



Computational Science at the Gates of Nature, Preface for ICCS 2015



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Welcome to the 15th Annual International Conference on Computational Science (ICCS), to be held on June 1-3, 2015 in Reykjavik, Iceland. Located in the North Atlantic Sea between Europe and America, Iceland is world-renowned for its stunning nature and inspiring culture. Reykjavik University, located in the heart of the nation's capital, is a dynamic international university with state-of-the-art facilities and a proud host of the conference. ICCS 2015 is organized by Reykjavik University, Universiteit van Amsterdam, NTU Singapore and the University of Tennessee.

The International Conference on Computational Science is an annual conference that brings together researchers and scientists from mathematics and computer science as basic computing disciplines, researchers from various application areas who are pioneering computational methods in sciences such as physics, chemistry, life sciences, and engineering, as well as in arts and humanitarian fields, to discuss problems and solutions in the area, to identify new issues, and to shape future directions for research.

Since its inception in 2001, ICCS has attracted increasingly higher quality and numbers of attendees and papers, and this year is not an exception, with over 400 expected participants. The proceedings series have become a major intellectual resource for computational science researchers and serve to define and advance the state of the art of the field.

ICCS 2015 in Reykjavik, Iceland, will be the fifteenth in this series of highly successful conferences. For the previous fourteen meetings see: <http://www.iccs-meeting.org/iccs2015/previous-iccs/>

The theme for ICCS 2015 is "**Computational Science at the Gates of Nature**", to mark the crucial role of computational science in tackling the myriad problems and applications within natural systems. The realization of computational science as a multidisciplinary environment and provider of crucial tools for the understanding of our world has literally put it at the gates of nature, a role that growing research and investment have increasingly confirmed. This conference will be a unique event focusing on recent developments in: scalable scientific algorithms; advanced software tools; computational grids; advanced numerical methods; and novel application areas. These innovative novel models, algorithms and tools drive new science through efficient application in areas such as physical systems, computational and systems biology, environmental systems, finance, and others.

ICCS is well known for its excellent line up of keynote speakers. The keynotes for 2015 are:

- **David Abramson**, The University of Queensland, Australia
- **Tim Cornwell**, Square Kilometre Array Telescope (SKA), UK
- **Petros Koumoutsakos**, Swiss Federal Institute of Technology Zurich, Switzerland
- **J. Stephen Lansing**, Nanyang Technological University, Singapore
- **Xin-She Yang**, Middlesex University London, UK
- **Kári Stefánsson**, deCode Genetics, Iceland

In addition to our distinct keynote speakers, out of the submitted papers to the main track and workshops, we selected about 360 high-quality papers for presentation at the conference and publication in the proceedings, published by Elsevier in open-access [Procedia Computer Science](#) series. Submission was very competitive this year and the main track accepted 81 papers from 248 submissions (33% acceptance rate).

ICCS relies strongly on the vital contributions of our workshop organizers to attract high quality papers in many subject areas. We would like to thank all committee members for the main track and workshops for their contribution to ensure a high standard for the accepted papers. We would also like to thank Elsevier, as the conference is organized with their financial and administrative support.

We are proud to note that ICCS is an ERA 2010 A-ranked conference series.

We wish you a successful and enjoyable conference in Reykjavík.

June 2015

The ICCS 2015 Organizers:

Slawomir Koziel
Leifur Leifsson
Michael Lees
Valeria V. Krzhizhanovskaya
Jack Dongarra
Peter M.A. Sloat

Local Organizing Committee in Iceland

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Slawomir Koziel and Leifur Leifsson
Ýr Gunnlaugsdóttir, Maria Gião

Workshops and Organizers

Multiscale Modelling and Simulation, 12th International Workshop

Derek Groen, Valeria Krzhizhanovskaya, Bartosz Bosak, Alfons Hoekstra

6th Workshop on Computational Optimization, Modelling and Simulation

Xin-She Yang, Slawomir Koziel, Leifur Leifsson

5th International Workshop on Advances in High-Performance Computational Earth Sciences: Applications and Frameworks

Xing Cai, Henry Tufo

Agent-based Simulations, Adaptive Algorithms and Solvers

Robert Schaefer, Krzysztof Cetnarowicz, Maciej Paszynski, Victor Calo, David Pardo

Architecture, Languages, Compilation and Hardware support for Emerging Manycore systems

Loïc Cudennec, Stéphane Louise

6th Workshop on Data Mining in Earth System Science

Forrest M. Hoffman, Jitendra Kumar, J. Walter Larson

Dynamic Data Driven Application Systems

Craig C. Douglas, Abani Patra, Ana Cortés

9th Workshop on Computational Chemistry and Its Applications

Ponnadurai Ramasami

Workshop on Teaching Computational Science

Valerie Maxville, Angela B. Shiflet, Alfredo Tirado-Ramos

Tools for Program Development and Analysis in Computational Science

Andreas Knüpfer, Arndt Bode, Karl Furlinger, Dieter Kranzlmüller, Jens Volkert, Jie Tao, Roland Wismüller

Solving Problems with Uncertainties

Vassil Alexandrov

Modeling and Simulation of Large-scale Complex Urban Systems

Heiko Aydt, Matthias Berger, Francisco Pereira

Urgent Computing: Computations for Decision Support in Critical Situations

Alexander V. Boukhanovsky, Marian Bubak

Large Scale Computational Physics

Elise de Doncker, Fukuko Yuasa

12th Workshop on Computational Finance and Business Intelligence

Yong Shi, Yingjie Tian

Bridging the HPC Talent Gap with Computational Science Research Methods

Evguenia S. Alexandrova, Vassil Alexandrov

Mathematical Methods and Algorithms for Extreme Scale

Vassil Alexandrov, Jack Dongarra

Computational Optimisation in the Real World

Andrew Lewis, Timoleon Kipouros, Marcus Randall

8th Workshop on Biomedical and Bioinformatics Challenges for Computer Science

Mario Cannataro, Riccardo Dondi

Paradigms for Control in Social Systems

Derek Ruths, Justin Ruths

Applications of Matrix Computational Methods in the Analysis of Modern Data

Kourosh Modarresi

Numerical and Computational Developments to Advance Multi-scale Earth System Models

Kate Evans, Hans Johansen, Carol Woodward

International Workshop on Computational Flow and Transport: Modeling, Simulations and Algorithms

Shuyu Sun, Jianguo Liu, Hua Zhong

Workshop on Nonstationary Models of Pattern Recognition and Classifier Combinations

Bartosz Krawczyk, Michal Wozniak

Dynamic Data Driven Applications Systems and Large-Scale-Big-Data & Large-Scale-Big-Computing

Erik Blasch, Frederica Darema

PRACE User Forum Satellite Symposium

Derek Groen

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