



**National Institute for Mathematical and Biological Synthesis**  
<http://www.nimbios.org>

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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 in collaboration with the U.S. Department of Homeland Security and the U.S. Department of Agriculture. Since March 2009 when NIMBioS programs officially began, more than 400 individuals from 15 countries and 43 states 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. Research activities to date include investigations of intragenomic conflict, multi-scale simulation of cellular processes, human origins, natural system dynamics, and infectious diseases in systems with wildlife hosts. 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 collaborates with the Great Smoky Mountains National Park to develop methods of interest for natural area management that are transferable to numerous U.S. locations. Other partners in NIMBioS include IBM and ESRI, Inc.

**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. At the college level, NIMBioS organizes an eight-week Research Experience for Undergraduates and a Research Experience for Veterinary Students program each summer. Veterinary students and undergraduates majoring in math, biology and related fields live on campus and work in teams with UT professors on innovative research projects. High school teachers also participate in the program. The NIMBioS Teacher Collaboration Program pairs teachers with interests in mathematics and biology with active researchers in the math biology community. Other educational activities include NIMBioS tutorial workshops designed 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. NIMBioS also hosts a variety of workshops and conferences on education at the math/biology interface for students and faculty from across the US.

