate and Postdoctoral 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
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

Collection, Use and Disclosure of Personal Information

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/09f31_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 Advanced Education and Skills Development, 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

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

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

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

Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through Registrarial Services.

Name Changes

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, their 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

The University undertakes to protect the privacy of each student and the confidentiality of their 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 https://www.uoguelph.ca/secretariat/office-services/university-secretariat/university-policies.
Learning Outcomes

Graduate Degree Learning Outcomes

On May 27, 2013, the University of Guelph Senate approved the following five University-wide Learning Outcomes as the basis from which to guide the development of graduate degree programs, specializations and courses:

1. Critical and Creative Thinking
2. Literacy
3. Global Understanding
4. Communication
5. Professional and Ethical Behaviour

These learning outcomes are also intended to serve as a framework through which our educational expectations are clear to students and the broader public; and to inform the process of outcomes assessment through the quality assurance process (regular reviews) of programs and departments.

An on-line guide to the learning outcomes, links to the associated skills, and detailed rubrics designed to support the development and assessment of additional program and discipline-specific outcomes, are available for reference on the Learning Outcomes website.

Critical and Creative Thinking

Critical and creative thinking is a concept in which one applies logical principles, after much inquiry and analysis, to solve problems with a high degree of innovation, divergent thinking and risk taking. Those mastering this outcome show evidence of integrating knowledge and applying this knowledge across disciplinary boundaries. Depth and breadth of understanding of disciplines is essential to this outcome. At the graduate level, originality in the application of knowledge (master’s) and undertaking of research (doctoral) is expected.

In addition, Critical and Creative Thinking includes, but is not limited to, the following outcomes: Independent Inquiry and Analysis; Problem Solving; Creativity; and Depth and Breadth of Understanding.

Literacy

Literacy is the ability to extract information from a variety of resources, assess the quality and validity of the material, and use it to discover new knowledge. The comfort in using quantitative literacy also exists in this definition, as does using technology effectively and developing visual literacy.

In addition, Literacy includes, but is not limited to, the following outcomes: Information Literacy, Quantitative Literacy, Technological Literacy, and Visual Literacy.

Global Understanding

Global understanding encompasses the knowledge of cultural similarities and differences, the context (historical, geographical, political and environmental) from which these arise, and how they are manifest in modern society. Global understanding is exercised as civic engagement, intercultural competence and the ability to understand an academic discipline outside of the domestic context.

In addition, Global Understanding includes, but is not limited to, the following outcomes: Global Understanding, Sense of Historical Development, Civic Knowledge and Engagement, and Intercultural Competence.

Communication

Communication is the ability to interact effectively with a variety of individuals and groups, and convey information successfully in a variety of formats including oral and written communication. Communication also comprises attentiveness and listening, as well as reading comprehension. It includes the ability to communicate and synthesize information, arguments, and analyses accurately and reliably.

In addition, Communication includes, but is not limited to, the following outcomes: Oral Communication, Written Communication, Reading Comprehension, and Integrative Communication.

Professional and Ethical Behaviour

Professional and ethical behaviour requires the ability to accomplish the tasks at hand with proficient skills in teamwork and leadership, while remembering ethical reasoning behind all decisions. The ability for organizational and time management skills is essential in bringing together all aspects of managing self and others. Academic integrity is central to mastery in this outcome. At the graduate level, intellectual independence is needed for professional and academic development and engagement.

In addition, Professional and Ethical Behaviour includes, but is not limited to, the following outcomes: Teamwork, Ethical Reasoning, Leadership, Personal Organization and Time Management, and Intellectual Independence.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computational Sciences</td>
<td>79</td>
</tr>
<tr>
<td>Administrative Staff</td>
<td>79</td>
</tr>
<tr>
<td>Graduate Faculty</td>
<td>79</td>
</tr>
<tr>
<td>PhD Program</td>
<td>80</td>
</tr>
<tr>
<td>Collaborative Specializations</td>
<td>80</td>
</tr>
<tr>
<td>Courses</td>
<td>80</td>
</tr>
</tbody>
</table>
Computational Sciences

The School of Computer Science (SoCS) offers an Interdisciplinary PhD degree in Computational Sciences that encompasses multiple Departments/Schools across the University of Guelph. The program provides a unique opportunity for students to study computing within the context of another discipline commensurate with their interests and career goals. Students entering this PhD program perform research that bridges Computer Science with at least one other discipline such as Economics and Finance, Engineering, English and Theatre Studies, Geography, History, Integrative Biology, Mathematics and Statistics, Pathobiology, Population Medicine and Psychology.

Administrative Staff

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>Minglu Gong (1117 Reynolds, Ext. 52824)</td>
<td><a href="mailto:director@soc.s.uoguelph.ca">director@soc.s.uoguelph.ca</a></td>
</tr>
<tr>
<td>Associate Graduate Director</td>
<td>Joe Sawada (2226 Reynolds, Ext. 53277)</td>
<td><a href="mailto:graddir@soc.s.uoguelph.ca">graddir@soc.s.uoguelph.ca</a></td>
</tr>
<tr>
<td>Graduate Program Assistant</td>
<td>Jennifer Hughes (1116 Reynolds, Ext. 56402)</td>
<td><a href="mailto:gradassist@soc.s.uoguelph.ca">gradassist@soc.s.uoguelph.ca</a></td>
</tr>
</tbody>
</table>

Graduate Faculty

From the School of Computer Science

Luiza Antonie  
BSc Bacharest, MSc, PhD Alberta - Assistant Professor

David A. Calvert  
BA, MSc Guelph, PhD Waterloo - Associate Professor

David K.Y. Chiu  
BA Waterloo, BSc Guelph, MSc Queen's, PhD Waterloo - Professor

Rozita Dara  
BSc Shahid Tesheshi, MSc Guelph, PhD Waterloo - Assistant Professor

Ali Dehghantanha  
BSE Azad, MSc, PhD Putra Malaysia - Assistant Professor

Minglu Gong  
BEng Harbin Engineering, MSc Tsinghua, PhD Alberta - Professor and Director

Gary Gréval  
BSc Brock, MSc, PhD Guelph - Associate Professor

Andrew Hamilton-Wright  
BSc, MSc Guelph, PhD Waterloo - Associate Professor

Hassan Khan  
BSc NUST, MSc Southern California, PhD Waterloo - Assistant Professor - Assistant Professor

Stefan C. Kremer  
BSc Guelph, PhD Alberta - Associate Professor

Xining Li  
BSc, MSc Nanjing, PhD Calgary - Professor

Xiaodong Lin  
BASc Nanjing, MSc East China Normal, PhD Beijing, PhD Waterloo - Associate Professor

Pascal Matsakis  
BSc, MSc, PhD Paul Sabatier (France) - Professor

Judi R. McCuaig  
BEd, BSc, MS, PhD Saskatchewan - Associate Professor

Blair Nonnecke  
BSc, MSc Guelph, PhD South Bank - Associate Professor

Charlie F. Ohimbo  
MSc Kiev, PhD New Brunswick - Associate Professor

Joseph Sawada  
BSc, PhD Victoria (British Columbia) - Professor

Stacey Scott  
BSc Dalhousie, PhD Calgary - Associate Professor

Fei Song  
BSc Jilin (China), MSc Academia Sinica (China), PhD Waterloo - Associate Professor

Deborah A. Stacey  
BSc Guelph, MASc, PhD Waterloo - Associate Professor

Fangju Wang  
BE Changsha, MSc Peking, PhD Waterloo - Professor

Mark Wineberg  
BSc Toronto, MSc, PhD Carleton - Associate Professor

Michael A. Wirth  
BSc New England (Aust.), MSc Manitoba, PhD RMIT Melbourne - Associate Professor

Yang Xiang  
BSc, MSc BUAA (Beijing), PhD UBC - Professor

From the Department of Animal Biosciences

Trevor Devries  
BSc, PhD British Columbia - Associate Professor

From the Department of Economics and Finance

Miana Plesca  
BSc Technical University of Cluj (Romania); MA Georgetown (Washington, D.C.); PhD Western - Associate Professor, Gordon S. Lang School of Business and Economics

From the School of Engineering

Hussein A. Abdullah  
BSc Univ. of Technology, MSc, PhD Glasgow, PEng - Professor and Director

Shawki Areibi  
BASc Al-Fateh, MASc Waterloo, PhD Waterloo, PEng - Professor

Fantahun Defersha  
BSc Ethiopia, MEng India, PhD Concordia - Assistant Professor

Robert Dony  
BASc, MASc Waterloo, PhD McMaster, PEng, FIET, FEC - Associate Professor

Stefano Gregori  
Laurea, Doctorate Univ. of Pavia - Associate Professor

Hadis Karimipour  
BSc Ferdowi, MSc Shahrood, PhD Alberta - Assistant Professor

Medhat A. Moussa  
BSc American, MASc Moncton, PhD Waterloo, PEng - Professor

Radu Muresan  
Dipl Engg Technical Univ. of Cluj-Napoca (Romania); MASc, PhD Waterloo, PEng - Associate Professor

Beth Parker  
BS Pennsylvania, MS North Carolina, PhD Waterloo - Professor

Petros Spachos  
Diplom Crete, MASc, PhD Toronto - Assistant Professor

Graham Taylor  
BASc, MASc Waterloo, PhD Toronto - Assistant Professor

Simon X. Yang  
BSc Peking, MSc Sinica, MSc Houston, PhD Alberta - Professor

From the School of English and Theatre Studies

Susan Brown  
BA King's College and Dalhousie, MA Dalhousie, PhD Alberta - Professor

From the Department of Food, Agricultural and Resource Economics

Getu Hailu  
BSc, MSc Alemaya, PhD Alberta - Professor

From the Department of Food Science

Jeffrey Farber  
BSc, MSc, PhD McGill - Professor

From the Department of Geography

Evan Fraser  
BA, MSc Toronto, PhD UBC - Professor

Wanhong Yang  
BSc Hubei, MSc Chinese Academy of Sciences, PhD Illinois - Professor

From the Department of History

Kris E. Inwood  
BA Trent, MA, PhD Toronto - Professor

From the Department of Integrative Biology

Robert Hanner  
BSc Eastern Michigan University, PhD University of Oregon - Associate Professor

Robert L. McLaughlin  
BSc Windsor, MSc Queen's, PhD McGill - Associate Professor

From the Department of Mathematics and Statistics

Gerarda Darlington  
BSc, MSc Guelph, PhD Waterloo - Professor

From the Department of Pathobiology

Shayan Sharif  
DVM Tehran, PhD Guelph - Professor

From the Department of Population Medicine

Amy Greer  
BSc, Mount Allison, MSc, Trent, PhD Arizona State - Assistant Professor

David Pearl  
BSc McGill, MSc York, DVM, PhD Guelph - Associate Professor
The objective of the PhD program is to produce interdisciplinary scholars who are capable of tackling emerging problems in a variety of disciplines through investigation and application of current computer technologies. Students require two co-advisors: one from the School of Computer Science; and the second from another discipline (see Graduate Faculty).

Admission Requirements

In addition to the Office of Graduate Studies admission requirements, applicants must submit: (i) a current CV including research publications; and (ii) a statement of research (maximum of 1500 words). The minimum academic requirement for admission to the PhD program is normally a recognized Master's degree that included a thesis or major independent project. We do not require students entering the program to have a credential in Computer Science. Such students are required to identify their experience using computerized techniques and demonstrate that they have the necessary background to complete the tasks outlined in a research proposal.

In exceptional circumstances, a student who has completed an honours undergraduate Computer Science degree (or an equivalent 4-year undergraduate degree) may apply for direct admission to the PhD program. The successful applicant must have an outstanding academic record, breadth of knowledge in Computer Science, demonstrated research accomplishments, and strong letters of recommendation.

Prospective students should check the School of Computer Science (SoCs) website http://www.socs.uoguelph.ca/ for further details, procedures and deadlines.

Program Requirements

The PhD program requires completion of CIS*6890: Technical and Communication Research Methodology, coupled with any additional courses and/or Computational Learning Modules assigned by the Advisory Committee on entry to the program. To achieve candidacy, students are expected to present a research proposal in a two-part seminar and successfully complete the Qualifying Examination (QE). Finally, students must present and defend a thesis.

Collaborative Specializations

One Health

Computational Sciences 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 Computational Sciences and the collaborative specialization. Students should consult the One Health listing for more information.

Courses

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<td>CIS*6890</td>
<td>Technical Communication and Research Methodology U [0.50]</td>
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This course aims to develop students' ability in technical communication and general research methodology. Each student is expected to present a short talk, give a mini lecture, review a conference paper, write a literature survey and critique fellow students' talks and lectures.

Department(s): School of Computer Science