

Preface

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1 PREFACE

The presented edition is a selection of papers initially presented at the ACRI 2020 conference. The 14th Conference and School “Cellular Automata for Research and Industry” was scheduled to take place in Lodz, Poland in the autumn 2020. Unfortunately, due to COVID-19 pandemic, the Steering and Organizing Committees decided to postpone the Conference. Finally, it was held on December 2-4 2020. Also the form of the conference had to change and instead of meeting directly, the participants had to be confined to a remote discussion.

The tradition of ACRI meeting is twenty-eight year old. Since the very first conference in Rende, the people interested in the study of the specific discrete model called Cellular Automaton have found the place to exchange their thoughts and experiences. Certainly, the history of Cellular Automata is much longer and is associated with such famous names as Stanisław Ulam, John von Neumann or John Conway. Also during our, already fourteenth, conference, we tried to offer to our colleagues from all over the world the opportunity to show their latest ideas and results. People from all continents but Australia presented almost thirty papers related to many areas of application of Cellular Automata: from cryptography to disease spreading and from nanotechnology to ecology.

From this set of papers we finally selected eight to be published in this special issue of *Journal of Cellular Automata*. All the papers presented here have passed rigorous review and, according to the opinions of independent reviewers, deserve to be published. The very different topics are represented among them but we observe that large number is related to the cryptography issues. Among four papers devoted to these problems, three concern different aspects of the Authenticated Encryption studied with the standard one-dimensional Cellular Automata. The most important problem is the reinforcement of the resistance of several types of existing CA-based encryption schemes on different typical forms of Fault Attacks - the Differential one or the Statistical Ineffective one. In the other papers, the new approaches are presented and also their resistance to different forms of attacks are shown. In the paper devoted to study of observability and reconstructability of CA we have also the try to interpret the state of particular cell as a signal coming from some stationary or mobile sensor. The remaining papers are related to practical problems: the study of wildland fires by using the three-dimensional CA with hexagonal geometry of cells; the desertification study with applied European Union module of inclusion of anthropogenic factors and the approach optimizing the pedestrian routes in cities fostering the sustainable forms of traffic. We hope that this selection is a good sample of interesting topics which can be studied within the frame of Cellular Automata technique.

Acknowledgment The members of Organizing Committee and the guest editors of this issue would like to thank to all who has contributed to the success of the conference and this issue. First of all our thanks go to all participants of the conference, especially to the authors of papers who actively attended the sessions despite its remote character. Our warm thanks go to those who helped with organisation: the members of Steering Committee and the reviewers who took their time to ensure the high scientific level of the meeting. Special thanks go to prof. Andy Adamatzky who helped us to publish the presented material.