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Preface

Some of the most challenging problems in science and engineering are being addressed by the integration of computation and science, a research field known as computational science.

Computational science plays a vital role in fundamental advances in biology, physics, chemistry, astronomy, and a host of other disciplines. This is through the coordination of computation, data management, access to instrumentation, knowledge synthesis, and the use of new devices. It has an impact on researchers and practitioners in the sciences and beyond. The sheer size of many challenges in computational science dictates the use of supercomputing, parallel and distributed processing, grid-based processing, advanced visualization and sophisticated algorithms.

At the dawn of the 21st century the series of International Conferences on Computational Science (ICCS) was initiated with a first meeting in May 2001 in San Francisco. The success of that meeting motivated the organization of the second meeting held in Amsterdam April 21–24, 2002, where over 500 participants pushed the research field further.

The International Conference on Computational Science 2003 (ICCS 2003) is the follow-up to these earlier conferences. ICCS 2003 is unique, in that it was a single event held at two different sites almost opposite each other on the globe – Melbourne, Australia and St. Petersburg, Russian Federation. The conference ran on the same dates at both locations and all the presented work was published in a single set of proceedings, which you hold in your hands right now.

ICCS 2003 brought together experts from a range of disciplines: mathematicians and computer scientists providing basic computing expertise, and researchers and scientists from various application areas who are pioneering advanced applications of computational methods in sciences such as physics, chemistry, life sciences, engineering, arts and humanities; along with software developers and vendors. The intent was to discuss problems and solutions in these areas, identify new issues, and shape future directions for research, as well as help industrial users apply advanced computational techniques.

Many of the advances in computational science are related to Grid Computing. The Grid has provided a way to link computation, data, networking, instruments and other resources together to solve today's complex and critical problems. As such, it is becoming a natural environment for the computational sciences. In these proceedings you will find original research in this new era of computational science and the challenges involved in building the information infrastructure needed to enable science and engineering discoveries of the future.

These four volumes, LNCS 2657, 2658, 2659 and 2660, contain the proceedings of the ICCS 2003 meeting. The volumes consist of over 460 peer-reviewed, contributed and invited papers presented at the conference in Melbourne, Australia and St. Petersburg, Russian Federation. The acceptance rate for oral pre-

sentations was 40% of the submitted papers. The papers presented reflect the aim of the scientific organization to bring together major players in the emerging field of computational science.

The conference included 27 workshops (10 in St. Petersburg and 17 in Australia), 6 presentations by Keynote speakers, and over 460 contributed papers selected for oral presentations and posters. Each paper/poster was refereed by at least two referees.

We are deeply indebted to all the authors who submitted high-quality papers to the conference, without this depth of support and commitment there would have been no conference at all. We acknowledge the members of the program committee and all those involved in the refereeing process, and the workshop organizers and all those in the community who helped us to convene a successful conference. Special thanks go to Dick van Albada, Martin Lack, Zhiming Zhao and Yan Xu for preparation of the proceedings; they did a marvelous job! Amitava Datta, Denis Shamonin, Mila Chevalier, Alexander Boukhanovsky and Elena Stankova are acknowledged for their assistance in the organization and all those 1001 things that need to be done to make a large (distributed!) conference like this a success!

Of course ICCS 2003 would not have been possible without the support of our sponsors, and we therefore gratefully acknowledge their help in the realization of this conference.

Amsterdam, June 2003

Peter M.A. Sloot,

on behalf of the co-editors:
David Abramson
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The conference was organized by the Section Computational Science, The University of Amsterdam, The Netherlands; the Innovative Computing Laboratory at The University of Tennessee, USA; the School of Computer Science and Software Engineering, Monash University, Victoria, Australia; the School of Information Technologies, The University of Sydney, New South Wales, Australia; and the Institute for High Performance Computing and Information Systems, St. Petersburg, Russian Federation.

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