

Preface

This volume contains the papers presented at The 14th International Conference [Unconventional Computation and Natural Computation](#) (UCNC 2015), which was held August 30–September 3, 2015 in Auckland, New Zealand.

The scope of the conference is to create a forum for the presentation of new results in all areas that relate to theoretical and experimental unconventional computation and natural computation and to foster collaboration between researchers working on these topics. Typical, but not exclusive, topics are:

- Molecular (DNA) computing, quantum computing, chaos computing, optical computing, physarum computing, computation in hyperbolic spaces, collision-based computing.
- Cellular automata, neural computation, evolutionary computation, swarm intelligence, nature-inspired algorithms, artificial immune systems, artificial life, membrane computing, amorphous computing.
- Computational systems biology, genetic networks, protein-protein networks, transport networks, synthetic biology, cellular (in vivo) computing.
- Computations beyond the Turing model and philosophical aspects of computing.

For this edition we received 38 submissions. Each submission was reviewed by at least two Programme Committee members. The committee decided to accept 16 papers. The programme also includes six invited talks:

Invited Lectures

1. R. Freivalds: *Ultrametric Algorithms and Automata*.
2. G. Longo: *Models, Simulations and “Reality”: A Comparison by Theoretical Symmetries*,
3. M. Sagar: *Behavioural Animation*.
4. Ya. D. Sergeyev: *The Infinity Computer and Numerical Computations with Infinities*.

Invited Tutorials

1. J.P. Lewis: *Textures and Realism: Turing Tests for Visual Computation*.
2. K. Pudenz: *Quantum Computing Meets the Real World*.

The conference has included four satellite workshops:

1. *Biological Cell Information Processing*, organised by M. Cooling
2. *Membrane Computing*, organised by M.J. Dinneen
3. *Physics and Computation*, organised by A. Abbott, V. Kendon, and S. Stepney
4. *Unconventional Computation in Europe*, organised by M. Amos and S. Stepney

The first conference in the series was organised in Auckland New Zealand in January 1998 by the [Centre for Discrete Mathematics and Theoretical Computer Science](#) (University of Auckland) and the [Santa Fe Institute](#), USA. The following twelve editions followed: Brussels, Belgium (December 2000), Kobe, Japan (October 2002), Seville, Spain (October 2005), York, UK (September 2006), Kingston, Canada (August 2007), Vienna, Austria (August 2008), Ponta Delgada, Portugal (September 2009), Tokyo, Japan (June 2010), Turku, Finland (June 2011), Orléans, France (September 2012) Milano, Italy (June 2013) and London, Ontario, Canada (July 2014).

The UCNC conference series is overseen by a Steering Committee which includes Thomas Back (Leiden University, The Netherlands), Cristian S. Calude (University of Auckland, New Zealand), as founding chair, Lov K. Grover (Bell Labs, Murray Hill, New Jersey, USA), Nataša Jonoska (University of South Florida, USA), as co-chair, Jarkko Kari (University of Turku, Finland), as co-chair, Lila Kari (University of Western Ontario, Canada), Seth Lloyd (Massachusetts Institute of Technology, USA), Giancarlo Mauri (University of Milano-Bicocca, Italy), Gheorghe Păun (Institute of Mathematics of the Romanian Academy, Romania), Grzegorz Rozenberg (Leiden University, The Netherlands), as emeritus chair, Arto Salomaa (University of Turku, Finland), Tommaso Toffoli (Boston University, USA), Carme Torras (Institute of Robotics and Industrial Informatics, Barcelona, Spain), and Jan Van Leeuwen (Utrecht University, The Netherlands).

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