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Unconventional Computation

4th International Conference, UC 2005
Sevilla, Spain, October 3 – 7, 2005
Proceedings

Springer

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Preface

The Fourth International Conference on **Unconventional Computation, UC 2005**, organized under the auspices of EATCS by the Centre for Discrete Mathematics and Theoretical Computer Science and the Department of Computer Science and Artificial Intelligence of the University of Seville, was held in Seville, October 3–7, 2005.

Seville, one of the most beautiful cities in Spain, is at its best in October. An explosion of colour and contrast: flamenco, bullfighting, and a lively atmosphere in the streets due to the open and friendly nature of its people. The river Guadalquivir, the Cathedral and the Golden Tower are all places full of magic where the visitor can feel the spirit of a city which is eternally romantic.

The series of International Conferences **Unconventional Computation (UC)**, `https://www.cs.auckland.ac.nz/CDMTCS/conferences/uc/` is devoted to all aspects of unconventional computation, theory as well as experiments and applications. Typical, but not exclusive, topics are: natural computing including quantum, cellular, molecular, neural and evolutionary computing; chaos and dynamical systems based computing; and various proposals for computations that go beyond the Turing model.

The first venue of the Unconventional Computation Conference (formerly called Unconventional Models of Computation) was Auckland, New Zealand in 1998; subsequent sites of the conference were Brussels, Belgium in 2000 and Kobe, Japan in 2002.

The titles of the proceedings volumes from past UC Conferences are as follows:

1. C.S. Calude, J. Casti, M.J. Dinneen (eds.). *Unconventional Models of Computation*, Springer-Verlag, Singapore, 1998, viii + 426 pp. ISBN: 981-3083-69-7.
2. I. Antoniou, C.S. Calude, M.J. Dinneen (eds.). *Unconventional Models of Computation, UMC'2K*, Springer-Verlag, London, December 2000, xi + 301 pp. ISBN 1-85233-417-0.
3. C.S. Calude, M.J. Dinneen, F. Peper (eds.). *Third International Conference, UMC 2002*, Lecture Notes in Computer Science, Vol. 2509, Springer-Verlag, Heidelberg, 2002, vii + 331 pp. ISBN: 3-540-44311-8.

The Steering Committee of the series of International Conferences **Unconventional Computation** includes T. Bäck (Leiden, The Netherlands), C.S. Calude (Auckland, NZ, co-chair), L.K. Grover (Murray Hill, NJ, USA), J. van Leeuwen (Utrecht, The Netherlands), S. Lloyd (Cambridge, MA, USA), Gh. Păun (Seville, Spain and Bucharest, Romania), T. Toffoli (Boston, MA,

USA), C. Torras (Barcelona, Spain), G. Rozenberg (Leiden, The Netherlands and Boulder, Colorado, USA, co-chair), A. Salomaa (Turku, Finland).

The five invited speakers of the conference were:

T. Bäck (Leiden, The Netherlands): *Using genetic algorithms to evolve behaviour in cellular automata*
L. Grover (Murray Hill, USA): *Quantum searching amidst uncertainty*
S. Istrail (Providence, USA): *Logic functions of the genomic cis-regulatory code*
N. Seeman (New York, USA): *Structural DNA nanotechnology: Molecular constructions and computations*
C. Torras (Barcelona, Spain): *Natural inspiration for artificial adaptivity: Some neurocomputing experiences in robotics*

UC 2005 included the following three tutorials:

S. Istrail (Providence, USA): *Logic of networks*
I. Petre (Turku, Finland) and G. Rozenberg (Leiden, The Netherland): *Computing with living cells*
Gh. Păun (Seville, Spain): *Elementary aspects of membrane computing*

The Programme Committee thanks the much appreciated work done by the paper reviewers for the conference. These experts were:

S. Basu	D. Karig	M. Margenstern	M. A. Stay
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The Programme Committee consisting of L. Accardi (Rome, Italy), H.-G. Beyer (Dornbirn, Austria), M. Burgin (Los Angeles, USA) C. S. Calude (chair; Auckland, NZ), M. J. Dinneen (secretary; Auckland, NZ), P. Érdi (Kalamazoo, USA), A. Ekert (Cambridge, UK), M. P. Frank (Tallahassee, USA), V. V. Ivanov (Dubna, Russia), N. Jonoska (Tampa, USA), N. Krasnogor (Nottingham, UK), J. van Leeuwen (Utrecht, The Netherlands), K. Morita (Hiroshima, Japan), M. Mozer (Boulder, USA), Gh. Păun (Seville, Spain), I. Petre, (Turku, Finland), H. Umeo (Osaka, Japan), R. Weiss (Princeton, USA), T. Yokomori (Tokyo, Japan), selected 18 papers (out of 29) to be presented as regular contributions.

We extend our thanks to all members of the Conference Committee, particularly to M. Cavaliere, C. Graciani Díaz, M. A. Gutiérrez Naranjo, A. Nepomuceno Fernández, Gh. Păun, M. J. Pérez Jiménez (chair), F. J. Romero

Campero, A. Riscos Núñez, A. Romero Jiménez, F. Sancho Caparrini, D. Sburlan, and U. Speidel (registration), for their invaluable organizational work.

We thank the University of Seville and the Centre for Discrete Mathematics of the University of Auckland for their technical support. The hospitality of our hosts, the Department of Computer Science and Artificial Intelligence of the University of Seville, is much appreciated. The conference was partially supported by the project TIN2004-23021-E of the Ministerio de Educación y Ciencia of Spain, by the II Plan Propio of the University of Seville, and by the Acción Coordinada IMUS 2003 of the Junta de Andalucía: we extend to all our gratitude.

It is a great pleasure to acknowledge the fine co-operation with the Lecture Notes in Computer Science team of Springer for producing this volume in time for the conference.

July 2005

C. S. Calude
M. J. Dinneen
Gh. Păun
M. J. Pérez Jiménez
G. Rozenberg

Table of Contents

Invited Papers

Using Genetic Algorithms to Evolve Behavior in Cellular Automata
Thomas Bäck, Ron Breukelaar 1

Quantum Searching Amidst Uncertainty
Lov K. Grover 11

Logic Functions of the Genomic Cis-regulatory Code
Eric Davidson, Sorin Istrail 19

Structural DNA Nanotechnology: Molecular Construction and Computation
Ruojie Sha, Xiaoping Zhang, Shiping Liao, Pamela E. Constantinou, Baoquan Ding, Tong Wang, Alejandra V. Garibotti, Hong Zhong, Lisa B. Israel, Xing Wang, Gang Wu, Banani Chakraborty, Junghuei Chen, Yuwen Zhang, Hao Yan, Zhiyong Shen, Wanqiu Shen, Phiset Sa-Ardyen, Jens Kopatsch, Jiwen Zheng, Philip S. Lukeman, William B. Sherman, Chengde Mao, Natasha Jonoska, Nadrian C. Seeman 20

Natural Inspiration for Artificial Adaptivity: Some Neurocomputing Experiences in Robotics
Carme Torras 32

Regular Papers

On Self-assembly in Population P Systems
Francesco Bernardini, Marian Gheorghe, Natalio Krasnogor, Jean-Louis Giavitto 46

A Web-Based P Systems Simulator and Its Parallelization
Cosmin Bonchiş, Gabriel Ciobanu, Cornel Izbaşa, Dana Petcu 58

Communication Complexity as a Principle of Quantum Mechanics
Adán Cabello 70

On Model-Checking of P Systems
Zhe Dang, Oscar H. Ibarra, Cheng Li, Gaoyan Xie 82

Looking for Simple Common Schemes to Design Recognizer P Systems with Active Membranes That Solve Numerical Decision Problems
Carmen Graciani-Díaz, Agustín Riscos-Núñez 94

P Systems with Active Membranes, Without Polarizations and Without Dissolution: A Characterization of P
Miguel A. Gutiérrez-Naranjo, Mario J. Pérez-Jiménez, Agustín Riscos-Núñez, Francisco J. Romero-Campero 105

Discrete State Transition Systems on Continuous Space-Time: A Theoretical Model for Amorphous Computing
Masami Hagiya 117

On Reversible Cellular Automata with Finite Cell Array
Shuichi Inokuchi, Kazumasa Honda, Hyen Yeal Lee, Tatsuro Sato, Yoshihiro Mizoguchi, Yasuo Kawahara 130

A Computational Model for Self-assembling Flexible Tiles
Nataša Jonoska, Gregory L. McColm 142

On Formulations of Firing Squad Synchronization Problems
Kojiro Kobayashi, Darin Goldstein 157

Computation in One-Dimensional Piecewise Maps and Planar Pseudo-Billiard Systems
Oleksiy Kurganskyy, Igor Potapov 169

On the Importance of Parallelism for Quantum Computation and the Concept of a Universal Computer
Marius Nagy, Selim G. Akl 176

On Computational Complexity of Counting Fixed Points in Symmetric Boolean Graph Automata
Predrag T. Tošić, Gul A. Agha 191

A New Sibling of BQP
Tereza Tušarová 206

A Twelve-State Optimum-Time Synchronization Algorithm for Two-Dimensional Rectangular Cellular Arrays
Hiroshi Umeo, Masaya Hisaoka, Shunsuke Akiguchi 214

Computing by Self-reproduction: Autopoietic Automata
Jiří Wiedermann 224

Lower Bounds on the Computational Power of an Optical Model of Computation
Damien Woods, J. Paul Gibson 237

On Counterfactual Computation
Paolo Zuliani 251

Author Index 267