

Invitation to Agent-Based Modeling Tutorial (3 hours)

Instructor: Georgiy Bobashev

Target Group: This short tutorial is aimed at the audience of statisticians, analysts and researchers in social sciences who are interested in learning about the agentbased modelling approach and understanding how agent-based models could be useful in their research.

Expected background: No special background is required besides common sense and logic.

Core reading: Steven F. Railsback & Volker Grimm Agent-Based and Individual-Based Modeling: A Practical Introduction <http://www.railsback-grimm-abmbook.com/>

Software (free): Netlogo <http://ccl.northwestern.edu/netlogo/>
<http://ccl.northwestern.edu/netlogo/docs/>

Requirements: You are required to bring your own laptop with wireless capability. Ideally download and install Netlogo software before the class. Otherwise you could install it in class.

Course Objectives: The short tutorial will give an overview of agent-based modeling and its place among other methods used in social simulation (statistical models, Markov models, and system dynamics models). We will focus on the basics of AgentBased models, describe the main steps in model formulation (ODD protocol), building and the interpretation of the results. At the end of the tutorial the participants will develop their first ABM

House Rules: This is a participatory tutorial. Students are encouraged to ask questions as we go to make sure everything is clear and the tutorial is useful.

Tutorial outline:

I. Introduction to ABMs

1. Why model? Modeling objectives and types: statistical, Markov, system dynamics, microsimulation, and agent-based

2. Examples of ABMs and seemingly non-intuitive emerging patterns.

II. Building an Agent-based models (including lab exercises)

3. ABM components (agents, rules, environments, networks) based on NetLogo examples

4. Build the first ABM and run simulations

5. Simulation scenarios and analysis of the results

6. Documenting an ABM. Overview, Design concepts, Detail (ODD) protocol

7. Uncertainty in ABM

Dr. Georgiy Bobashev is an RTI Fellow in the Center for Data Science at RTI International with over 20 years of experience in health research. He has been a PI and Co-I on numerous NIDA- and NIAAA-funded grants. Georgiy Bobashev received a Master's degree in physics from St.-Petersburg Technical University in Russia in 1989. Between 1989 and 1993 he was a lead engineer at the laboratory of ecosystems modeling at Leningrad Agrophysics Research Institute. In 1997 he has received a Ph.D. degree in Biomathematics from the Department of Statistics, North Carolina State University, and before joining RTI in 1998 he was a post-doctoral fellow in the School of Public Health at Johns Hopkins University.