

Preface

CiE 2015: Evolving Computability Bucharest, Romania, June 29 – July 3, 2015

The evolution of the universe, and us within it, invites a parallel evolution in understanding. The CiE agenda – fundamental and engaged – targets the extraction and development of computational models basic to current challenges. From the origins of life, to the understanding of human mentality, to the characterizing of quantum randomness – computability theoretic questions arise in many guises. The CiE community this year met for the first time in Bucharest, to carry forward the search for coherence, depth, and new thinking across this rich and vital field of research. In line with other conferences in this series, CiE 2015 had a broad scope and provided a forum for the discussion of theoretical and practical issues in computability with an emphasis on new paradigms of computation and the development of their mathematical theory.

The conference series Computability in Europe is organized by the Association CiE. The association promotes the development of computability-related science, ranging from mathematics, computer science, and applications in various natural and engineering sciences, such as physics and biology, as well as the promotion of related fields, such as philosophy and history of computing. In particular, the conference series successfully brings together the mathematical, logical, and computer sciences communities that are interested in developing computability-related topics.

The host of CiE 2015 was the Faculty of Mathematics and Computer Science of the University of Bucharest.

The ten previous CiE conferences were held in Amsterdam (The Netherlands) in 2005, Swansea (Wales) in 2006, Siena (Italy) in 2007, Athens (Greece) in 2008, Heidelberg (Germany) in 2009, Ponta Delgada (Portugal) in 2010, Sofia (Bulgaria) in 2011, Cambridge (UK) in 2012, Milan (Italy) in 2013, and Budapest (Hungary) in 2014. The proceedings of all these meetings were published in the Springer series *Lecture Notes in Computer Science*. The annual CiE conference has become a major event and is the largest international meeting focused on computability theoretic issues. CiE 2016 will be held in Paris, France.

The series is coordinated by the CiE Conference Series Steering Committee consisting of Arnold Beckmann (Swansea, chair), Laurent Bienvenu (Paris), Alessandra Carbone (Paris), Barry Cooper (Leeds), Natasha Jonoska (Tampa FL), Benedikt Löwe (Amsterdam and Hamburg), Florin Manea (Kiel), Dag Normann (Oslo), Mariya Soskova (Sofia), and Susan Stepney (York).

The Program Committee of CiE 2015 was chaired by Victor Mitrana (Bucharest) and Mariya Soskova (Sofia). It was responsible for the selection of the invited speakers and the special session organizers and for running the reviewing process of all submitted regular contributions.

The conference had two tutorials by John Reif (Duke University) and by Stephen Simpson (Pennsylvania State University), and one public lecture by Mircea Dumitru (University of Bucharest and Romanian Academy).

In addition, the Program Committee invited seven speakers to give plenary lectures: Ann Copestake (University of Cambridge), Pawel Gawrychowski (University of Warsaw), Julia Knight (University of Notre Dame), Anca Muscholl (Université Bordeaux), Gheorghe Paun (Romanian Academy), Alexander Razborov (University of Chicago and Steklov Mathematical Institute), and Vlatko Vedral (University of Oxford).

Springer generously funded a Best Student Paper Award. For the second year in a row the winner was Ludovic Patey. His contribution to this year's volume is entitled "Iterative Forcing and Hyperimmunity in Reverse Mathematics."

The conference CiE 2015 has six special sessions: two sessions, Representing Streams and Reverse Mathematics, were introduced for the first time in the conference series. In addition to this, new developments in areas frequently covered in the CiE conference series were addressed in the further special sessions on Automata, Logic and Infinite Games, Bio-inspired Computation, Classical Computability Theory, and History and Philosophy of Computing. Speakers in these special sessions were selected by the special session organizers, and were invited to contribute a paper to this volume:

Automata, Logic, and Infinite Games

Organizers. Dietmar Berwanger and Ioana Leustean

Speakers. Christian Georg Fermüller (Wien), Slawomir Lasota (Warsaw), Paulo Oliva (London), Michael Vanden Boom (Oxford)

Bio-inspired Computation

Organizers. Andrei Paun, Petr Sosik

Speakers. Erzsébet Csuhaj-Varjú (Budapest), Ion Petre (Turku), Alexandru Tomescu (Helsinki), Sergey Verlan (Paris)

Classical Computability Theory

Organizers. Marat Arslanov, Steffen Lempp

Speakers. Sergey Goncharov (Novosibirsk), Wei Li (Vienna), Frank Stephan (Singapore), Dan Turetsky (Vienna)

History and Philosophy of Computing

Organizers. Christine Proust, Marco Benini

Speakers. Felice Cardone (Turin), Laura Crosilla (Leeds), Baptiste Mèlès (Nancy), Eric Vandendriessche (Paris)

Representing Streams

Organizers. Jörg Endrullis, Dimitri Hendriks

Speakers. Juhani Karhumäki (Turku), Jean-Eric Pin (Paris), Narad Rampersad (Winnipeg), Luke Schaeffer (Waterloo)

Reverse Mathematics

Organizers. Damir Dzhafarov, Alberto Marcone

Speakers. David Belanger (Ithaca, NY), Takako Nemoto (Ishikawa), Ludovic Patey (Paris), Paul Shafer (Ghent)

We received 64 non-invited contributed paper submissions, which were reviewed by the Program Committee and many expert reviewers. In the end, 42 % of the submitted papers were accepted for publication in this volume. In addition, this volume contains ten invited papers. Without the help of our expert reviewers, the production of the volume would have been impossible. We would like to thank all of them for their excellent work; their names are listed at the end of this Preface.

All authors who contributed to this conference were encouraged to submit significantly extended versions of their papers with unpublished research content to *Computability: The Journal of the Association CiE*.

The Steering Committee of the conference series CiE is concerned about the representation of female researchers in the field of computability. In order to increase female participation, the series started the Women in Computability (WiC) program in 2007, first funded by the Elsevier Foundation, then taken over by the publisher Elsevier. We are proud to continue this program with its annual WiC workshop and mentorship program for junior female researchers in 2015. Both initiatives are coordinated by Liesbeth De Mol. The workshop speakers are Johanna Franklin (University of Connecticut) Anca Muscholl (Labri, Université Bordeaux I) and Cezara Dragoi (CNRS/Inria/Equipe Antique, Ecole Normale Supérieure, Paris).

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