

Mathematical Biosciences First TIE Annual Update – May 2007

Executive Summary

In recent years, there have been remarkable advances in the biological sciences, from the completion of the human genome project to the fight against diseases of the brain, such as Alzheimer's and Parkinson's. Society is eager to see basic research and technological advances translated into better diagnostic tools for health problems. This can be achieved via mathematical and statistical modeling. However, most biologists are not skilled mathematicians or statisticians and few mathematicians understand the language of the life sciences. The Mathematical Biosciences Institute (MBI), funded by the NSF, was created in 2002 in order to provide a national forum to address these challenges.

The best U.S. programs in basic mathematical biology have only small faculty groups (5-7), but each includes several world-class leaders. With existing strengths, OSU would require the addition of only a few outstanding mathematical biology faculty to achieve our research goals and rise into the elite group of programs. However, there are only a few senior mathematical biology researchers, and they are firmly entrenched. Junior faculty are highly sought after and most often are successfully recruited to institutions where there already exists a critical mass in mathematical biology. We believe that exceptional new faculty can be attracted to OSU precisely because of the presence of the MBI, with its rich interdisciplinary research, many visitors, workshops, post-docs, and GRAs, and because of the available support for release time to faculty.

OSU's strengths in basic mathematical biology are distributed across departments and programs within the Colleges of Biological Sciences (CBS) and Mathematical and Physical Sciences (MAPS). The MBI presence on campus is providing critical expertise and logistics to foster the integration of these existing strengths; it is positioning OSU to become one of the national leaders in mathematical biosciences, especially if we are successful in hiring very strong new faculty.

The targeted investment in excellence (TIE) award will leverage existing commitments from CBS and MAPS, accelerate faculty hiring, facilitate interdisciplinary research and educational programs, and dramatically improve our ability to be the national leader in the mathematical biosciences.

A bullet-pointed overview of accomplishments to date

Some of these are a result of direct central TIE financial commitment, and some are the result of MAPS/CBS matching support:

- Two new faculty hires were made, one in Mathematics (Janet Best), one split 80-20 between Statistics and EEOB (Laura Kubatko).
- Ten course releases were granted for faculty in Mathematics and Statistics.
- A \$1,000,000 NSF Undergraduate Biology and Mathematics grant proposal was submitted in April 2007 by seven OSU faculty members, including the two new faculty mentioned above (Janet Best and Laura Kubatko), a math faculty member receiving MBI course release (Yuan Lou – Math), Tom Waite (EEOB), David Terman (Math and MBI Senior Assoc Director), Libby Marschall (EEOB and MBI Associate Director), and Tony Nance (Math and MBI Assistant Director).
- Three new courses were designed and piloted in 2006-07, and a fourth will be piloted in Spring 2008 (Best, Kubatko, Lou, and Nance). All four courses (three in Mathematics and one in Statistics) are designed for freshmen and sophomores, integrating biological motivation and perspective into the mathematical and statistical tools being presented. Plans exist for similar curricular additions and development in the next 2-3 years, including some at the graduate level.
- Nineteen course releases have been granted to OSU faculty next year, representing at least eight departments from three colleges.
- A senior MBI long term visitor (Baltazar Aguda) has been recruited who will be working with Clay Marsh (Internal Medicine) as well as the MBI.

A statement of implementation issues

We have no implementation issues at present.