

# DOCTORATE IN PHILOSOPHY MICROBIOLOGY AND IMMUNOLOGY AND SPECIALIZATION BIOINFORMATICS

## Overview

### Summary

- Degrees offered: Doctorate in Philosophy (PhD)
- Registration status option: Full-time
- Language of instruction: English
- Program option (expected duration of the program):
  - with thesis (12 full-time terms; 48 consecutive months)
- Academic units: Faculty of Medicine (<http://med.uottawa.ca/graduate-postdoctoral/>), Department of Biochemistry, Microbiology and Immunology (<http://med.uottawa.ca/bmi/>).

### Program Description

The programs refine critical and scholarly skills in fields and areas of specialization and prepare students for a variety of careers in teaching and research both within and outside of academia, including in a governmental, clinical, or industrial setting. Graduates are expected to have acquired autonomy in conducting research, in preparing scholarly publications, through a training that includes course work, research seminars, and independent research leading to a thesis.

The Department is a participating unit in the following collaborative programs: the Bioinformatics program (at the master's level) and the Pathology and Experimental Medicine program (at the master's and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Microbiology and Immunology and an MD. For more information please see the website of the Faculty of Medicine.

### Main Areas of Research

- Microbiology
- Host Biology

### Other Programs Offered Within the Same Discipline or in a Related Area

- Doctorate in Philosophy Microbiology and Immunology (PhD)
- Doctorate in Philosophy Microbiology and Immunology Specialization in Pathology and Experimental Medicine (PhD)

### Fees and Funding

Program fees:

- The estimated amount for university fees (<https://www.uottawa.ca/university-fees/>) associated with this program are available under

the section Finance your studies (<http://www.uottawa.ca/graduate-studies/programs-admission/finance-studies/>).

- International students enrolled in a French-language program of study may be eligible for a differential tuition fee exemption (<https://www.uottawa.ca/university-fees/differential-tuition-fee-exemption/>).
- To learn about possibilities for financing your graduate studies, consult the Awards and financial support (<https://www.uottawa.ca/graduate-studies/students/awards/>) section.

## Notes

- Programs are governed by the general regulations (<http://www.uottawa.ca/graduate-studies/students/general-regulations/>) in effect for graduate studies.
- In accordance with the University of Ottawa regulation, students have the right to complete their assignments, examinations, research papers, and theses in French or in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

## Program Contact Information

Graduate Studies Office, Faculty of Medicine (<https://med.uottawa.ca/graduate-postdoctoral/>)

451 Smyth Road, Room RGN 2016

Ottawa, Ontario, Canada

K1N 6N5

Tel.: 613-562-5215

Email: [grad.med@uottawa.ca](mailto:grad.med@uottawa.ca)

## Admission Requirements

For the most accurate and up to date information on application deadlines, language tests and other admission requirements, please visit the specific requirements (<https://www.uottawa.ca/graduate-studies/programs-admission/apply/specific-requirements/>) webpage.

### To be eligible, candidates must:

- Have a master's degree in microbiology or immunology (or equivalent) with a minimum average of B+ (75%).

Note: International candidates must check the admission equivalencies (<https://www.uottawa.ca/graduate-studies/international/study-uottawa/admission-equivalencies/>) for the diploma they received in their country of origin.

- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- The requirements outlined above are a minimum. The Admission Committee reserves the right to add any course considered essential in light of the student's background. The courses BNF 5106 and/or BNF 6100 could be added to the student's program requirements.
- Identify at least one professor who is willing to supervise your research and thesis.

- We recommend that you contact potential thesis supervisors as soon as possible.
- To register, you need to have been accepted by a thesis supervisor.
- The thesis director must be a member of the collaborative program.

## Language Requirements

Applicants must be able to understand and fluently speak the language of instruction in the program to which they are applying. Proof of linguistic proficiency may be required.

Applicants whose first language is neither French nor English must provide proof of proficiency in the language of instruction.

Note: Candidates are responsible for any fees associated with the language tests.

## Notes

- The admission requirements listed above are minimum requirements and do not guarantee admission to the program.
- Admissions are governed by the general regulations (<http://www.uottawa.ca/graduate-studies/students/general-regulations/>) in effect for graduate studies.
- Candidates must apply to the primary program and indicate in their application for admission to the PhD program in Microbiology and Immunology that they wish to be accepted into the collaborative-specialization in Bioinformatics. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. To be admitted to the collaborative program, candidates must also be accepted in the primary program.

## Fast-Track from Master's to PhD

Students enrolled in the master's program in Microbiology and Immunology at the University of Ottawa may be eligible to fast-track directly into the doctoral program without writing a master's thesis, provided the following conditions are met:

- Successful completion of the seminar and all the core courses required for the master's program.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.

Note: The transfer must take place within sixteen months of initial enrollment in the master's. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all of the requirements of the doctoral program must be met.

## Program Requirements

The Department may require students to take additional courses, depending on their backgrounds.

Students must meet the following requirements:

### Compulsory Courses: <sup>1</sup>

MED 8166	Professionalism and Professional Skills
----------	---

3 optional course units in microbiology and immunology (MIC) at the graduate level <sup>2</sup>	3 Units
---	---------

3 optional course units in microbiology and immunology (MIC) at the 8000 level <sup>2</sup>	3 Units
---	---------

### Seminars:

MIC 8366	PhD Seminar <sup>3</sup>	3 Units
----------	--------------------------	---------

BNF 8166	Seminar in Bioinformatics <sup>4</sup>	3 Units
----------	--	---------

### Comprehensive Examination:

MIC 9998	Comprehensive Examination
----------	---------------------------

### Thesis:

THD 9999	Doctoral Thesis <sup>5, 6</sup>
----------	---------------------------------

### Note(s)

1

Students in the BNF PhD program who already have taken BNF 5106 will be required to take one of BCH 5101, BCH 8110, BIO 8301, BNF 5107 or CHM8309.

2

The optional course units must be approved by the Department.

3

The seminar course involves the presentation of a seminar and regular attendance at the departmental seminars.

4

The seminar course in bioinformatics involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.

5

Successful presentation and defense of a thesis based on original research carried out under the direct supervision of a research faculty member in the Department.

6

Students are responsible for ensuring they have met all of the thesis requirements.

## Research

### Research Fields & Facilities

Located in the heart of Canada's capital, a few steps away from Parliament Hill, the University of Ottawa is among Canada's top 10 research universities.

uOttawa focuses research strengths and efforts in four Strategic Areas of Development in Research (SADRs):

- Canada and the World
- Health
- e-Society
- Molecular and Environmental Sciences

With cutting-edge research, our graduate students, researchers and educators strongly influence national and international priorities.

## Research at the Faculty of Medicine

"The Faculty of Medicine has a long history of conducting both basic and clinical research of the highest quality. Many of our high profile research projects are conducted in partnership with affiliated-

teaching hospitals and research institutes. These partnerships lead to biomedical discoveries that have a significant impact on health care. In the process they educate the next generation of Canadian scientists. Our research activity also attracts significant investment, which stimulates the Ottawa economy."

- Dr. Jocelyn Côté, Vice-Dean, Research

## Facilities, Research Centres and Institutes at the Faculty of Medicine

- Centre for Neural Dynamics (<https://neurodynamic.uottawa.ca/>)
- University of Ottawa Centre for Neuromuscular Disease (<http://med.uottawa.ca/neuromuscular/>)
- Centre for Research in Biopharmaceuticals and Biotechnology (<http://www.med.uottawa.ca/crb/bb/eng/>)
- Canadian Partnership for Stroke Recovery (<https://canadianstroke.ca/>)
- Kidney Research Centre (<http://www.ohri.ca/centres/KRC/default.asp>)
- University of Ottawa Skills and Simulation Centre (<http://uoss.ca/>)
- Medical Devices Innovation Institute
- Ottawa Institute of Systems Biology (<http://med.uottawa.ca/oisb/>)
- University of Ottawa Brain and Mind Research Institute (<http://www.uottawa.ca/brain/>)

For more information, refer to the list of faculty members and their research fields on **Uniweb**.

**IMPORTANT: Candidates and students looking for professors to supervise their thesis or research project can also consult the website of the faculty or department (<https://www.uottawa.ca/graduate-studies/students/academic-unit-contact-information/>) of their program of choice. Uniweb does not list all professors authorized to supervise research projects at the University of Ottawa.**

## Courses

### **BNF 5106 Bioinformatics (3 units)**

Major concepts and methods of bioinformatics. Topics may include, but are not limited to: genetics, statistics & probability theory, alignments, phylogenetics, genomics, data mining, protein structure, cell simulation and computing.

**Course Component:** Lecture

### **BNF 5107 Applied Bioinformatics (3 units)**

Computational knowledge discovery in and the dynamic nature of cellular networks. Includes, but is not limited to, knowledge representation, large scale data integration, data mining and computational systems biology.

This course is equivalent to BIOL 5516 at Carleton University.

**Course Component:** Lecture

### **BNF 5506 Bioinformatique (3 crédits)**

Concepts et méthodes en bioinformatique. Les sujets abordés peuvent inclure, entre autres, la génétique, les statistiques et les théories des probabilités, les alignements, la phylogénétique, la génomique et la structure de protéines.

**Volet :** Cours magistral

### **BNF 6100 MSc Seminar (3 units)**

Current topics in bioinformatics presented by program professors and invited speakers. Oral presentation and written report required. Graded S (Satisfactory) / NS (Not satisfactory).

**Course Component:** Lecture

### **BNF 6500 Séminaire de maîtrise (3 crédits)**

Sujets courants en bioinformatique présentés par des professeurs membres du programme et des conférenciers invités. Présentation orale et rapport écrit requis. Noté S (satisfaisant) ou NS (non satisfaisant).

**Volet :** Cours magistral

### **BNF 8166 Seminar in Bioinformatics (3 crédits)**

Current research topics in bioinformatics presented by PhD students and invited speakers. Oral presentation required. Graded S (Satisfactory) / NS (Not satisfactory).

### **BNF 8766 Séminaire en bioinformatique (3 crédits)**

Sujets courants en bioinformatique présentés par des étudiants en PhD et des conférenciers invités. Présentation orale requise. Noté S (satisfaisant) ou NS (non satisfaisant).

### **MIC 5100 Pathogen Interactions and Host (3 units)**

This course will examine current issues in microbiology/immunology. Topics to be chosen to allow discussion across the broad areas of virology, immunology and bacteriology. Within each of the modules, the focus will be on host-pathogen interactions at the molecular level, how microorganisms utilize, modify or disrupt host cell functions, including immune cell functions and immune responses, to establish infection and cause diseases, or on immunological diseases which may have an infectious component.

**Course Component:** Lecture

Prerequisite: At least one undergraduate course in microbiology and/or immunology and one course in molecular biology.

### **MIC 5366 MSc Seminar (3 units)**

Attendance at two half-day symposia with guest speakers, attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Microbiology and Immunology. Students must present at least one poster and one oral presentation during the course of their program. Graded S (Satisfactory) or NS (Not satisfactory).

**Course Component:** Seminar

### **MIC 6003 Thesis Research in Microbiology and Immunology III**

**Volet / Course Component:** Cours magistral / Lecture

### **MIC 8120 ADVANCED TOPICS IN IMMUNOMETABOLISM (3 units)**

An advanced study of the recent literature dealing with the field of immunometabolism, with a focus on both immunometabolic pathways