

# BIOTECHNOLOGY

This interdepartmental program focuses on molecular approaches and provides both scientific and business discipline-specific training. The Master of Biotechnology program provides graduates with advanced education, knowledge, technical and business expertise in the broad field of biotechnology. Courses promote effective communication of knowledge of the scientific discipline, as well as place it in a business context. It fosters academic and intellectual growth, as well as interactions between graduate students, faculty, the university, and the wider research community and the private sector. Students will be trained as highly competent, independent, and creative researchers/managers who are familiar with and able to integrate both the science and business environments. Furthermore, the program encourages the development of entrepreneurial activities in this area, which is crucial for the formation of new private sector companies. The ultimate goal of the program is to advance and encourage biotechnology research on campus, both amongst the graduate students enrolled in the program, as well as amongst and between faculty.

## Administrative Staff

### Director

Ian Tetlow (4471 Summerlee Science Complex, Ext. 52735)  
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### Graduate Program Coordinator

Jaideep Mathur (4463 Summerlee Science Complex, Ext. 56636)  
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### Course-Based Master's Program Coordinator

Emily Berzitis (4451 Science Complex, Ext. 56474)  
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## Graduate Faculty

This program is offered by the Department of Molecular and Cellular Biology, in partnership with the Departments of Food, Agriculture and Resource Economics, Food Science, Integrative Biology, Management, Pathobiology, Physics, and Plant Agriculture.

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

### Tariq Akhtar

B.Sc., M.Sc. Waterloo, PhD Florida - Associate Professor  
Graduate Faculty

### Emma Allen-Vercoe

B.Sc. London (UK), PhD Open (UK) - Professor  
Graduate Faculty

### Melanie Alpaugh

B.Sc., M.Sc. Guelph, PhD Toronto - Assistant Professor  
Graduate Faculty

### Joseph L. Colasanti

B.Sc., PhD Western - Associate Professor  
Graduate Faculty

### Marc Coppolino

B.Sc. Waterloo, M.Sc., PhD Toronto - Associate Professor  
Graduate Faculty

### Georgina Cox

B.Sc., PhD Leeds - Assistant Professor

## Graduate Faculty

### John Dawson

B.Sc. Wilfrid Laurier, PhD Alberta - Professor and Associate Dean (Academic), College of Biological Sciences  
Graduate Faculty

### Jennifer Geddes-McAlister

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

### Steffen P. Graether

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

### Robert Hanner

B.Sc. Eastern Michigan, PhD Oregon - Professor  
Graduate Faculty

### Nina Jones

B.Sc. Guelph, PhD Toronto - Professor  
Graduate Faculty

### Cezar Khursigara

B.Sc. Ryerson, PhD McGill - Professor  
Graduate Faculty

### Matthew S. Kimber

B.Sc., PhD Toronto - Professor  
Graduate Faculty

### Jasmin Lalonde

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

### Ray Lu

B.Sc. Wuhan (China), M.Sc. Beijing Medical, PhD Saskatchewan - Associate Professor  
Graduate Faculty

### Jaideep Mathur

B.Sc., M.Sc. Lucknow (India), PhD Gorakhpur (India) - Associate Professor  
Graduate Faculty

### Baozhong Meng

B.Sc., M.Sc. Hebei Agricultural (China) - Professor  
Graduate Faculty

### Robert T. Mullen

B.Sc., PhD Alberta - Professor  
Graduate Faculty

### Priyanka Pundir

B.V.Sc. G.B. Pant (India), PhD Atlantic Veterinary - Assistant Professor  
Graduate Faculty

### Davar Rezanian

M.Sc. Utrecht, MBA Derby, PhD Ramon Llull, CPA, CMA - Associate Professor and Chair  
Graduate Faculty

### Shaun Sanders

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

**Stephen Y. K. Seah**

B.Sc., M.Sc. National (Singapore), PhD Sheffield - Professor  
Graduate Faculty

**Rebecca Shapiro**

B.Sc. McGill, PhD Toronto - Associate Professor  
Graduate Faculty

**Matthew Sorbara**

B.Sc., PhD Toronto - Assistant Professor  
Graduate Faculty

**Paul Spagnuolo**

B.Sc., M.Sc. Guelph, PhD Waterloo - Associate Professor  
Graduate Faculty

**Ian Tetlow**

B.Sc. Newcastle (UK), PhD North Wales - Professor  
Graduate Faculty

**James Uniacke**

B.Sc., PhD Concordia - Associate Professor  
Graduate Faculty

**Siavash Vahidi**

PhD Western - Assistant Professor  
Graduate Faculty

**George van der Merwe**

B.Sc., M.Sc., PhD Stellenbosch (South Africa) - Associate Professor  
Graduate Faculty

**Terry Van Raay**

B.Sc. Windsor, M.Sc. Guelph, PhD Utah - Associate Professor  
Graduate Faculty

**John Vessey**

B.Sc., M.Sc. Dalhousie, PhD Eberhard Karls (Tubingen) - Assistant  
Professor  
Graduate Faculty

**Sarah Wootton**

B.Sc., PhD Guelph - Associate Professor  
Graduate Faculty

**Yang Xu**

B.Sc. Northwest A&F, M.Sc. South China, PhD Alberta - Assistant  
Professor  
Graduate Faculty

**Wei Zhang**

B.Sc. Beijing, MA York, PhD Toronto - Assistant Professor  
Graduate Faculty

## MBIOT Program

### Admission Requirements

Students entering the program will normally have completed an Honours Bachelor's degree with a minimum admission average of B (75% and higher) in one of the following fields: biology, molecular biology and genetics, biotechnology, microbiology, biochemistry, biophysics, food science, agriculture, food production systems, commerce with a strong science background. Anyone lacking the required background will be encouraged to complete them prior to commencing their studies in the new program (typically in the immediately preceding summer semester)

or, if approved by the program counsellor, during their studies. Students whose first language is not English require a minimum TOEFL score of 93 with a minimum score of 22 in each of the four categories, or a minimum IELTS score of 7.0, with a minimum of at least 6.5 in each component. Applicants who have completed an undergraduate degree from institutions where the language of instruction was English may be exempt from ESL requirements, pending departmental approval.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results and assessment forms 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

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 view the "Before you Apply" and "Admission Process" webpages on the ADR Future Student's site.

Space in this program will be limited and applicants are advised to ensure their applications are complete by the application deadline stated on the program website. Application details and the admissions deadline are posted on the program website.

### Program Requirements

A total of 4.0 course credits are required to graduate, which must include:

Code	Title	Credits
BIOT*6500	Molecular Biotechnology	0.50
BIOT*6600	Innovation Management	0.50
BIOT*6550	Biodiversity and Biotechnology	0.50
BIOT*6610	Cases in Biotechnology Management	0.50
BIOT*6700	Communication in Science and Business	0.50
BIOT*6800	Biotechnology Research Project (must be taken in Semester 3)	1.00
Electives		0.50

An optional Semester 4 may be added, as a research project extension.

### Duration of the Program

Students will normally take three courses per semester for two semesters (3.0 credits) and complete the Biotechnology Masters project (1.0) credit in semester 3. Therefore, the program normally takes 12 months of full-time study. There is, however, the option to continue the Biotechnology Masters project into a second fall semester, in which case the program will take 16 months of full-time study.

## Courses

### BIOT\*6500 Molecular Biotechnology Fall Only [0.50]

This course will provide an overview of molecular approaches relevant to a broad range of biotechnology industries including those found in medical, microbial, protein, pharmaceutical, environmental and agricultural fields.

**Restriction(s):** Restricted to Master of Biotechnology students.

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

**Location(s):** Guelph

**BIOT\*6550 Biodiversity and Biotechnology Winter Only [0.50]**

Biological diversity includes the variability among living organisms spanning genetic, species, habitat and geographic scales, thereby encompassing all living things and associated systems. This course provides an overview of DNA-based approaches used to analyze and characterize the main principles of biodiversity followed by discussions of the impact of biologically diverse communities within the biotechnology sector.

**Restriction(s):** Restricted to Master of Biotechnology students.

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

**Location(s):** Guelph

**BIOT\*6600 Innovation Management Fall Only [0.50]**

This course will focus on the integration of science and business from initial discovery through to commercialization. This integration involves resolving issues related to technical, market and financial feasibility. Topics will include the innovation process, assessment of markets, development of business models and managing projects under high uncertainty.

**Department(s):** Department of Management

**Location(s):** Guelph

**BIOT\*6610 Cases in Biotechnology Management Winter Only [0.50]**

This course will examine contemporary issues in biotechnology / science-based business through a case-based approach. Topics from across the spectrum of business disciplines (marketing, management, strategy, intellectual property, etc.) will be examined. Time permitting, a live case with an industry partner will be used.

**Prerequisite(s):** BIOT\*6600

**Department(s):** Department of Management

**Location(s):** Guelph

**BIOT\*6700 Communication in Science and Business Winter Only [0.50]**

The goal of this course is to develop written, and oral presentation skills to effectively communicate ideas and experiments in both scientific and business contexts. Students are asked to write and orally communicate a research proposal.

**Restriction(s):** Restricted to Master of Biotechnology students.

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

**Location(s):** Guelph

**BIOT\*6800 Biotechnology Research Project Summer Only [1.00]**

The students will be matched with a research advisor in their first semester and write a research proposal on their project in the second semester communication course. During the time they do their research project, they will be expected to do the research work that they propose and then to prepare a written report of their results and conclusions as well as to give a poster presentation on this. The research project can be undertaken with any appropriate faculty member, or with an approved off-campus institution.

**Restriction(s):** Restricted to Master of Biotechnology students.

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

**Location(s):** Guelph

**Electives****College of Biological Sciences**

Code	Title	Credits
MCB*6310	Advanced Topics in Molecular and Cellular Biology	0.50
MCB*6370	Protein Structural Biology and Bioinformatics	0.50
HHNS*6440	Nutrition, Gene Expression and Cell Signalling	0.50

**Bioinformatics**

Code	Title	Credits
BINF*6110	Genomic Methods for Bioinformatics	0.50
BINF*6210	Software Tools for Biological Data Analysis and Organization	0.50

**Gordon S. Lang School of Business and Economics**

Code	Title	Credits
UNIV*6050	Innovation and Entrepreneurship in Agri-Food Systems	1.00
MGMT*6200	Leadership Assessment and Development	0.50
MGMT*6400	Project Management	0.50

**Ontario Agricultural College**

Code	Title	Credits
ANSC*6450	Topics in Animal Biotechnology	0.50
ENVS*6040	Molecular Basis of Plant-Microbe Interactions	0.50
PLNT*6500	Applied Bioinformatics	0.50