Overview of the Concentration

Advances in the mathematical sciences — mathematics, statistics, and computer science — have brought new perspectives to biological research. By answering questions that cannot be addressed using other means, the mathematical sciences can provide indispensable tools for biological research. The result is the interdisciplinary field of mathematical biology, which involves developing analytical and computational predictive models of biological systems.

The concentration at St. Olaf is intended to train students in mathematical biology, allowing them to understand the development and applications of these models. With the large number of subfields in mathematical biology today, the concentration allows students to pursue a path that best suits their interest (e.g., mathematical modeling or bioinformatics).

Students completing the concentration will be equipped with the skills necessary to enter the fast-growing field of mathematical biology or pursue graduate work in the field.

Intended Learning Outcomes for the Concentration

Students are required to work on an independent project that integrates mathematics, computer science, and/or statistics with biology.

Senior Math Biology Symposium

Seniors present their independent project in the form of a poster in a Mathematical Biology Symposium held at St. Olaf in the spring.

Total Credits

5

Integrative Project

The project must be approved by the director in order for the student to finish the concentration. There are many ways in which the project can be completed. For example, the level III biology electives in the concentration all include final projects that allow a student to work on an integrative project for the concentration. Other experiences that could fulfill this requirement include a research project such as a summer Research Experience for Undergraduates (REU); a project in the expanded Center for Interdisciplinary Research (eCIR); working with faculty to develop a module for a course; an independent research or independent study with a faculty member; or working with a faculty member to develop a computational lab that could be incorporated into an existing course.

Senior Math Biology Symposium

The symposium is open to the public and provides students the opportunity to explain mathematical and biological concepts to a broad audience. In addition, the symposium is an event that brings together all the students in the concentration, thus strengthening the mathematical biology community here at St. Olaf.
Courses

**MABIO 130: Exploring Biomathematics (0.25)**
Students spend one evening each week exploring topics at the interface of mathematics and biology. Faculty introduce topics supported by a reading assignment to be done prior to class. Class time is spent exploring the problem and developing the mathematical approach to solving it. Topics may include invasive species, sex-ratio evolution, neural networks, feedback control, graph theory, statistical ecology, and population genetics. P/N only. Offered annually in the spring semester.

**Prerequisite:** MATH 120 or equivalent.