MOLECULAR AND CELLULAR BIOLOGY

The MCB graduate program offers opportunities for interdisciplinary studies in molecular and cellular biology leading to the MSc and PhD degrees in the following five fields:

- Biochemistry
- Cell Biology
- Microbiology
- Molecular Biology and Genetics
- Plant Biology

The research groups directed by the faculty pursue fundamental and applied research questions involving diverse biological systems (plants, humans and other animals, prokaryotic and eukaryotic microbes). In general, they follow lines of scientific enquiry at the level of molecules to cells. See the department website (http://www.uoguelph.ca/mcb/graduate/graduate.shtml/) for additional information.

Administrative Staff

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Graduate Faculty

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

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Graduate Faculty

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B.Sc. Australian National, PhD Macquarie - Associate Professor
Graduate Faculty

Malcolm Campbell
B.Sc. Guelph, MA Oxford, PhD Guelph - Professor and Vice-President (Research)
Graduate Faculty

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B.Sc., M.Sc., PhD Waterloo - Dean, Faculty of Science, Wilfrid Laurier University
Associated Graduate Faculty

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Graduate Faculty

Georgina Cox
B.Sc., PhD Leeds - Assistant Professor
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B.Sc. Wilfrid Laurier, PhD Alberta - Professor
Graduate Faculty

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Graduate Faculty

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Graduate Faculty

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BASc, M.Sc., PhD Toronto - Professor Emeritus
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P. David Josephy
B.Sc., PhD British Columbia - Retired Faculty, Molecular and Cellular Biology, University of Guelph
Associated Graduate Faculty

Cezar Khursigara
B.Sc. Ryerson, PhD McGill - Associate Professor
Graduate Faculty

Matthew S. Kimber
B.Sc., PhD Toronto - Associate Professor
Graduate Faculty

Jasmin Lalonde
BA Ottawa, MA, PhD McGill - Assistant Professor
Graduate Faculty

Joseph S. L. Lam
B.Sc., PhD Calgary - Professor Emeritus
Associated Graduate Faculty
MSc Program

The MCB MSc program is offered in five fields:

1. biochemistry;
2. cell biology;
3. microbiology;
4. molecular biology and genetics; and
5. plant biology.

The objective of the program is to provide graduate students with a high level of relevant knowledge and expertise in contemporary molecular and cellular biology, including experimental techniques, library research, writing and communication skills. Graduates will have the knowledge and skills needed to carry out high quality scientific research and will be prepared for employment in positions with some responsibility in the research and teaching enterprises of academic institutions (as instructors and technical staff), in science-related positions in the broad biotechnology sector (e.g. food and beverage industries, pharmaceuticals, biomedical, and agriculture-related industries), or in government sector institutes and laboratories. They will be well prepared to continue their graduate education at the PhD level. Alternatively they may opt to complete a professional degree (such as law, medicine, or business) or a teaching certificate.
Admission Requirements
To be considered, applicants must have completed a four-year honours undergraduate science degree (or its equivalent) in a relevant discipline. Normally, the applicant must have achieved a "B" (75%) average or higher during the last two years of full-time study. In exceptional circumstances, students with a “B-minus” average (70%) will be considered provided there is strong supporting evidence of research aptitude and potential.

Each applicant must obtain the support of a faculty member willing to serve as their thesis advisor and list them accordingly on their application for admission, at the time of its submission.

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

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest 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 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 in the MSc program must complete a minimum of 2 courses (1.5 credits) at the graduate level. MCB*6500 MSc Research Topics in Molecular and Cellular Biology is mandatory. This two-semester course should be completed in the first year of study and normally in the first two semesters. Senior undergraduate courses may be taken on the recommendation of the Advisory Committee but these will not count towards the 1.5 credit requirement. An average of “B-minus” (70%) must be achieved in the prescribed courses.

The MSc thesis research must involve original enquiry into a well-defined question in the molecular biosciences. It is expected that the research will not have been previously reported in the literature and, wherever possible, the research should yield publishable data.

All students beyond year 1 in the program are required to participate annually in the CBS Graduate Student Symposium by giving a presentation describing their research progress.

PhD Program
The MCB PhD program is offered in five fields:

1. biochemistry;
2. cell biology;
3. microbiology;
4. molecular biology and genetics; and
5. plant biology.

The objective of the program is to develop independent and creative scientists specializing in molecular and cellular biology. Graduates will be prepared for positions as scholars in academic institutions, as leaders in the research and development sector of the biomedical and other industries or government agencies, and in social institutions.

Admission Requirements
There are three pathways for admission to the PhD program:

1. Students who have achieved an "A-minus" (80%) average or higher during the last two years of full-time study while completing a four-year honours BSc program (or its equivalent) and who provide evidence of research aptitude and potential based on laboratory research experience may apply to enter the PhD program directly, or
2. An MSc student may apply to transfer to the PhD program before completing the MSc degree. To be eligible for transfer, the student must have completed a high quality undergraduate degree with a grade average of B+ or higher. Before applying for transfer to the PhD program students must complete MCB*6500 MSc Research Topics in Molecular and Cellular Biology plus an additional course with at least 0.5 graduate course credit, attaining an overall A minus average (at least 80%). Applications for transfer must be approved by the end of the fourth semester in the MSc program. Each applicant must obtain the support of a faculty member willing to serve as their thesis advisor and list them accordingly on their application for admission, at the time of its submission.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest 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 may be granted for entry in September, January or May. Completed applications should be uploaded at least one full semester (four months) before the expected date of admission (at least eight months for international students).

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/).

Completed 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
Students in the PhD program must complete MCB*7500 PhD Research Topics in Molecular and Cellular Biology. This two-semester course should be completed in the first year of study and normally within the first two semesters. Students without an MSc degree in Molecular and
Cellular Biology or the equivalent are required to take one additional graduate course. Other courses may be taken on the recommendation of the Advisory Committee. An average of "B-minus" (70%) must be achieved in the prescribed courses. To be a candidate for the PhD degree, each student must pass a PhD Qualifying Exam. The Qualifying Examination is completed before the end of the fifth semester (for students with an MSc) or the end of the seventh semester (for students without an MSc).

The PhD thesis research must involve original enquiry into a well-defined question in the molecular biosciences. It is expected to result in the publication of one or more papers in high-quality peer-reviewed journals. The research must represent a significant contribution to the relevant research field.

All students beyond year 1 in the program are required to participate annually in the CBS Graduate Student Symposium by giving a presentation describing their research progress.

### Interdepartmental Programs

Faculty in Molecular and Cellular Biology also participate in the interdepartmental programs in Bioinformatics ([calendar.uoguelph.ca/graduate-calendar/graduate-programs/bioinformatics/](calendar.uoguelph.ca/graduate-calendar/graduate-programs/bioinformatics/)), Biophysics ([calendar.uoguelph.ca/graduate-calendar/graduate-programs/biophysics/](calendar.uoguelph.ca/graduate-calendar/graduate-programs/biophysics/)) and Biotechnology ([calendar.uoguelph.ca/graduate-calendar/graduate-programs/biotechnology/](calendar.uoguelph.ca/graduate-calendar/graduate-programs/biotechnology/)).

### Collaborative Specializations

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

### Courses

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MCB*6310</td>
<td>Advanced Topics in Molecular and Cellular Biology Fall Only</td>
<td>[0.50]</td>
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<tr>
<td>BINF*6110</td>
<td>Genomic Methods for Bioinformatics</td>
<td>0.50</td>
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<tr>
<td>BIOT*6500</td>
<td>Molecular Biotechnology</td>
<td>0.50</td>
</tr>
<tr>
<td>MCB*6370</td>
<td>Protein Structural Biology and Bioinformatics Unspecified</td>
<td>[0.50]</td>
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This mandatory two semester course emphasizes the development and refinement of the skills of scientific communication. Students submit a written thesis proposal and present a public seminar on a contemporary subject in the molecular biosciences. MCB MSc students normally complete this course within the first two semesters of their program. Students will register in each semester and receive a grade of INP (in progress) at the end of the first semester and a grade at the end of the second semester.

**Department(s):** Department of Molecular and Cellular Biology  
**Location(s):** Guelph