



NIMBioS

National Institute for Mathematical and Biological Synthesis

<http://www.nimbios.org>

The National Institute for Mathematical and Biological Synthesis (NIMBioS), located on the University of Tennessee-Knoxville campus, focuses on advancing research and education at the interface between biology and mathematics. NIMBioS is sponsored by the National Science Foundation, with additional support from the UTK. Since March 2009 when NIMBioS programs officially began, more than 6,000 individuals from more than 50 countries and every U.S. state have participated in various research and educational activities.

The mission of NIMBioS is to:

- *address key biological questions using approaches from the mathematical and computational sciences*
- *foster the development of a cadre of researchers who are capable of conceiving and engaging in creative and collaborative connections across disciplines*

Research at the Interface Between Mathematics and Biology. NIMBioS advances a wide variety of research opportunities designed to facilitate interaction between mathematicians and biologists to arrive at innovative solutions to problems in all areas of biology. One area of particular emphasis at NIMBioS has been modeling animal infectious diseases, such as white-nose syndrome in bats, pseudo-rabies virus in feral swine, *Toxoplasma gondii* in cats, and malaria from mosquitoes. As a leading international center for animal infectious disease modeling, NIMBioS has contributed significantly to global needs in analyzing the potential spread, impact and control of diseases that can move from animals to humans, such as West Nile virus, anthrax, swine flu and mad cow disease. Two mechanisms for research at NIMBioS are Working Groups and Investigative Workshops. Working Groups are comprised of 10-15 invited participants focusing on specific questions at the interface of math and biology. Investigative Workshops include 30-40 participants and focus on a broader set of topics. NIMBioS also provides support for post-doctoral and sabbatical fellows, short-term visitors, graduate research assistants, and faculty collaborators at UT. NIMBioS has partnered with the Great Smoky Mountains National Park to develop methods of interest for natural area management that are transferable to numerous U.S. locations.

Education and Outreach. NIMBioS has an active Education and Outreach program geared toward learners of all ages, from elementary school students through college and graduate school and the general public. NIMBioS organizes an eight-week Summer Research Experience for Undergraduates and Teachers program. Participants live on campus and conduct research in teams with UT professors, NIMBioS researchers, and collaborators on projects at the interface of math and biology. NIMBioS also organizes and hosts an Undergraduate Research Conference at the Interface of Biology and Mathematics each fall featuring student talks and posters as well as panel discussions. Other educational activities include NIMBioS tutorial workshops to enlighten biologists about key quantitative methods, such as optimal control and optimization or high performance computing methods in biology. K-12 outreach programs include Biology by Numbers, in which elementary and middle school students learn about biology using mathematics, and Biology in a Box, a hands-on, inquiry-based approach to teach the scientific method and enhance math skills.

