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Jin-Yi Cai
S. Barry Cooper
Angsheng Li (Eds.)

Theory and Applications of Models of Computation

Third International Conference, TAMC 2006
Beijing, China, May 2006
Proceedings



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Preface

Theory and Applications of Models of Computation (TAMC) is an international conference series with an interdisciplinary character, bringing together researchers working in computer science, mathematics (especially logic) and the physical sciences. It is this, together with its predominantly computational and computability theoretic focus, which gives the series its special character.

TAMC 2006 was the third conference in the series. The previous two meetings were held May 17–19, 2004 in Beijing, and May 17–20, 2005 in Kunming, P.R. China. There are already plans for future meetings in Shanghai, Beijing, and Singapore.

At TAMC 2006 we were very pleased to have ten plenary speakers chosen by the Program Committee, each giving a one-hour talk. These were:

- Giorgio Ausiello (Rome), *On-line Algorithms, Real Time, the Virtue of Laziness, and the Power of Clairvoyance*;
- Rodney Downey (Wellington), *Some New Naturally Definable Degree Classes*;
- Martin Dyer (Leeds), *Counting Graph Homomorphisms*;
- Yuri Ershov (Novosibirsk), *On Rogers Semi-lattices of Finite Partially Ordered Sets*;
- Michael Rathjen (Leeds), *Models of Constructive Type and Set Theories*;
- Alan Selman (Buffalo, NY), *Mitosis in Computational Complexity*;
- Chris Umans (Cal Tech), *Optimization Problems in the Polynomial-Time Hierarchy*;
- Alasdair Urquhart (Toronto), *Width and Size in Resolution Refutations*;
- Paul Vitanyi (Amsterdam), *Similarity of Objects and the Meaning of Words*;
- Andrew C. Yao (Beijing), *Recent Progress in Quantum Computational Complexity*.

There were also five special sessions at TAMC 2006, the speakers for each invited by the organizers appointed for that special area. They were:

- Learning Theory. Organized by Frank Stephan (Singapore) and Nicolo Cesa-Bianchi (Rome), with speakers: Shai Ben-David (Waterloo), Marcus Hutter (Galleria, Switzerland), Sanjay Jain (Singapore, jointly with Frank Stephan), Jochen Nessel (jointly with Sanjay Jain, and Frank Stephan), Rocco A. Servedio (New York), Vladimir Vovk (London), and Thomas Zeugmann (Sapporo, Japan).
- Algorithms and Bioinformatics. Organized by Tao Jiang (Riverside, CA), with speakers: Francis Chin (Hong Kong), Lusheng Wang (Hong Kong), Louxin Zhang (Singapore), and Kaizhong Zhang (Ontario).
- Computational Complexity. Organized by Jin-Yi Cai (Madison, WI), and Alan Selman (Buffalo, NY), with speakers Jin-Yi Cai (Wisconsin, jointly with Vinay Choudhary), Alan Selman (Buffalo, NY), Chris Umans (Cal Tech), Alasdair Urquhart (Toronto), and Xiaoming Sun (Beijing).

- Randomness and Real Computation. Organized by Rod Downey (Wellington, NZ), with speakers Felipe Cucker (Hong Kong), Denis Hirschfeldt (Chicago), Frank Stephan (Singapore, jointly with Liang Yu), Andrew E. M. Lewis (Siena), and Alexander Shen (Moscow/Paris, jointly with Andrej Muchnik, Mikhail Ustinov, Nikolay Vereshchagin and Michael Vyugin).
- Computability. Organized by Chi Tat Chong (Singapore), Andrea Sorbi (Siena), with speakers Peter Cholak (Notre Dame), Liang Yu (Singapore, jointly with Yue Yang), Jan Reimann (Heidelberg), and Serikzhan Badaev (Almaty).

The TAMC conference series arose naturally in response to important scientific developments affecting how we compute in the twenty-first century. At the same time, TAMC is already playing an important regional and international role, and promises to become a key contributor to the scientific resurgence seen throughout China and other parts of Asia.

The enthusiasm with which TAMC 2006 has been received by the scientific community is evident in the large number, and high quality, of the articles submitted to the conference. There were 319 submissions, originating from 27 countries. This presented the Program Committee with a major assessment task, which led to the selection of 54 excellent papers for inclusion in this LNCS volume, along with those of our invited speakers, with the acceptance rate of less than 20% comparing favorably with other leading international conferences in the area.

We are very grateful to the Program Committee, and the many external referees they called on, for the hard work and expertise which they brought to the difficult selection process. We also wish to thank all those authors who submitted their work for our consideration. The Program Committee could have accepted many more submissions without compromising standards, and were only restrained by the practicalities of timetabling so many talks and by the inevitable limitations on the size of this proceedings volume.

Finally we would like to thank the members of the editorial board of *Lecture Notes in Computer Science* and the editors at Springer for their encouragement and cooperation throughout the preparation of this conference.

Of course TAMC 2006 would not have been possible without the support of our sponsors, and we therefore gratefully acknowledge their help in the realization of this conference.

Beijing
March 2006

Jin-Yi Cai
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Organization

The conference was organized by the Institute of Software, Chinese Academy of Sciences, China; University of Leeds, UK; and the University of Wisconsin, USA.

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