

# Essentials of the Interdisciplinary Minor in Mathematical Biology

Sunday, March 16, 2008

Five years of conducting interdisciplinary, collaborative research and creating student learning at the intersection of the life and mathematical sciences has allowed Truman to develop the infrastructure to support a minor degree program in the emerging field of mathematical biology.

**DISTINCTION...** Truman would be the first institution in Missouri to offer such an undergraduate program. The program would bring distinction to the University as an innovator in learning and as a school at the cutting edge of science and mathematics education.

**SUPPORT...** Students are eager for this minor to be put into place. In addition to those who have participated in our *Research-focused Learning Communities in Mathematical Biology* program, we get “when will it be available?” questions from members of student government, student attendees at our Mathematical Biology Seminar series, and others with no clear connection to our program.

Votes of faculty show great support for this minor, as well. The Mathematical Biology faculty supports it (17-0). The Agricultural Science faculty supports it unanimously. The Biology faculty supports it (22-0-2). And the Mathematics & Computer Science faculty supports it (24-9).

**OUTCOMES...** The minor is for students who engage in learning experiences that bring together concepts, techniques, and activities in the life and mathematical sciences. It takes advantage of regular MATH, CS, and BIOL courses, but it also relies on a few courses developed with external funds to support this interdisciplinary learning. The **five learning outcomes** target student proficiency with data acquisition, mathematical and computational modeling, using or modifying computational tools, conducting statistical analysis, and independent research; all activities occur at the interface of the two fields.

Students majoring in biology, computer science, or mathematics will be eligible for the minor. To earn the minor, a student will demonstrate proficiency in each outcome area (see below), take at least 15 credits (at least 9 credits at 300--level or higher) of courses with no more than one course “double-counted” toward their major. As part of this, all students will take MATH/BIOL 345, two one-credit seminars, a credit-bearing research experience, and be a regular attendee of a relevant seminar series.

**LEARNING-CENTERED...** The proposed minor is distinctive in two ways. First, it is an **evidence-based** minor. Using an online portfolio, students provide evidence of their interdisciplinary learning in the five proficiency areas. A minor advisor assists the student, and a minor oversight committee evaluates the evidence and regularly provides the student with feedback. Second, the minor uses a student-created **learning plan** to encourage deliberate thinking about interdisciplinary activities. Through this plan, a student will provide a rationale for how their chosen courses and experiences create an integrated experience resulting in interdisciplinary training. This approach allows the minor to use ‘regular’ courses in BIOL, CS, and MATH as vehicles for interdisciplinary learning.

**MANAGEMENT...** Twenty-three faculty from several disciplines belong to the Mathematical Biology program. To oversee this interdisciplinary minor, those faculty will choose an oversight committee consisting of two faculty from the Department of Mathematic and Computer Science and two faculty from the Department of Biology. This committee will have formal responsibility for the minor, working with the Director of Interdisciplinary Studies. It will also manage frequent, ongoing communication with constituent departments. Faculty do understand that slight adjustments to the program will be made to better serve the students and faculty involved. Such changes will require approval of the Mathematical Biology program.

**THE FUTURE...** An interdisciplinary minor provides Truman with a distinctive academic program that speaks to regional and national needs of the industrial and research sectors. It will attract to Truman strong students, innovative faculty, external funding, and charitable donations that will enhance learning at all levels.

*More detailed information about the minor is available in the formal proposal document.*