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Workshop Targets Control-Theoretic Approaches for Agent-based Models

KNOXVILLE, Tenn. – Agent-based models (ABMs) are powerful computer-simulation modeling techniques that are used increasingly to understand a broad range of biological phenomena, such as tumor growth, the immune system, and the spread of infectious diseases through a population.

Researchers will gather Dec. 1-3 at the National Institute for Mathematical and Biological Synthesis (NIMBioS) on the University of Tennessee, Knoxville (UTK), campus to discuss ways to develop mathematical control theory methods for ABMs. The deadline is Oct. 1 for applying to attend the NIMBioS Investigative Workshop: *Optimal Control and Optimization for Individual-based and Agent-based Models*.

ABMs simulate the actions and interactions of autonomous individual parts, or agents, with a view to assessing the effects on the system as a whole. By simulating the simultaneous operation of multiple agents, ABMs can re-create and predict the actions of complex phenomena.

In order to study the effectiveness of possible interventions, such as vaccination and quarantine schemes, in biomedical problems, ABMs must be simulated numerous times to compare alternative intervention scenarios, which is a limitation of ABMs. Results of ABMs are not optimal solutions, but rather scenarios with various assumptions. Applying analytic methods to study how possible interventions affect system dynamics might be more useful. Thus, the goal of the workshop is to discuss the possibility of developing control-theoretic approaches for ABMs, which could be applied in studying interventions.

The ABM Workshop is organized by Filippo Castiglione from the Institute for Computing Applications, Rome; Volker Grimm from UFZ Center for Environmental Research, Leipzig; Reinhard Laubenbacher from the Virginia Bioinformatics Institute; and Suzanne Lenhart, NIMBioS Associate Director of Education and Outreach and UTK Professor of Mathematics.

NIMBioS Investigative Workshops involve 30-40 participants, of which about half are invited. Individuals with a strong interest in the topic can also apply to attend. For more information about the Agent-based Models Workshop and how to apply, visit <http://www.nimbios.org>

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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.

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