Advancing Science Through Computation

I knock at the stone's front door.
"It's only me, let me come in.
I've come out of pure curiosity.
Only life can quench it.
I mean to stroll through your palace,
then go calling on a leaf, a drop of water.
I don't have much time.
My mortality should touch you."

Wisława Szymborska,
Conversation with a Stone, in *Nothing Twice*, 1997

The International Conference on Computational Science (ICCS 2008) held in Kraków, Poland, June 23–25, 2008, was the eighth in the series of highly successful conferences: ICCS 2007 in Beijing, China; ICCS 2006 in Reading, UK; ICCS 2005 in Atlanta; ICCS 2004 in Krakow, Poland; ICCS 2003 held simultaneously in Melbourne, Australia and St. Petersburg, Russia; ICCS 2002 in Amsterdam, The Netherlands; and ICCS 2001 in San Francisco, USA.

The theme for ICCS 2008 was "Advancing Science Through Computation," to mark several decades of progress in computational science theory and practice, leading to greatly improved applications in science. This conference was a unique event focusing on recent developments in novel methods and modeling of complex systems for diverse areas of science, scalable scientific algorithms, advanced software tools, computational grids, advanced numerical methods, and novel application areas where the above novel models, algorithms, and tools can be efficiently applied, such as physical systems, computational and systems biology, environment, finance, and others. ICCS 2008 was also meant as a forum for scientists working in mathematics and computer science as the basic computing disciplines and application areas, who are interested in advanced computational methods for physics, chemistry, life sciences, and engineering. The main objective of this conference was to discuss problems and solutions in all areas, to identify new issues, to shape future directions of research, and to help users apply various advanced computational techniques. During previous editions of ICCS, the goal was to build a computational science community; the main challenge in this edition was ensuring very high quality of scientific results presented at the meeting and published in the proceedings.

Keynote lectures were delivered by:

- Maria E. Orłowska: *Intrinsic Limitations in Context Modeling*
- Jesus Villasante: *EU Research in Software and Services: Activities and Priorities in FP7*
- Stefan Blügel: *Computational Materials Science at the Cutting Edge*

- Martin Walker: *New Paradigms for Computational Science*
- Yong Shi: *Multiple Criteria Mathematical Programming and Data Mining*
- Hank Childs: *Why Petascale Visualization and Analysis Will Change the Rules*
- Fabrizio Gagliardi: *HPC Opportunities and Challenges in e-Science*
- Pawel Gepner: *Intel's Technology Vision and Products for HPC*
- Jarek Nieplocha: *Integrated Data and Task Management for Scientific Applications*
- Neil F. Johnson: *What Do Financial Markets, World of Warcraft, and the War in Iraq, all Have in Common? Computational Insights into Human Crowd Dynamics*

We would like to thank all keynote speakers for their interesting and inspiring talks and for submitting the abstracts and papers for these proceedings.
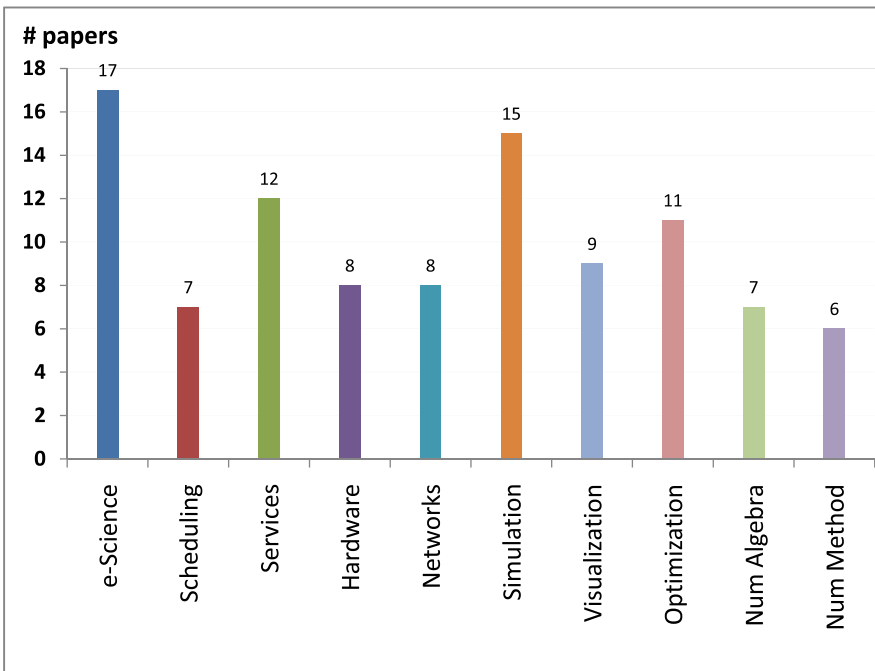
Fig. 1. Number of papers in the general track by topic

The main track of ICSS 2008 was divided into approximately 20 parallel sessions (see Fig. 1) addressing the following topics:

1. e-Science Applications and Systems
2. Scheduling and Load Balancing
3. Software Services and Tools

 4. New Hardware and Its Applications
 5. Computer Networks
 6. Simulation of Complex Systems
 7. Image Processing and Visualization
 8. Optimization Techniques
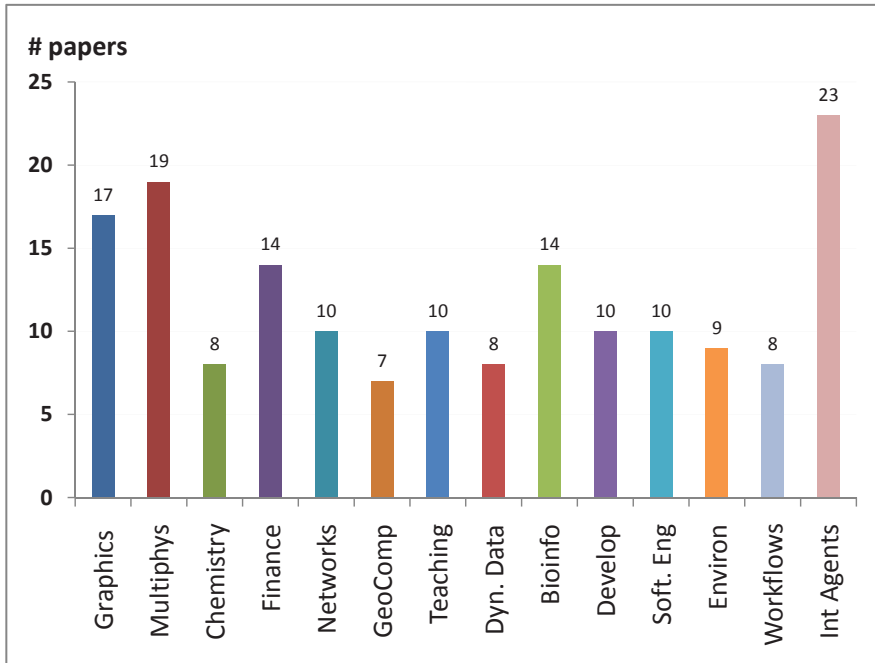 9. Numerical Linear Algebra
10. Numerical Algorithms

Fig. 2. Number of papers in workshops

The conference included the following workshops (Fig. 2):

 1. 7th Workshop on Computer Graphics and Geometric Modeling
 2. 5th Workshop on Simulation of Multiphysics Multiscale Systems
 3. 3rd Workshop on Computational Chemistry and Its Applications
 4. Workshop on Computational Finance and Business Intelligence
 5. Workshop on Physical, Biological and Social Networks
 6. Workshop on GeoComputation
 7. 2nd Workshop on Teaching Computational Science
 8. Workshop on Dynamic Data-Driven Application Systems
 9. Workshop on Bioinformatics' Challenges to Computer Science
10. Workshop on Tools for Program Development and Analysis in Computational Science

11. Workshop on Software Engineering for Large-Scale Computing
12. Workshop on Collaborative and Cooperative Environments
13. Workshop on Applications of Workflows in Computational Science
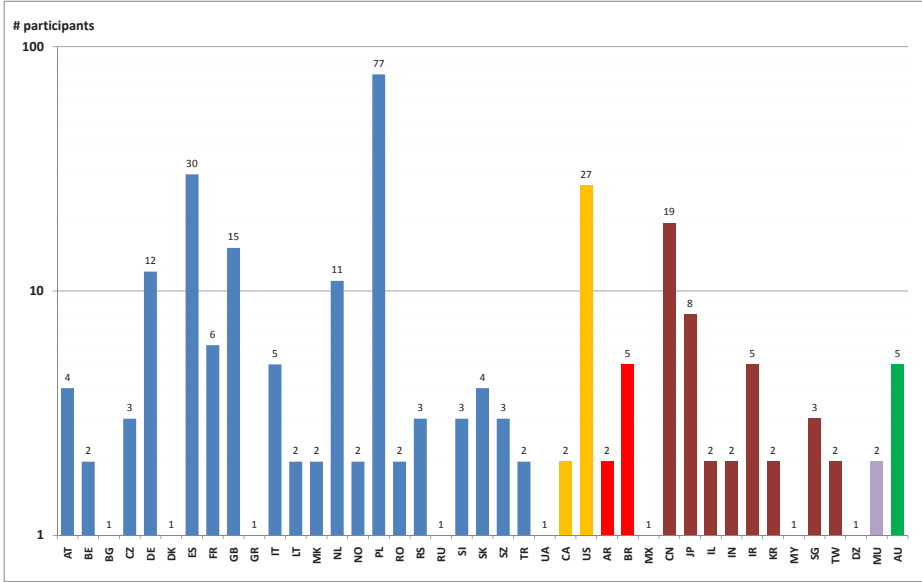14. Workshop on Intelligent Agents and Evolvable Systems

Fig. 3. Number of accepted papers by country

Selection of papers for the conference was possible thanks to the hard work of the Program Committee members and about 510 reviewers; each paper submitted to ICCS 2008 received at least 3 reviews. The distribution of papers accepted for the conference is presented in Fig. 3. ICCS 2008 participants represented all continents; their geographical distribution is presented in Fig. 4.

The ICCS 2008 proceedings consist of three volumes; the first one, LNCS 5101, contains the contributions presented in the general track, while volumes 5102 and 5103 contain papers accepted for workshops. Volume LNCS 5102 is related to various computational research areas and contains papers from Workshops 1–7, while volume LNCS 5103, which contains papers from Workshops 8–14, is mostly related to computer science topics. We hope that the ICCS 2008 proceedings will serve as an important intellectual resource for computational and computer science researchers, pushing forward the boundaries of these two fields and enabling better collaboration and exchange of ideas. We would like to thank Springer for fruitful collaboration during the preparation of the proceedings. At the conference, the best papers from the general track and workshops were nominated and presented on the ICCS 2008 website; awards were funded by Elsevier and Springer. A number of papers will also be published as special issues of selected journals.
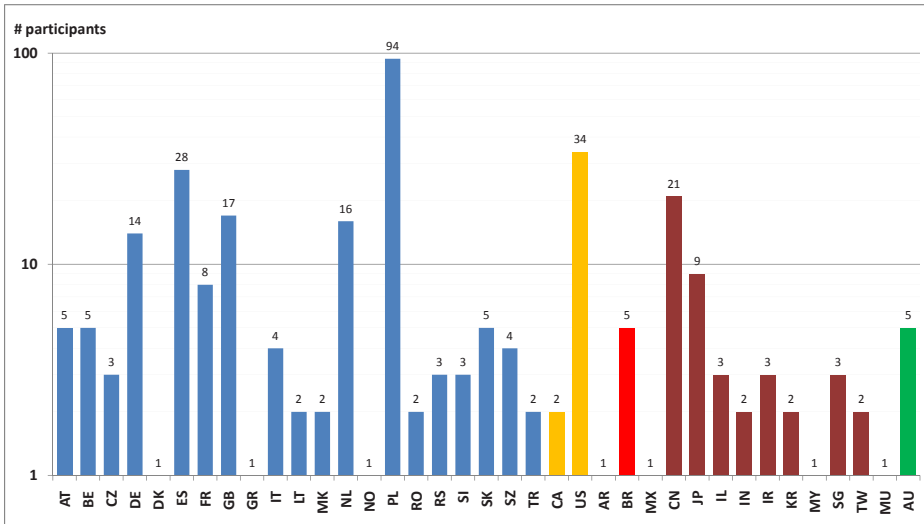
Fig. 4. Number of participants by country

We owe thanks to all workshop organizers and members of the Program Committee for their diligent work, which ensured the very high quality of ICCS 2008. We would like to express our gratitude to the Kazimierz Wiatr, Director of ACC CYFRONET AGH, and to Krzysztof Zieliński, Director of the Institute of Computer Science AGH, for their personal involvement. We are indebted to all the members of the Local Organizing Committee for their enthusiastic work towards the success of ICCS 2008, and to numerous colleagues from ACC CYFRONET AGH and the Institute of Computer Science for their help in editing the proceedings and organizing the event. We very much appreciate the help of the computer science students during the conference. We own thanks to the ICCS 2008 sponsors: Hewlett-Packard, Intel, Qumak-Secom, IBM, Microsoft, ATM, Elsevier (Journal Future Generation Computer Systems), Springer, ACC CYFRONET AGH, and the Institute of Computer Science AGH for their generous support.

We wholeheartedly invite you to once again visit the ICCS 2008 website (`http://www.iccs-meeting.org/iccs2008/`), to recall the atmosphere of those June days in Kraków.

June 2008   Marian Bubak
                                                          G. Dick van Albada
                                                          Peter M.A. Sloot
                                                          Jack J. Dongarra

Organization

ICCS 2008 was organized by the Academic Computer Centre Cyfronet AGH in cooperation with the Institute of Computer Science AGH (Kraków, Poland), the University of Amsterdam (Amsterdam,The Netherlands) and the University of Tennessee (Knoxville, USA).

All the members of the Local Organizing Committee are staff members of ACC Cyfronet AGH and ICS AGH.

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Workshop on Applications of Workflows in Computational Science

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Workshop on Intelligent Agents and Evolvable Systems

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