

Marian Bubak  
Geert Dick van Albada  
Peter M.A. Sloot  
Jack J. Dongarra (Eds.)

# Computational Science – ICCS 2004

4th International Conference  
Kraków, Poland, June 2004  
Proceedings, Part IV

4 Part IV



Springer

3-53  
4  
+

Marian Bubak   Geert Dick van Albada  
Peter M.A. Sloot   Jack J. Dongarra (Eds.)

# Computational Science - ICCS 2004

4th International Conference  
Kraków, Poland, June 6-9, 2004  
Proceedings, Part IV



E200404023



Springer

## Volume Editors

Marian Bubak

AGH University of Science and Technology

Institute of Computer Science and Academic Computer Center CYFRONET

Mickiewicza 30, 30-059 Kraków, Poland

E-mail: bubak@uci.agh.edu.pl

Geert Dick van Albada

Peter M.A. Sloot

University of Amsterdam, Informatics Institute, Section Computational Science

Kruislaan 403, 1098 SJ Amsterdam, The Netherlands

E-mail: {dick,sloot}@science.uva.nl

Jack J. Dongarra

University of Tennessee, Computer Science Departement

Suite 413, 1122 Volunteer Blvd., Knoxville, TN-37996, USA

E-mail: dongarra@cs.utk.edu

Library of Congress Control Number: Applied for

CR Subject Classification (1998): D, F, G, H, I, J, C.2-3

ISSN 0302-9743

ISBN 3-540-22129-8 Springer-Verlag Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are liable to prosecution under the German Copyright Law.

Springer-Verlag is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2004

Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP-Berlin, Protago-TeX-Production GmbH

Printed on acid-free paper SPIN: 11009597 06/3142 5 4 3 2 1 0

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Friedemann Mattern

*ETH Zurich, Switzerland*

John C. Mitchell

*Stanford University, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

Oscar Nierstrasz

*University of Bern, Switzerland*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*University of Dortmund, Germany*

Madhu Sudan

*Massachusetts Institute of Technology, MA, USA*

Demetri Terzopoulos

*New York University, NY, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Moshe Y. Vardi

*Rice University, Houston, TX, USA*

Gerhard Weikum

*Max-Planck Institute of Computer Science, Saarbruecken, Germany*



E200404023



Springer



Commenced Publication in 1973  
Founding and Former Series Editors:  
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

- Takeo Kanade  
Carnegie Mellon University, Pittsburgh, PA, USA  
Joost Kijster  
University of Surrey, Guildford, UK  
Jon M. Kleinberg  
Cornell University, Ithaca, NY, USA  
Erkdemir M. M. M. M.  
ETH Zurich, Switzerland  
John C. Mitchell  
Stanford University, CA, USA  
Motti Nave  
Weizmann Institute of Science, Rehovot, Israel  
Oscar Nierstrasz  
University of Bern, Switzerland  
C. Pandu Rangan  
Indian Institute of Technology Madras, India  
Bernhard Steffen  
University of Dortmund, Germany  
Madhu Sudan  
Massachusetts Institute of Technology, MA, USA  
Demetri Terzopoulos  
New York University, NY, USA  
Doug Tygar  
University of California, San Diego, CA, USA  
Moshe Y. Vardi  
Rice University, Houston, TX, USA  
Gerhard Weikum  
Max-Planck Institute of Computer Science, Saarbrücken, Germany



**Springer**

- Berlin  
Heidelberg  
New York  
Hong Kong  
London  
Milan  
Paris  
Tokyo

## Preface

The International Conference on Computational Science (ICCS 2004) held in Kraków, Poland, June 6–9, 2004, was a follow-up to the highly successful ICCS 2003 held at two locations, in Melbourne, Australia and St. Petersburg, Russia; ICCS 2002 in Amsterdam, The Netherlands; and ICCS 2001 in San Francisco, USA.

As computational science is still evolving in its quest for subjects of investigation and efficient methods, ICCS 2004 was devised as a forum for scientists from mathematics and computer science, as the basic computing disciplines and application areas, interested in advanced computational methods for physics, chemistry, life sciences, engineering, arts and humanities, as well as computer system vendors and software developers. 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. The event harvested recent developments in computational grids and next generation computing systems, tools, advanced numerical methods, data-driven systems, and novel application fields, such as complex systems, finance, econo-physics and population evolution.

Keynote lectures were delivered by David Abramson and Alexander V. Bogdanov, *From ICCS 2003 to ICCS 2004 – Personal Overview of Recent Advances in Computational Science*; Iain Duff, *Combining Direct and Iterative Methods for the Solution of Large Sparse Systems in Different Application Areas*; Chris Johnson, *Computational Multi-field Visualization*; John G. Michopoulos, *On the Pathology of High Performance Computing*; David De Roure, *Semantic Grid*; and Vaidy Sunderam, *True Grid: What Makes a Grid Special and Different?* In addition, three invited lectures were delivered by representatives of leading computer system vendors, namely: Frank Baetke from Hewlett Packard, Eng Lim Goh from SGI, and David Harper from the Intel Corporation.

Four tutorials extended the program of the conference: Paweł Płaszczak and Krzysztof Wilk, *Practical Introduction to Grid and Grid Services*; Grzegorz Młynarczyk, *Software Engineering Methods for Computational Science*; the *CrossGrid Tutorial* by the CYFRONET CG team; and the Intel tutorial.

We would like to thank all keynote, invited and tutorial speakers for their interesting and inspiring talks.

Aside of plenary lectures, the conference included 12 parallel oral sessions and 3 poster sessions. Ever since the first meeting in San Francisco, ICCS has attracted an increasing number of more researchers involved in the challenging field of computational science. For ICCS 2004, we received 489 contributions for the main track and 534 contributions for 41 originally-proposed workshops. Of these submissions, 117 were accepted for oral presentations and 117 for posters in the main track, while 328 papers were accepted for presentations at 30 workshops. This selection was possible thanks to the hard work of the Program

Committee members and 477 reviewers. The author index contains 1395 names, and almost 560 persons from 44 countries and all continents attended the conference: 337 participants from Europe, 129 from Asia, 62 from North America, 13 from South America, 11 from Australia, and 2 from Africa.

The ICCS 2004 proceedings consists of four volumes, the first two volumes, LNCS 3036 and 3037 contain the contributions presented in the main track, while volumes 3038 and 3039 contain the papers accepted for the workshops. Parts I and III are mostly related to pure computer science, while Parts II and IV are related to various computational research areas. For the first time, the ICCS proceedings are also available on CD. We would like to thank Springer-Verlag for their fruitful collaboration. During the conference the best papers from the main track and workshops as well as the best posters were nominated and presented on the ICCS 2004 Website. We hope that the ICCS 2004 proceedings will serve as a major intellectual resource for computational science researchers, pushing back the boundaries of this field. A number of papers will also be published as special issues of selected journals.

We owe thanks to all workshop organizers and members of the Program Committee for their diligent work, which ensured the very high quality of the event. We also wish to specifically acknowledge the collaboration of the following colleagues who organized their workshops for the third time: Nicoletta Del Buono (New Numerical Methods) Andres Iglesias (Computer Graphics), Dieter Kranzlmüller (Tools for Program Development and Analysis), Youngsong Mun (Modeling and Simulation in Supercomputing and Telecommunications).

We would like to express our gratitude to Prof. Ryszard Tadeusiewicz, Rector of the AGH University of Science and Technology, as well as to Prof. Marian Noga, Prof. Kazimierz Jeleń, Dr. Jan Kulka and Prof. Krzysztof Zieliński, 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 2004, 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 and Computational Physics students during the conference. We owe thanks to the ICCS 2004 sponsors: Hewlett-Packard, Intel, IBM, SGI and ATM, SUN Microsystems, Polish Airlines LOT, ACC CYFRONET AGH, the Institute of Computer Science AGH, the Polish Ministry for Scientific Research and Information Technology, and Springer-Verlag for their generous support.

We wholeheartedly invite you to once again visit the ICCS 2004 Website (<http://www.cyfronet.krakow.pl/iccs2004/>), to recall the atmosphere of those June days in Kraków.

June 2004

Marian Bubak, Scientific Chair 2004  
on behalf of the co-editors:

G. Dick van Albada  
Peter M.A. Sloot  
Jack J. Dongarra

## Organization

ICCS 2004 was organized by the Academic Computer Centre CYFRONET AGH University of Science and Technology (Kraków, Poland) in cooperation with the Institute of Computer Science AGH, the University of Amsterdam (The Netherlands) and the University of Tennessee (USA).

All the members of the Local Organizing Committee are the staff members of CYFRONET and/or ICS. The conference took place at the premises of the Faculty of Physics and Nuclear Techniques AGH and at the Institute of Computer Science AGH.

### Conference Chairs

**Scientific Chair** – Marian Bubak (Institute of Computer Science and ACC CYFRONET AGH, Poland)

**Workshop Chair** – Dick van Albada (University of Amsterdam, The Netherlands)

**Overall Chair** – Peter M.A. Sloot (University of Amsterdam, The Netherlands)

**Overall Co-chair** – Jack Dongarra (University of Tennessee, USA)

### Local Organizing Committee

Marian Noga

Marian Bubak

Zofia Mosurska

Maria Stawiarska

Milena Zając

Mietek Pilipczuk

Karol Frańczak

Aleksander Kuszniar

### Program Committee

Jemal Abawajy (Carleton University, Canada)

David Abramson (Monash University, Australia)

Dick van Albada (University of Amsterdam, The Netherlands)

Vassil Alexandrov (University of Reading, UK)

Srinivas Aluru (Iowa State University, USA)

David A. Bader (University of New Mexico, USA)



J.A. Rod Blais (University of Calgary, Canada)  
Alexander Bogdanov (Institute for High Performance Computing and Information Systems, Russia)  
Peter Brezany (University of Vienna, Austria)  
Marian Bubak (Institute of Computer Science and CYFRONET AGH, Poland)  
Rajkumar Buyya (University of Melbourne, Australia)  
Bastien Chopard (University of Geneva, Switzerland)  
Paul Coddington (University of Adelaide, Australia)  
Toni Cortes (Universitat Politècnica de Catalunya, Spain)  
Yiannis Cotronis (University of Athens, Greece)  
Jose C. Cunha (New University of Lisbon, Portugal)  
Brian D'Auriol (University of Texas at El Paso, USA)  
Federic Desprez (INRIA, France)  
Tom Dhaene (University of Antwerp, Belgium)  
Hassan Diab (American University of Beirut, Lebanon)  
Beniamino Di Martino (Second University of Naples, Italy)  
Jack Dongarra (University of Tennessee, USA)  
Robert A. Evarestov (SPbSU, Russia)  
Marina Gavrilova (University of Calgary, Canada)  
Michael Gerndt (Technical University of Munich, Germany)  
Yuriy Gorbachev (Institute for High Performance Computing and Information Systems, Russia)  
Andrzej Goscinski (Deakin University, Australia)  
Ladislav Hluchy (Slovak Academy of Sciences, Slovakia)  
Alfons Hoekstra (University of Amsterdam, The Netherlands)  
Hai Jin (Huazhong University of Science and Technology, ROC)  
Peter Kacsuk (MTA SZTAKI Research Institute, Hungary)  
Jacek Kitowski (AGH University of Science and Technology, Poland)  
Dieter Kranzlmüller (Johannes Kepler University Linz, Austria)  
Domenico Laforenza (Italian National Research Council, Italy)  
Antonio Lagana (Università di Perugia, Italy)  
Francis Lau (University of Hong Kong, ROC)  
Bogdan Lesyng (ICM Warszawa, Poland)  
Thomas Ludwig (Ruprecht-Karls-Universität Heidelberg, Germany)  
Emilio Luque (Universitat Autònoma de Barcelona, Spain)  
Michael Mascagni (Florida State University, USA)  
Edward Moreno (Euripides Foundation of Marilia, Brazil)  
Jiri Nedoma (Institute of Computer Science AS CR, Czech Republic)  
Genri Norman (Russian Academy of Sciences, Russia)  
Stephan Olariu (Old Dominion University, USA)  
Salvatore Orlando (University of Venice, Italy)  
Marcin Paprzycki (Oklahoma State University, USA)  
Ron Perrott (Queen's University of Belfast, UK)  
Richard Ramaroson (ONERA, France)  
Rosemary Renaut (Arizona State University, USA)

Alistair Rendell (Australian National University, Australia)  
 Paul Roe (Queensland University of Technology, Australia)  
 Hong Shen (Japan Advanced Institute of Science and Technology, Japan)  
 Dale Shires (U.S. Army Research Laboratory, USA)  
 Peter M.A. Slood (University of Amsterdam, The Netherlands)  
 Gunther Stuer (University of Antwerp, Belgium)  
 Vaidy Sunderam (Emory University, USA)  
 Boleslaw Szymanski (Rensselaer Polytechnic Institute, USA)  
 Ryszard Tadeusiewicz (AGH University of Science and Technology, Poland)  
 Pavel Tvrdik (Czech Technical University, Czech Republic)  
 Puthong Uthayopas (Kasetsart University, Thailand)  
 Jesus Vigo-Aguiar (University of Salamanca, Spain)  
 Jens Volkert (University of Linz, Austria)  
 Koichi Wada (University of Tsukuba, Japan)  
 Jerzy Wasniewski (Technical University of Denmark, Denmark)  
 Greg Watson (Los Alamos National Laboratory, USA)  
 Jan Węglarz (Poznań University of Technology, Poland)  
 Roland Wismüller (LRR-TUM, Germany)  
 Roman Wyrzykowski (Technical University of Częstochowa, Poland)  
 Jinchao Xu (Pennsylvania State University, USA)  
 Yong Xue (Chinese Academy of Sciences, ROC)  
 Xiaodong Zhang (College of William and Mary, USA)  
 Alexander Zhmakin (Soft-Impact Ltd, Russia)  
 Krzysztof Zieliński (Institute of Computer Science and CYFRONET AGH, Poland)  
 Zahari Zlatev (National Environmental Research Institute, Denmark)  
 Albert Zomaya (University of Sydney, Australia)  
 Elena Zudilova (University of Amsterdam, The Netherlands)

## Reviewers

|                  |               |                    |
|------------------|---------------|--------------------|
| Abawajy, J.H.    | Aluru, S.     | Balogh, Z.         |
| Abe, S.          | Anglano, C.   | Bang, Y.C.         |
| Abramson, D.     | Archibald, R. | Baraglia, R.       |
| Adali, S.        | Arenas, A.    | Barron, J.         |
| Adcock, M.       | Astalos, J.   | Baumgartner, F.    |
| Adriaansen, T.   | Ayani, R.     | Becakaert, P.      |
| Ahn, G.          | Ayyub, S.     | Belleman, R.G.     |
| Ahn, S.J.        | Babik, M.     | Bentes, C.         |
| Albada, G.D. van | Bader, D.A.   | Bernardo Filho, O. |
| Albuquerque, P.  | Bajaj, C.     | Beyls, K.          |
| Alda, W.         | Baker, M.     | Blais, J.A.R.      |
| Alexandrov, V.   | Bališ, B.     | Boada, I.          |
| Alt, M.          | Balk, I.      | Bode, A.           |

- |                  |                       |                   |
|------------------|-----------------------|-------------------|
| Bogdanov, A.     | Cramer, H.S.M.        | Gabriel, E.       |
| Bollapragada, R. | Cunha, J.C.           | Gagliardi, F.     |
| Boukhanovsky, A. | Danilowicz, C.        | Galis, A.         |
| Brandes, T.      | D'Auriol, B.          | Galvez, A.        |
| Brezany, P.      | Degtyarev, A.         | Gao, X.S.         |
| Britanak, V.     | Denazis, S.           | Garstecki, L.     |
| Bronsvoort, W.   | Derntl, M.            | Gatjal, E.        |
| Brunst, H.       | Desprez, F.           | Gava, F.          |
| Bubak, M.        | Devendeville, L.      | Gavidia, D.P.     |
| Budinska, I.     | Dew, R.               | Gavras, A.        |
| Buono, N. Del    | Dhaene, T.            | Gavrilova, M.     |
| Buyya, R.        | Dhoedt, B.            | Gelb, A.          |
| Cai, W.          | D'Hollander, E.       | Gerasimov, V.     |
| Cai, Y.          | Diab, H.              | Gerndt, M.        |
| Cannataro, M.    | Dokken, T.            | Getov, V.         |
| Carbonell, N.    | Dongarra, J.          | Geusebroek, J.M.  |
| Carle, G.        | Donnelly, D.          | Giang, T.         |
| Caron, E.        | Donnelly, W.          | Gilbert, M.       |
| Carothers, C.    | Dorogovtsev, S.       | Glasner, C.       |
| Castiello, C.    | Duda, J.              | Gobbert, M.K.     |
| Chan, P.         | Dudek-Dyduch, E.      | Gonzalez-Vega, L. |
| Chassin-de-      | Dufourd, J.F.         | Gorbachev, Y.E.   |
| Kergommeaux, J.  | Dumitriu, L.          | Goscinski, A.M.   |
| Chaudet, C.      | Duplaga, M.           | Goscinski, W.     |
| Chaves, J.C.     | Dupuis, A.            | Gourhant, Y.      |
| Chen, L.         | Dzwinel, W.           | Gualandris, A.    |
| Chen, Z.         | Embrechts, M.J.       | Guo, H.           |
| Cheng, B.        | Emiris, I.            | Ha, R.            |
| Cheng, X.        | Emrich, S.J.          | Habala, O.        |
| Cheung, B.W.L.   | Enticott, C.          | Habib, A.         |
| Chin, S.         | Evangelos, F.         | Halada, L.        |
| Cho, H.          | Evarestov, R.A.       | Hawick, K.        |
| Choi, Y.S.       | Fagni, T.             | He, K.            |
| Choo, H.S.       | Faik, J.              | Heinzlreiter, P.  |
| Chopard, B.      | Fang, W.J.            | Heyfitch, V.      |
| Chuang, J.H.     | Farin, G.             | Hisley, D.M.      |
| Chung, R.        | Fernandez, M.         | Hluchy, L.        |
| Chung, S.T.      | Filho, B.O.           | Ho, R.S.C.        |
| Coddington, P.   | Fisher-Gewirtzman, D. | Ho, T.            |
| Coeurjolly, D.   | Floros, E.            | Hobbs, M.         |
| Congiusta, A.    | Fogel, J.             | Hoekstra, A.      |
| Coppola, M.      | Foukia, N.            | Hoffmann, C.      |
| Corral, A.       | Frankovic, B.         | Holena, M.        |
| Cortes, T.       | Fuehrlinger, K.       | Hong, C.S.        |
| Cotronis, Y.     | Funika, W.            | Hong, I.          |

|                      |                         |                |
|----------------------|-------------------------|----------------|
| Hong, S.             | Kommineni, J.           | Marconi, S.    |
| Horan, P.            | Korczak, J.J.           | Mareev, V.     |
| Hu, S.M.             | Korkhov, V.             | Margalef, T.   |
| Huh, E.N.            | Kou, G.                 | Marrone, S.    |
| Hutchins, M.         | Kouniak, C.             | Martino, B. Di |
| Huynh, J.            | Kranzlmüller, D.        | Marzolla, M.   |
| Hwang, I.S.          | Krzhizhianovskaya, V.V. | Mascagni, M.   |
| Hwang, J.            | Kuo, T.W.               | Mayer, M.      |
| Iacono, M.           | Kurka, G.               | Medeiros, P.   |
| Iglesias, A.         | Kurniawan, D.           | Meer, H. De    |
| Ingram, D.           | Kurzyniec, D.           | Meyer, N.      |
| Jakulin, A.          | Laclavik, M.            | Miller, B.     |
| Janciak, I.          | Laforenza, D.           | Miyaji, C.     |
| Janecek, J.          | Lagan, A.               | Modave, F.     |
| Janglova, D.         | Lagana, A.              | Mohr, B.       |
| Janicki, A.          | Lamehamedi, H.          | Monterde, J.   |
| Jin, H.              | Larrabeiti, D.          | Moore, S.      |
| Jost, G.             | Latt, J.                | Moreno, E.     |
| Juhola, A.           | Lau, F.                 | Moscato, F.    |
| Kacsuk, P.           | Lee, H.G.               | Mourelle, L.M. |
| Kalousis, A.         | Lee, M.                 | Mueller, M.S.  |
| Kalyanaraman, A.     | Lee, S.                 | Mun, Y.        |
| Kang, M.G.           | Lee, S.S.               | Na, W.S.       |
| Karagiorgos, G.      | Lee, S.Y.               | Nagel, W.E.    |
| Karaivanova, A.      | Lefevre, L.             | Nanni, M.      |
| Karl, W.             | Leone, P.               | Narayanan, M.  |
| Karypis, G.          | Lesyng, B.              | Nasri, A.      |
| Katarzyniak, R.      | Leszczynski, J.         | Nau, B.        |
| Kelley, T.           | Leymann, F.             | Nedjah, N.     |
| Kelly, W.            | Li, T.                  | Nedomá, J.     |
| Kennedy, E.          | Lindner, P.             | Negoita, C.    |
| Kereku, E.           | Logan, B.               | Neumann, L.    |
| Kergommeaux, J.C. De | Lopes, G.P.             | Nguyen, G.T.   |
| Kim, B.              | Lorencz, R.             | Nguyen, N.T.   |
| Kim, C.H.            | Low, M.Y.H.             | Norman, G.     |
| Kim, D.S.            | Ludwig, T.              | Olariu, S.     |
| Kim, D.Y.            | Luethi, J.              | Orlando, S.    |
| Kim, M.              | Lukac, R.               | Orley, S.      |
| Kim, M.J.            | Luksch, P.              | Otero, C.      |
| Kim, T.W.            | Luque, E.               | Owen, J.       |
| Kitowski, J.         | Mairandres, M.          | Palus, H.      |
| Klein, C.            | Malawski, M.            | Paprzycki, M.  |
| Ko, P.               | Malony, A.              | Park, N.J.     |
| Kokoszka, P.         | Malyshkin, V.E.         | Patten, C.     |
| Kolingerova, I.      | Maniatty, W.A.          | Peachey, T.C.  |



- Peluso, R.  
 Peng, Y.  
 Perales, F.  
 Perrott, R.  
 Petit, F.  
 Petit, G.H.  
 Pfluger, P.  
 Philippe, L.  
 Platen, E.  
 Plemenos, D.  
 Pllana, S.  
 Polak, M.  
 Polak, N.  
 Politi, T.  
 Pooley, D.  
 Popov, E.V.  
 Puppín, D.  
 Qut, P.R.  
 Rachev, S.  
 Rajko, S.  
 Rak, M.  
 Ramaroson, R.  
 Ras, I.  
 Rathmayer, S.  
 Raz, D.  
 Recio, T.  
 Reichel, L.  
 Renaut, R.  
 Rendell, A.  
 Richta, K.  
 Robert, Y.  
 Rodgers, G.  
 Rodionov, A.S.  
 Roe, P.  
 Ronsse, M.  
 Ruder, K.S.  
 Ruede, U.  
 Rycerz, K.  
 Sanchez-Reyes, J.  
 Sarfraz, M.  
 Sbert, M.  
 Scarpa, M.  
 Schabanel, N.  
 Scharf, E.  
 Scharinger, J.
- Schaubschlaeger, C.  
 Schmidt, A.  
 Scholz, S.B.  
 Schreiber, A.  
 Seal, S.K.  
 Seinstra, F.J.  
 Seron, F.  
 Serrat, J.  
 Shamonin, D.P.  
 Sheldon, F.  
 Shen, H.  
 Shende, S.  
 Shentu, Z.  
 Shi, Y.  
 Shin, H.Y.  
 Shires, D.  
 Shoshmina, I.  
 Shrikhande, N.  
 Silvestri, C.  
 Silvestri, F.  
 Simeoni, M.  
 Simo, B.  
 Simonov, N.  
 Siu, P.  
 Slizik, P.  
 Slominski, L.  
 Slood, P.M.A.  
 Slota, R.  
 Smetek, M.  
 Smith, G.  
 Smolka, B.  
 Sneeuw, N.  
 Snoek, C.  
 Sobaniec, C.  
 Sobecki, J.  
 Sofroniou, M.  
 Sole, R.  
 Soofi, M.  
 Sosnov, A.  
 Sourin, A.  
 Spaletta, G.  
 Spiegl, E.  
 Stapor, K.  
 Stuer, G.  
 Suarez Rivero, J.P.
- Sunderam, V.  
 Suzuki, H.  
 Szatzschneider, W.  
 Szczepanski, M.  
 Szirmay-Kalos, L.  
 Szymanski, B.  
 Tadeusiewicz, R.  
 Tadic, B.  
 Talia, D.  
 Tan, G.  
 Taylor, S.J.E.  
 Teixeira, J.C.  
 Telelis, O.A.  
 Teo, Y.M.  
 Teresco, J.  
 Teyssiere, G.  
 Thalmann, D.  
 Theodoropoulos, G.  
 Theoharis, T.  
 Thurner, S.  
 Tirado-Ramos, A.  
 Tisserand, A.  
 Toda, K.  
 Tonellootto, N.  
 Torelli, L.  
 Torenvliet, L.  
 Tran, V.D.  
 Truong, H.L.  
 Tsang, K.  
 Tse, K.L.  
 Tvrdik, P.  
 Tzevelekas, L.  
 Uthayopas, P.  
 Valencia, P.  
 Vassilakis, C.  
 Vaughan, F.  
 Vazquez, P.P.  
 Venticinque, S.  
 Vigo-Aguiar, J.  
 Vivien, F.  
 Volkert, J.  
 Wada, K.  
 Walter, M.  
 Wasniewski, J.  
 Wasserbauer, A.

|                   |                  |                |
|-------------------|------------------|----------------|
| Watson, G.        | Xiao, Y.         | Zhang, J.W.    |
| Wawrzyniak, D.    | Xu, J.           | Zhang, N.X.L.  |
| Weglarz, J.       | Xue, Y.          | Zhang, X.      |
| Weidendorfer, J.  | Yahyapour, R.    | Zhao, L.       |
| Weispfenning, W.  | Yan, N.          | Zhmakin, A.I.  |
| Wendelborn, A.L.  | Yang, K.         | Zhu, W.Z.      |
| Weron, R.         | Yener, B.        | Zieliński, K.  |
| Wismüller, R.     | Yoo, S.M.        | Zlatev, Z.     |
| Wojciechowski, K. | Yu, J.H.         | Zomaya, A.     |
| Wolf, F.          | Yu, Z.C.H.       | Zudilova, E.V. |
| Worring, M.       | Zara, J.         |                |
| Wyrzykowski, R.   | Zatevakhin, M.A. |                |

## Workshops Organizers

### Programming Grids and Metasystems

- V. Sunderam (Emory University, USA)
- D. Kurzyniec (Emory University, USA)
- V. Getov (University of Westminster, UK)
- M. Malawski (Institute of Computer Science and CYFRONET AGH, Poland)

### Active and Programmable Grids Architectures and Components

- C. Anglano (Università del Piemonte Orientale, Italy)
- F. Baumgartner (University of Bern, Switzerland)
- G. Carle (Tübingen University, Germany)
- X. Cheng (Institute of Computing Technology, Chinese Academy of Science, ROC)
- K. Chen (Institut Galilée, Université Paris 13, France)
- S. Denazis (Hitachi Europe, France)
- B. Dhoedt (University of Gent, Belgium)
- W. Donnelly (Waterford Institute of Technology, Ireland)
- A. Galis (University College London, UK)
- A. Gavras (Eurescom, Germany)
- F. Gagliardi (CERN, Switzerland)
- Y. Gourhant (France Telecom, France)
- M. Gilbert (European Microsoft Innovation Center, Microsoft Corporation, Germany)
- A. Juhola (VTT, Finland)
- C. Klein (Siemens, Germany)
- D. Larrabeiti (University Carlos III, Spain)
- L. Lefevre (INRIA, France)
- F. Leymann (IBM, Germany)
- H. de Meer (University of Passau, Germany)
- G. H. Petit (Alcatel, Belgium)

J. Serrat (Universitat Politècnica de Catalunya, Spain)  
 E. Scharf (QMUL, UK)  
 K. Skala (Ruder Bosković Institute, Croatia)  
 N. Shrikhande (European Microsoft Innovation Center, Microsoft Corporation, Germany)  
 M. SolarSKI (FhG FOKUS, Germany)  
 D. Raz (Technion Institute of Technology, Israel)  
 K. Zieliński (AGH University of Science and Technology, Poland)  
 R. Yahyapour (University Dortmund, Germany)  
 K. Yang (University of Essex, UK)

### **Next Generation Computing**

E.-N. John Huh (Seoul Women's University, Korea)

### **Practical Aspects of High-Level Parallel Programming (PAPP 2004)**

F. Loulergue (Laboratory of Algorithms, Complexity and Logic, University of Paris Val de Marne, France)

### **Parallel Input/Output Management Techniques (PIOMT 2004)**

J. H. Abawajy (Carleton University, School of Computer Science, Canada)

### **OpenMP for Large Scale Applications**

B. Chapman (University of Houston, USA)

### **Tools for Program Development and Analysis in Computational Science**

D. Kranzlmüller (Johannes Kepler University Linz, Austria)  
 R. Wismüller (TU München, Germany)  
 A. Bode (Technische Universität München, Germany)  
 J. Volkert (Johannes Kepler University Linz, Austria)

### **Modern Technologies for Web-Based Adaptive Systems**

N. Thanh Nguyen (Wrocław University of Technology, Poland)  
 J. Sobecki (Wrocław University of Technology, Poland)

### **Agent Day 2004 – Intelligent Agents in Computing Systems**

E. Nawarecki (AGH University of Science and Technology, Poland)  
 K. Cetnarowicz (AGH University of Science and Technology, Poland)  
 G. Dobrowolski (AGH University of Science and Technology, Poland)  
 R. Schaefer (Jagiellonian University, Poland)  
 S. Ambroszkiewicz (Polish Academy of Sciences, Warsaw, Poland)  
 A. Koukam (Université de Belfort-Montbéliard, France)  
 V. Srovnal (VSB Technical University of Ostrava, Czech Republic)  
 C. Cotta (Universidad de Málaga, Spain)  
 S. Raczynski (Universidad Panamericana, Mexico)

**Dynamic Data Driven Application Systems**

F. Darema (NSF/CISE, USA)

**HLA-Based Distributed Simulation on the Grid**

S. J. Turner (Nanyang Technological University, Singapore)

**Interactive Visualisation and Interaction Technologies**

E. Zudilova (University of Amsterdam, The Netherlands)

T. Adriaansen (CSIRO, ICT Centre, Australia)

**Computational Modeling of Transport on Networks**

B. Tadic (Jozef Stefan Institute, Slovenia)

S. Thurner (Universität Wien, Austria)

**Modeling and Simulation in Supercomputing and Telecommunications**

Y. Mun (Soongsil University, Korea)

**QoS Routing**

H. Choo (Sungkyunkwan University, Korea)

**Evolvable Hardware**

N. Nedjah (State University of Rio de Janeiro, Brazil)

L. de Macedo Mourelle (State University of Rio de Janeiro, Brazil)

**Advanced Methods of Digital Image Processing**

B. Smolka (Silesian University of Technology, Laboratory of Multimedia Communication, Poland)

**Computer Graphics and Geometric Modelling (CGGM 2004)**

A. Iglesias Prieto (University of Cantabria, Spain)

**Computer Algebra Systems and Applications (CASA 2004)**

A. Iglesias Prieto (University of Cantabria, Spain)

A. Galvez (University of Cantabria, Spain)

**New Numerical Methods for DEs: Applications to Linear Algebra, Control and Engineering**

N. Del Buono (University of Bari, Italy)

L. Lopez (University of Bari, Italy)

**Parallel Monte Carlo Algorithms for Diverse Applications in a Distributed Setting**

V. N. Alexandrov (University of Reading, UK)

A. Karaivanova (Bulgarian Academy of Sciences, Bulgaria)

I. Dimov (Bulgarian Academy of Sciences, Bulgaria)



## **Modelling and Simulation of Multi-physics Multi-scale Systems**

- V. Krzhizhanovskaya (University of Amsterdam, The Netherlands)
- B. Chopard (University of Geneva, CUI, Switzerland)
- Y. Gorbachev (St. Petersburg State Polytechnical University, Russia)

## **Gene, Genome and Population Evolution**

- S. Cebrat (University of Wrocław, Poland)
- D. Stauffer (Cologne University, Germany)
- A. Maksymowicz (AGH University of Science and Technology, Poland)

## **Computational Methods in Finance and Insurance**

- A. Janicki (University of Wrocław, Poland)
- J.J. Korczak (University Louis Pasteur, Strasbourg, France)

## **Computational Economics and Finance**

- X. Deng (City University of Hong Kong, Hong Kong)
- S. Wang (Chinese Academy of Sciences, ROC)
- Y. Shi (University of Nebraska at Omaha, USA)

## **GeoComputation**

- Y. Xue (Chinese Academy of Sciences, ROC)
- C. Yarotsos (University of Athens, Greece)

## **Simulation and Modeling of 3D Integrated Circuits**

- I. Balk (R3Logic Inc., USA)

## **Computational Modeling and Simulation on Biomechanical Engineering**

- Y.H. Kim (Kyung Hee University, Korea)

## **Information Technologies Enhancing Health Care Delivery**

- M. Duplaga (Jagiellonian University Medical College, Poland)
- D. Ingram (University College London, UK)
- K. Zieliński (AGH University of Science and Technology, Poland)

## **Computing in Science and Engineering Academic Programs**

- D. Donnelly (Siena College, USA)