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Bastien Chopard · Stefania Bandini ·
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Cellular Automata

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Proceedings

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Preface

This volume contains a collection of original papers covering both applications and theoretical results on cellular automata, which were selected for presentation at the 15th International Conference on Cellular Automata for Research and Industry, ACRI 2022, held in Geneva, Switzerland, from September 12 to September 15, 2022. The event was organized by the Computer Science Department of the Faculty of Sciences at the University of Geneva.

The primary goal of the conference was to bring together researchers coming from many different scientific fields in order to favor and foster international collaborations on cellular automata as well as to spread scientific knowledge among the experts in several scientific areas: computer science, pure and applied mathematics, physics, biology, etc.

Cellular automata are powerful computational models used for studying complex phenomena characterized by simple local interactions. They are discrete (both in space and time) models that have been successfully applied in many different scientific fields for dealing with complex systems. Starting from their introduction in the middle of the 20th century, cellular automata have generated more and more interest in both the theoretical aspects and the practical applications.

The ACRI conference series was first organized in Italy, namely, ACRI 1994 in Rende, ACRI 1996 in Milan, and ACRI 1998 in Trieste, which were followed by ACRI 2000 in Karlsruhe (Germany), ACRI 2002 in Geneva (Switzerland), ACRI 2004 in Amsterdam (The Netherlands), ACRI 2006 in Perpignan (France), ACRI 2008 in Yokohama (Japan), ACRI 2010 in Ascoli Piceno (Italy), ACRI 2012 in Santorini (Greece), ACRI 2014 in Kraków (Poland), ACRI 2016 in Fez (Morocco), ACRI 2018 in Como (Italy), and ACRI 2020 in Łódź (Poland).

This 15th edition of ACRI aimed at enlarging the traditional topics to include other areas related to or extending cellular automata. This allowed a larger community to have the opportunity to discuss their work in various related fields like, for example, complex networks, games, cryptography, lattice gas and lattice Boltzmann models, agent-based models, etc.

Each paper inside this volume was reviewed by at least two Program Committee members. Following the initial, tutorial-related, paper, the remainder of the volume is divided into five parts, which collate the papers relating to different topic areas: Theory; Modelling and Simulation of Physical Systems and Phenomena; Cellular Automata and Spreading Dynamics; Crowds, Pedestrians, and Traffic Dynamics; and Other Studies on Cellular Automata.

We would like to express our sincere thanks to the invited speakers who kindly accepted our invitation to give plenary lecture at ACRI 2022: Michel Milinkovitch, Katsuhiro Nishinari, and Pablo Arrighi.

Moreover, we are grateful to the Program Committee and all the additional reviewers for their contribution in selecting the papers. We are also grateful for the financial and logistic support from CUI (Centre Universitaire d'Informatique) and the Computer Science Department of the University of Geneva. Finally, we acknowledge the excellent

cooperation from the Lecture Notes in Computer Science team of Springer for their help in producing this volume in time for the conference.

July 2022

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