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Unconventional Computation

9th International Conference, UC 2010
Tokyo, Japan, June 21-25, 2010
Proceedings

Springer

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Preface

The 9th International Conference on Unconventional Computation, UC 2010, was organized under the auspices of EATCS and Academia Europaea, by the University of Tokyo (Tokyo, Japan), and the Center for Discrete Mathematics and Theoretical Computer Science (Auckland, New Zealand). It was held in Tokyo during June 21–25, 2010 (see `http://arn.local.frs.riken.jp/UC10/`).

The venue was the Sanjo (Hilltop) Conference Hall at Hongo Campus of the University of Tokyo. Hongo Campus was formerly the residence of the Maeda family, one of the richest feudal lords in the Edo period of Japan. The Japanese garden in the residence is partially preserved, including the pond and the hill on which the conference hall is located. Within walking distance from Hongo Campus are Ueno park with many museums, the Akihabara area, which is now the center of Japanese pop culture, and the Korakuen amusement park/baseball stadium.

The International Conference on Unconventional Computation (UC) series (see `http://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, membrane, neural, and evolutionary computing, as well as chaos and dynamical system-based computing, and various proposals for computational mechanisms 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, Kobe, Japan in 2002, Seville, Spain in 2005, York, UK in 2006, Kingston, Canada in 2007, Vienna, Austria in 2008, and Ponta Delgada, Portugal in 2009. The proceedings of the previous UC conferences appeared as follows:

1. Calude, C. S., Casti, J., Dinneen, M. J. (eds.): Unconventional Models of Computation, Springer, Singapore (1998)
2. Antoniou, I., Calude, C. S., Dinneen, M. J. (eds.): Unconventional Models of Computation, UMC 2K: Proceedings of the Second International Conference, Springer, London (2001)
3. Calude, C. S., Dinneen, M. J., Peper, F. (eds.): UMC 2002. LNCS 2509, Springer, Heidelberg (2002)
4. Calude, C. S., Dinneen, M. J., Păun, G., Pérez-Jiménez, M. J., Rozenberg, G. (eds.): UC 2005. LNCS 3699, Springer, Heidelberg (2005)
5. Calude, C. S., Dinneen, M. J., Păun, G., Rozenberg, G., Stepney, S. (eds.): UC 2006. LNCS 4135, Springer, Heidelberg (2006)
6. Akl, S. G., Calude, C. S., Dinneen, M. J., Rozenberg, G., Wareham, H. T. (eds.): UC 2007. LNCS 4618, Springer, Heidelberg (2007)

7. Calude, C. S., Costa, J. F., Freund, R., Oswald, M., Rozenberg, G. (eds.): UC 2008. LNCS 5204, Springer, Heidelberg (2008)
8. Calude, C. S., Costa, J. F., Dershowitz, N., Freire, E., Rozenberg, G. (eds.): UC 2009. LNCS 5715, Springer, Heidelberg (2009)

The four keynote speakers at the 2010 conference were:

- Shun-ichi Amari (Brain Science Institute, RIKEN, Japan): "Computations Inspired from the Brain"
- Luca Cardelli (Microsoft, UK): "Algebras and Languages for Molecular Programming"
- Françoise Chatelin (Université Toulouse and Cerfacs, France): "A Computational Journey into Nonlinearity"
- José Félix Costa (IST, Technical University of Lisbon, Portugal): "Computable Scientists, Uncomputable World"

We would like to thank the keynote speakers for taking their time to come to the conference and for a stimulating series of lectures.

In addition to the main UC2010 conference, three workshops were also hosted: one on "Hypercomputation" organized by Mike Stannett (University of Sheffield, UK), one on "Computing with Spatio-Temporal Dynamics 2010" organized by So Tsuda (University of the West of England, UK) and Masashi Aono (RIKEN Advanced Science Institute, Japan), and one on "DNA Nanotechnology Toward Molecular Robotics" organized by Satoshi Murata (Research Group on Molecular Robotics, SICE/Tohoku University).

The Program Committee selected 15 papers (out of 26), 4 posters (out of 4), and 6 papers converted to posters to be presented as full-length talks. In this volume, 4 (extended) abstracts of invited talks, 15 regular papers, and 8 abstracts of posters are included.

The Program Committee is very grateful to the extra reviewers for the help they provided in improving the papers for this volume. These experts are: A. Alhazov, T. Haruna, K. Imai, I. Kawamata, N. Nagy, M. Olah, X. Piao, P. Rothemund, L. Staiger, and F. Tanaka.

We extend our thanks to all members of the Local Organizing Committee, particularly to M. Aono, M. Hagiya, S. Murata, F. Peper, and F. Tanaka for their invaluable organizational work.

The conference was supported by the University of Tokyo, the Mitsubishi Foundation, and Support Center for Advanced Telecommunications Technology Research, Foundation (SCAT). We extend to all of them our deep gratitude.

We would like to acknowledge the developers of the EasyChair system, and the excellent cooperation from the *Lecture Notes in Computer Science* team of Springer for their help in making possible the production of this volume in time for the conference.

Finally, we would like to thank all the authors for their high-quality contributions and hope that they found the conference enjoyable and stimulating.

April 2010

Cristian S. Calude
Masami Hagiya
Kenichi Morita
Grzegorz Rozenberg
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