# Mathematical Biology

**BSc |** www.yorku.ca/science/mathstats/mathematical-biology

## Admission Requirements

- ENG4U, SBI4U, SCH4U, MHF4U, MCV4U
- **Recommended:** SPH4U
- **Minimum admission average:** high 70s – mid 80s

## Program Overview

York offers **Canada's only degree in Mathematical Biology.** At York, your studies in Mathematical Biology will give you will get a solid base of knowledge in mathematics with an emphasis on the applications of mathematics and computing in the medical, environmental, and public health fields. Your studies will begin with core courses in Mathematics and Statistics alongside introductory Biology and Chemistry courses. You will then specialize in areas like Mathematical Ecology, Medical Imaging, Public Health, Pharmaceutical Development, and many more. You may also combine your studies with a degree program in Science or Health.

You will demonstrate your learning outside of the lecture room. You can use the Experimental Math Space to study animal movement using robots or write simulations to model tree growth and infectious disease spread. You can intern with our world-renowned faculty and industry/government partners. You will have access to The Centre for Disease Modelling (CDM). In your fourth year, you will acquire real-life problem-solving skills in a required research project, in partnership with faculty in Biology, Chemistry, Kinesiology, and industry or government partners.

## Research Highlights

The Mathematical Biology group at York University has led the battle against COVID-19. They have published research findings on COVID-19, attracted millions of dollars in research funding to fight the pandemic, advised governments, and appeared regularly in the media. All of this has been accomplished with the assistance of several undergraduate and graduate students.

## First Year Courses:

- Linear Algebra and Calculus
- Statistics
- Problems, Conjectures and Proofs
- Computing for Math and Statistics
- Biology
- Chemistry

The Math & Stats programs at York are designed so you can switch between any of our programs in the first three semesters and still finish your degree on time.

## Second Year Courses:

- Multivariable Calculus
- Probability
- Differential Equations
- Symbolic Computational Lab
- Human Physiology or Anatomy
- Ecology
- Environmental Studies

## Upper Year Options:

- Mathematical Biology
- Practicum in Mathematical Biology
- Mathematical Modelling
- Vector Integral Calculus
- Numerical Methods
- Probability Modelling
- Complex Variables
- Dynamical Systems
- Immunology
- Virology
- Cell Biology
- Ecology

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### Experiential Education

In this program, you will have substantial opportunities for experiential education.

• **Research:** You can participate in summer research with professors funded through the Research at York program (RAY) and the Undergraduate Student Research Award program (USRA). In fourth year, you can pursue research work for credit in specialized project courses.

• **Internships:** You can integrate your classroom learning with hands-on, paid work after your third year for 4, 8, 12, or 16 months.

Visit yorku.ca/science/students/experiential-education/ for more information.

### Possible Career Pathways

Your studies in Mathematical Biology will prepare you for success in professional careers in disease prevention, pharmaceutical and vaccine development, advertising, behaviour analysis, ecology, media and space and aeronautics research, natural resource management, education, government, and for further professional or postgraduate studies.

- Conservationist; Natural Resource Management
- Pharmaceutical and Vaccine research
- Disease Prevention Specialist
- Scientific Consultant
- Disease Modeller
- Epidemiologist
- City Planning
- Ecologist
- Finance
- Doctor

- Forestry Industry; Oil and Gas industry
- Armed Forces/Intelligence Agencies Analyst
- Education- high school, college, university
- University researcher in Biology, Engineering, Medicine, Public Health, Environmental Studies

### Get In Touch

**Domestic Students:**
science@yorku.ca

**International Students:**
intlsci@yorku.ca

### Follow Us

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"I switched into the program and became enamoured by the curriculum, including mathematical modelling, computations, and dynamical systems. During my final year, I had the fantastic opportunity to develop my thesis project under the supervision of Professor Jane Heffernan and to participate in weekly meetings with her graduate and Ph.D. students. I used the knowledge I acquired to pursue my passion in genetics, specifically cancer genetics and prenatal genetics. I recommend this program to anyone interested in developing tools to comprehend biological phenomena using a mathematical lens."

**- Shira, Mathematical Biology Alumni**