

8th Jena Summer Academy on



'Innovation and Uncertainty'

Summary

Course on Simulation Methods (SIME)

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Using simulation models for research purposes involves more than writing a code for model equations. It requires also technical (non-programming) and methodological work without which a research project fails to deliver the expected results independently from the programming sophistication of the model. The SIME course aims at providing students with the skills necessary to successfully face all stages of a research project based on simulation models, focusing specifically on agent-based simulations used for research in social sciences. Namely, the course discusses:

- model design
- implementation
- revision
- analysis of results and their validation
- dissemination.

The course is based on the simulation platform "Laboratory for Simulation Development" (LSD). This is essentially a programming language allowing modelers to express agent-based models (ABMs) with minimal programming efforts, thus being easy to use even for researchers without prior programming experience. The mostly attracting feature of LSD is that automatically (i.e. without any modeler intervention) it provides an extensive and flexible set of interfaces calibrated around the current state of the model, allowing users to fully exploit their model in professional ways. Details on LSD can be found at: www.labsimdev.org.



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The course will consist of lectures illustrating specific issues related to the use of simulation models. Following the lectures students will be invited to implement exercises meant to gain experience on the topic, assisted by online material and, if necessary, individual coaching by the staff (students are expected to use their own personal computers; any OS is supported). Moreover, during the course there will be seminars meant to provide examples of research projects in Economics using ABM simulations, with particular focus on methodological issues. Class collaboration and discussions are strongly invited.

The course is aimed at students having an interest in using simulation models for research purposes in social sciences. Interested students are expected to have a variety of backgrounds. First-time modelers will be guided through learning how to develop simulation models from scratch and use their results, reaching the capacity to fully exploit any type of model and develop independently relatively elaborated models. Students with prior programming skills will learn how to carry on a methodologically sound research projects based on simulation modeling. Technically oriented students will have the opportunity to compare LSD to alternative simulation tools, possibly evaluating specific solutions to improve existing tools (LSD itself developed partly from suggestions by past students).

Given the expected diversity of the class, students are strongly invited to plan their work independently, in accordance with the staff, during the periods devoted to the exercises. If necessary, individually tailored programs can be agreed upon for specific goals, such as perfecting existing models. Students with specific goals should indicate so in the application providing a short description of the desired results from their participation. In case of selection, these students will be contacted to discuss the feasibility of their project and, in case, possible pre-course preparations.