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Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland
e-mail: kacprzyk@ibspan.waw.pl

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Advances in Social Simulation 2015

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Introduction

Social simulation is a rapidly evolving field. Social scientists are increasingly interested in social simulation as a tool to tackle the complex nonlinear dynamics of society. As such, it comes as no surprise that scientists employing social simulation techniques are targeting a wide variety of topics and disciplinary fields. The management of natural resources, financial-economical systems, traffic, biological systems, social conflict, and war—they are all examples of phenomena where nonlinear developments play an important role. Social simulation, often using the methodology of agent-based modeling, has proven to be a new and powerful methodology to address these processes, thus offering new insights in both the emergence and the management of nonlinear processes. Moreover, offering a formal and dynamical description of behavioral systems, social simulation also facilitates the interaction between behavioral sciences and other domain-related scientific disciplines such as ecology, history, agriculture, and traffic management, to just name a few examples. The increased capacity for simulating social systems in a valid manner contributes to the collaboration of different disciplines in understanding and managing various societal issues.

The European Social Simulation Association, founded in 2003, is a scientific society aimed at promoting the development of social simulation research, education of young scientists in the field, and application of social simulation. One of its activities is the organization of an annual conference. From September 14th to 18th in 2015, the 11th Social Simulation Conference was organized in Groningen, the Netherlands. The hosting organization was the Groningen Center for Social Complexity Studies.

This book highlights recent developments in the field of social simulation as presented at the conference. It covers advances in both applications and methods of social simulation. Because the field of social simulation is evolving rapidly, developments from a variety of perspectives have been brought together in this book, which has a multidisciplinary scope. Yet all the contributions in this book share a common interest: the understanding of how interactions between a multitude of individuals give rise to complex social phenomena, and how these phenomena in turn affect individual behavior. This multidisciplinarity is of vital importance,

because it facilitates the communication between different disciplinary areas. The value of disciplinary collaboration and cross-fertilization in social simulation research is demonstrated by many contributions in this volume. To mention just one of the many areas for which this holds: insights from studying the socio-ecological dynamics of fisheries may prove to be relevant in understanding conflicts in human organizations as well.

Concerning the topics addressed in this book, the reader will find a wide variety of issues that are addressed using social simulation models. The topic of complexities of economic systems is addressed in a number of chapters, providing a perspective on our understanding of the nonlinear characteristics of economic systems on various levels. Opinion dynamics is another topic on which numerous contributions focus. Studying opinion dynamics is highly relevant to develop a deeper understanding of societal polarization, the emergence and resolution of conflict, and civil violence. A range of contributions addresses the interaction of humans with their environment, most notably the social dynamics of natural resource use and ecosystem management. Applied topics deal with fish stocks and land use. Closely related to this are contributions dealing with food production and consumption, a theme that in turn has important consequences for land use. Another field with important societal impact addressed by papers in this volume is transportation, where technology development and human behavior interact likewise. This is related to the rapid developments that we currently witness in systems for the production and consumption of energy. The energy transition can be seen as a typical example of a nonlinear process where social simulation contributes to a deeper understanding that may help to develop more effective managerial and societal strategies in the future. Besides looking at current societal and socio-ecological issues, social simulation is increasingly used to understand developments that happened in the past. In this book, the reader will find chapters demonstrating how social simulation, as a methodology, may be valuable in understanding historical developments.

Besides applications of social simulation models on topical domains, this book also covers relevant developments in the methodology of social simulation. An area that receives increasing attention in the literature is the empirical validation of simulation models. Various contributions address the question how empirical data can be used in further improving the reliability of social simulation models. Also attention is devoted to the use of behavioral theory in social simulation models, which requires a translation from more descriptive and correlational models to a formal dynamic model of behavior. Related to this is the topic of construction of artificial populations to be used in experimenting with models of societal processes. Finally, in making models more accessible for the general public, attention is given to running social simulation models in browsers, which would make them much more accessible.

This book is an important source for readers interested in cutting-edge developments exemplifying how simulation of social interaction contributes to understanding and managing complex social phenomena. The editors wish to thank all authors, the members of the scientific committee and the auxiliary reviewers who were responsible for reviewing all the papers submitted for the conference, as well

as the organizers of the special sessions. For a list of all people involved in shaping the contents of the conference and reviewing the submissions, see the next pages. The papers published in this volume are a representative selection from a broader set of research papers presented at Social Simulation 2015.

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- Social Conflict and Social Simulation: Armando Geller and Martin Neumann
- Applications in Policy Modelling: Petra Ahrweiler, Nigel Gilbert, Bruce Edmonds, and Ruth Meyer
- Cognitive Models in Social Simulation: Nanda Wijermans and Cara Kahl
- Social Simulations of Land, Water and Energy: Tatiana Filatova
- Simulating the Social Processes of Science: Bruce Edmonds
- Modelling Routines and Practices: Bruce Edmonds
- Qual2Rule—Using Qualitative Data to Inform Behavioural Rules: Melania Borit
- Modelling Social Science Aspects of Fisheries: Melania Borit
- Simulation of Economic Processes: Alexander Tarvid
- Affiliation, Status and Power in Society: Gert Jan Hofstede, Sjoukje Osinga, and Floor Ambrosius

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