



NIMBioS

National Institute for Mathematical
and Biological Synthesis



NIMBioS Interdisciplinary Seminar

3:30 p.m.*, Tuesday, November 19, 2013

Dr. Roger Nisbet*

Ecology, Evolution and Marine Biology
Univ. of California, Santa Barbara

**NIMBioS Postdoctoral Fellow Invited Distinguished Visitor*

“Modeling environmental impacts of engineered nanomaterials: The value of ‘generic models’ of individual organisms”

Mathematical models are contributing to synthesis of information on an emerging environmental challenge: to understand the implications of the rapidly growing use of engineered nanomaterials (ENMs). Release of ENMs into soil and water is inevitable, and the ecological consequences are unknown. There is a near limitless combination of ENMs, organisms, and environments of potential importance, but there are limited resources for (expensive) ecological studies. In contrast, there is a large, and growing, body of data on organismal and suborganismal responses to ENMs. Progress in understanding ecological implications of ENMs in the environment requires theory that takes advantage of this knowledge base. I shall describe an approach based on Dynamic Energy Budget (DEB) theory, illustrated by three applications to nanotoxicology: (i) a study of the response of bacteria to quantum dots that illustrates the role in model selection of data on suborganismal dynamics; (ii) a model of phytoplankton populations exposed to silver nanoparticles (AgNPs) that demonstrates the importance of a feedback mechanism involving metabolic “waste” products; (iii) individual based models of the effects of AgNPs on phytoplankton-zooplankton interactions that suggest the concept of ontogenetic asymmetry may help elucidate the population level consequences of impacts mediated by different physiological modes of action.

Location: Room 105 at NIMBioS, Claxton Education Bldg, 1122 Volunteer Blvd.

**Join us for refreshments at 3 p.m.*

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The National Institute for Mathematical and Biological Synthesis (NIMBioS) brings together researchers from around the world to collaborate across disciplinary boundaries to investigate solutions to basic and applied problems in the life sciences. NIMBioS is sponsored by the National Science Foundation, the U.S. Department of Homeland Security, and the U.S. Department of Agriculture with additional support from The University of Tennessee, Knoxville.

