

Program Guidelines

Guidelines for Applicants:

Any student majoring in any of the mathematical or biological sciences can apply. Following NSF program guidelines, preference will be given to students majoring in math (including applied math), statistics, and biology (including systems biology).

Preference will be given to students in their sophomore or junior years at the time of application (i.e. 1st year students are welcome to attend the weekly biomath forum but are encouraged not to apply until the sophomore year).

Preference will be given to students who have not been through the program before.

Following NSF's guidelines, half of the students admitted will be majoring in the biological sciences and half in the mathematical sciences.

Examples of the guidelines in action:

For the Jan 2007 - May 2008 project cycle, we admitted two systems biology majors (soph/jr year), one math major (jr/sr year) and one applied math major (soph/jr year).

Guidelines for admitted students:

Students entering the RIBMS program will commit to:

1. Participate in the biomath research forum for three consecutive semesters (the spring before and the fall and spring semesters following the summer research internship). The forum provides an opportunity for students to learn about available research projects, to learn skills related to mathematical biology research, and to interact with a variety of researchers at the math/bio interface.
2. Work full time on a 10 week paid research internship during the summer following their application

3. Following the summer internship, students enroll in either BIOL 388 (juniors) or 388S (seniors) in the fall, and BIOL 390 in the spring. (N.B. BIOL 390 can be taken more than once).
4. Write progress reports at the end of summer and fall and a final report at the end of spring. (Written reports are required for BIOL 388, 388S, and 390.)
5. Present their finished work publicly at least once. Opportunities for this include the Biomath Forum, the SOURCE/Senior Capstone fair, and Research ShowCase.
6. Produce a poster of their finished work. (This can be part of their public presentation.)

Examples of the guidelines in action:

For the Jan. 2007 – May 2008 project cycle, two students enrolled in BIOL 388 (juniors), one in BIOL 388S (a junior with senior standing), and one in MATH 651 (research for the Master's Thesis) in lieu of the usual capstone.

Project milestones to keep in mind:

- **Spring semester before internship:** Participate in biomath forum and project selection (see below).
- **Early June:** Summer internship begins (precise dates negotiable with mentors)
- **Early August:**
 1. poster at SPUR poster fair (optional)
 2. hand in summer progress report (rough research paper format)
- **Fall semester after internship:**
 1. Participate in biomath forum
 2. Present summer research progress in biomath forum, early fall
 3. Enroll in BIOL 388, BIOL 388S or other approved capstone

4. Hand in progress report end of fall semester (same format as summer report)

- **Spring semester after internship:**

1. Participate in biomath forum
2. Enroll in BIOL 390 or other approved capstone
3. Final public presentation in second half of semester. E.g. a poster at the SOURCE/capstone poster fair or Research ShowCase. We encourage students to participate in the Michelson-Morley competition that occurs at the SOURCE poster fair. Students may present posters at more than one venue.
4. Hand in final report (polished research paper format)

Deadlines for 2008:

- Research ShowCase abstract deadline: 1/31/08
- Michelson-Morley competition entry deadline: 3/19/08
- SOURCE entry deadline: 3/21/08

This list is intended to give participants an idea of the scope of the program, but it is not necessarily exhaustive. Additional opportunities may arise (e.g. to present work at conferences or in written form) of which we will strive to keep participants informed as far in advance as possible.

Guidelines for team and project selection:

As part of the biomath research forum, and through faculty/team meetings, students will have the opportunity to familiarize themselves with two or more of the available projects and report back to the rest of the students. Following NSF program guidelines, students will form teams including at least one student from the mathematical and one from the biological sciences. No students will engage in a solo research project.

In close consultation with a team of faculty mentors, students are to propose a project to pursue by the eleventh week of the semester. Students will submit a project proposal to the RIBMS program directors (Thomas

and Snyder). Proposals should include a discussion of background and motivation for the project, a brief description of methods students will employ in conducting research, and a description of the form the results of the research might be expected to take. Proposals are typically refinements of research ideas originating from the faculty teams (for examples, see <http://www.case.edu/artsci/ribms/projects.html>) but novel project ideas may also be considered if endorsed by a team of faculty mentors.

Students are to propose a project to pursue by the eleventh week of the semester and submit a project proposal to the RIBMS program directors (Thomas and Snyder). Proposals should include a discussion of background and motivation for the project, a brief descriptions of methods students will employ in conducting the research, and a description of the form the results of the research might be expected to take. Students may work with a faculty team in preparing the proposal as closely as they wish. Assignment of student teams to projects will be based on the proposals, subject to final approval by the faculty mentors and the RIBMS co-directors.

Examples of the guidelines in action:

For the Jan. 2007 – May 2008 project cycle, a team of two students could not agree on which of two closely related projects to pursue together. There was enough overlap in the sponsoring faculty teams to merge the two projects into a coherent whole, allowing the team to proceed.

Guidelines for participating faculty:

Faculty should submit one-page project proposals to the steering committee. Proposals should motivate and define the research problem and briefly describe the research activities the math and biology team members will pursue. Proposals are welcomed at any time, however proposals submitted after October 5th, 2007 may not be included in the official 2008–9 program recruiting or publicity materials.

Each faculty team will be expected to present a brief (10 minutes including Q and A) overview of their project during a special meeting of the biomathematics research forum, near the start of the spring semester. Subsequently each faculty team will be expected to make themselves available to meet with one or more student teams interested in learning more about the project; students will report back a more detailed project description

to their peers in a subsequent biomath forum session (typically without the sponsoring faculty present).

As per NSF restrictions, participating faculty in the departments of Biology, Mathematics and Statistics are eligible to receive a small amount of summer salary support, if they in fact mentor a team of students in a particular summer (assignment of teams to projects is driven by student preference, with final determination resting with the RIBMS co-directors).

For questions or suggestions about these guidelines please contact the co-directors Peter Thomas (pjthomas-at-case-dot-edu), Robin Snyder (res29-at-case-dot-edu).