Preface

The 16th International Conference on Unconventional Computation and Natural Computation (UCNC 2017) was held June 5–9, 2017, on the campus of the University of Arkansas in Fayetteville, Arkansas, USA. The UCNC series of international conferences is genuinely interdisciplinary and it covers theory as well as experiments and applications. It is concerned with various proposals for computation that go beyond the Turing model, human-designed computation inspired by nature, and with the computational nature of processes taking place in nature. Typical, but not exclusive, topics are: hypercomputation; chaos and dynamical systems-based computing; granular, fuzzy, and rough computing; mechanical computing; cellular, evolutionary, molecular, neural, and quantum computing; membrane computing; amorphous computing, swarm intelligence; artificial immune systems; physics of computation; chemical computation; evolving hardware; the computational nature of self-assembly, developmental processes, bacterial communication, and brain processes.

More information about this conference series and its full history can be found on the following website: https://www.cs.auckland.ac.nz/research/groups/CDMTCS/conferences/uc/uc.html.

Submissions to UCNC 2017 comprised 21 full papers across a wide variety of topics, including (but not limited to) quantum computing, algorithmic self-assembly, and chemical reaction networks. Of these, 14 were accepted for presentation at the conference and publication in these proceedings. Beyond the contributed papers and associated talks, UCNC 2017 was greatly enhanced by the plenary talks and tutorials provided by several prestigious speakers. José Félix Costa from the University of Lisbon, Portugal, gave a plenary talk titled "The Power of Analogue-Digital Machines." Erik Demaine from the Massachusetts Institute of Technology, USA, presented his plenary talk "Computing with Glue, Balls, and Recycled Bits: New Physical Models of Computing." Masayuki Endo from Kyoto University, Japan, gave a plenary talk titled "High-speed AFM Imaging of Synthetic Nanomachines and Nanostructures." A tutorial titled "Ways to Compute in Euclidean Frameworks" was provided by Jérôme Durand-Lose from the Université d'Orléans, France, and Makoto Naruse from the National Institute of Information and Communications Technology, Japan, presented a tutorial titled "Decision Making by Photonics: Experiment and Category Theoretic Foundation."

Included during the conference were two workshops. The Workshop on Membrane Computing was organized by Matteo Cavaliere from the University of Edinburgh, UK, and Alfonso Rodriguez Paton from the Universidad Politecnica de Madrid, Spain. Invited speakers for that workshop were Alvaro Sanchez from Yale University, USA, and Sergey Verlan from the University Paris Est Créteil, France. The First International Workshop on Oritatami (Oritatami 2017) was organized by Shinnosuke Seki from the University of Electro-Communications, Japan, and the invited speakers for that workshop were Cody Geary from Caltech, USA, and Aarhus University, Denmark, and

Nicolas Schabanel from CNRS, University of Paris Diderot (IRIF), and ENS Lyon (IXXI), France.

UCNC 2017 brought together researchers from all over the world to share and discuss ideas on forms of computation inspired by natural systems and unconventional methods. Its success as the 16th conference in the series is owed to a great amount of help from many people and organizations. First and foremost, we would like to thank the Steering Committee co-chairs, Nataša Jonoska and Jarkko Kari, whose expert guidance and invaluable advice helped to shape all aspects of the conference. Next, a huge debt of gratitude is owed to the Program Committee members and external reviewers who carefully reviewed all submissions and provided important feedback to help decide which papers to accept. Beyond the technical details of assembling invited speakers and selecting contributed papers, the amount of work done to organize the venue, meals, excursion, and countless other details would have been completely overwhelming without the enthusiastic and tireless help of Cindy Pickney, as well as the other members of the Organizing Committee, Jamie Stafford, George Holmes, and Jason Crawley. There would have been no conference without their help. Important financial support was provided by the Department of Computer Science and Computer Engineering at the University of Arkansas, the College of Engineering at the University of Arkansas, and the National Science Foundation (which provided funding to support student travel to the conference). Finally, many thanks are owed to the LNCS team at Springer who helped with the publication of these proceedings.

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