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# Computational Science – ICCS 2008

8th International Conference  
Kraków, Poland, June 23-25, 2008  
Proceedings, Part II

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# 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.

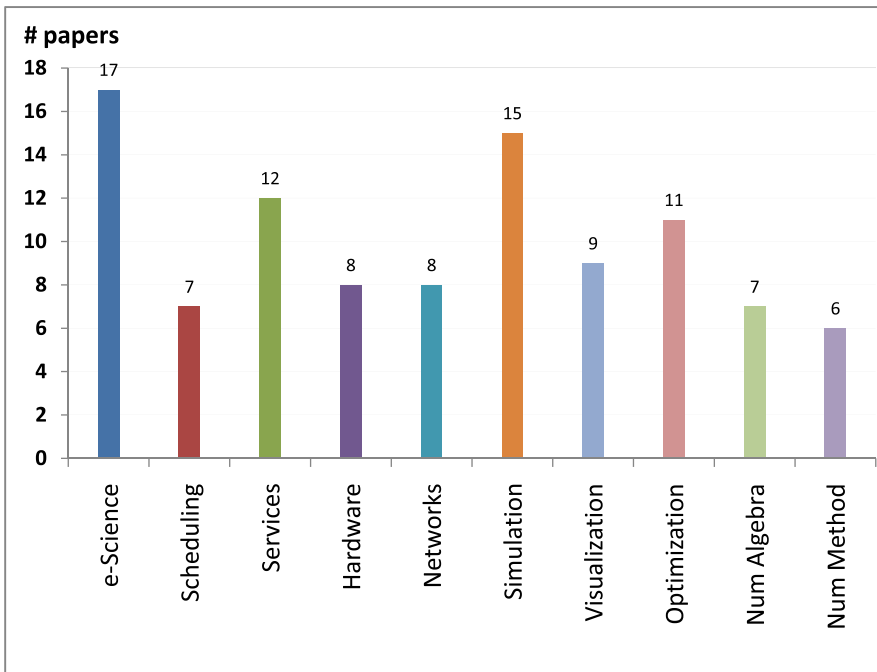
The theme for ICCS 2008 was “Advancing Science Through Computation,” to mark several decades of progress in computational science theory and practice, leading to greatly improved applications in science. This conference was a unique event focusing on recent developments in novel methods and modeling 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.

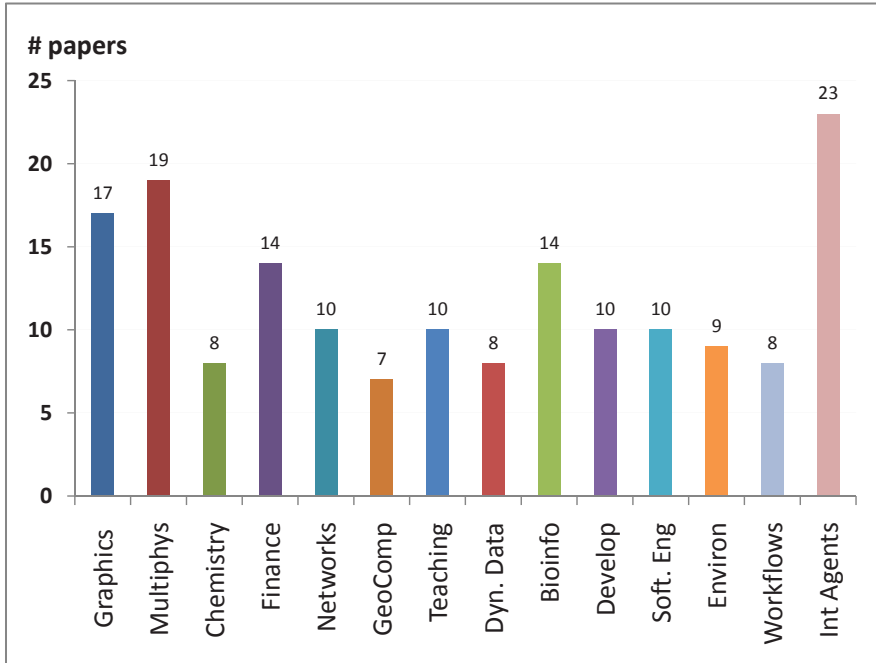


**Fig. 1.** Number of papers in the general track by topic

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

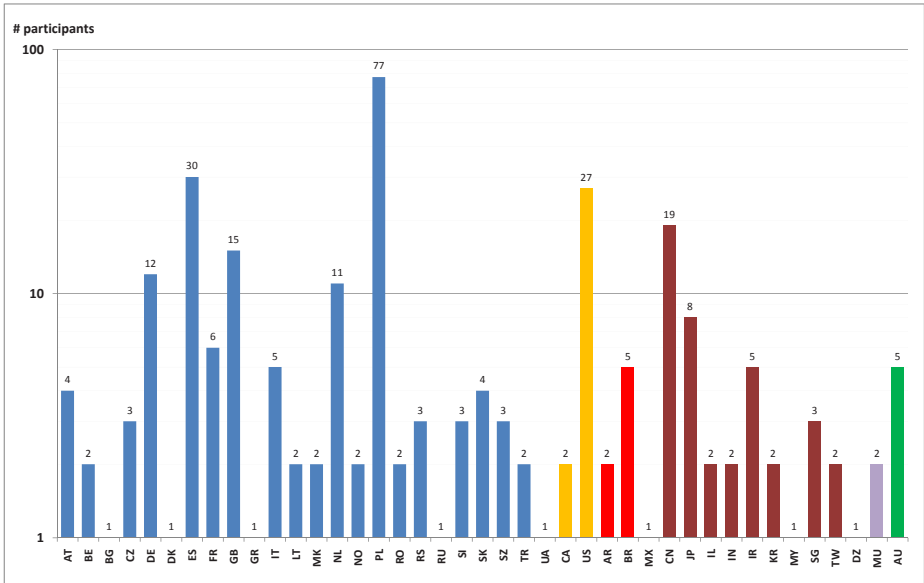


**Fig. 2.** Number of papers in workshops

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.

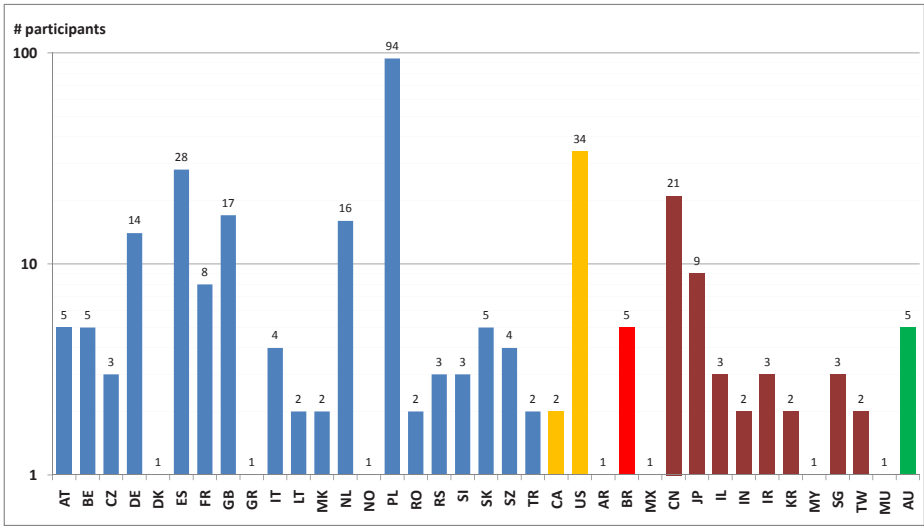


Fig. 4. Number of participants by country

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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 S. Thurner  
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## Table of Contents – Part II

### 7th International Workshop on Computer Graphics and Geometric Modeling

VII International Workshop on Computer Graphics and Geometric Modeling – CGGM’2008 .....	3
<i>Andrés Iglesias</i>	
Sliding-Tris: A Sliding Window Level-of-Detail Scheme .....	5
<i>Oscar Ripolles, Francisco Ramos, and Miguel Chover</i>	
Efficient Interference Calculation by Tight Bounding Volumes .....	15
<i>Masatake Higashi, Yasuyuki Suzuki, Takeshi Nogawa, Yoichi Sano, and Masakazu Kobayashi</i>	
Modeling of 3D Scene Based on Series of Photographs Taken with Different Depth-of-Field .....	25
<i>Marcin Denkowski, Michal Chlebiej, and Pawel Mikolajczak</i>	
A Simple Method of the T <sub>E</sub> X Surface Drawing Suitable for Teaching Materials with the Aid of CAS .....	35
<i>Masataka Kaneko, Hajime Izumi, Kiyoshi Kitahara, Takayuki Abe, Kenji Fukazawa, Masayoshi Sekiguchi, Yuuki Tadokoro, Satoshi Yamashita, and Setsuo Takato</i>	
Family of Energy Conserving Glossy Reflection Models .....	46
<i>Michal Radziszewski and Witold Alda</i>	
Harmonic Variation of Edge Size in Meshing CAD Geometries from IGES Format .....	56
<i>Maharavo Randrianarivony</i>	
Generating Sharp Features on Non-regular Triangular Meshes .....	66
<i>Tetsuo Oya, Shinji Seo, and Masatake Higashi</i>	
A Novel Artificial Mosaic Generation Technique Driven by Local Gradient Analysis .....	76
<i>Sebastiano Battiato, Gianpiero Di Blasi, Giovanni Gallo, Giuseppe Claudio Guarnera, and Giovanni Puglisi</i>	
Level-of-Detail Triangle Strips for Deforming Meshes .....	86
<i>Francisco Ramos, Miguel Chover, Jindra Parus, and Ivana Kolingerova</i>	
Triangular Bézier Approximations to Constant Mean Curvature Surfaces .....	96
<i>A. Arnal, A. Lluch, and J. Monterde</i>	

Procedural Graphics Model and Behavior Generation . . . . .	106
<i>J.L. Hidalgo, E. Camahort, F. Abad, and M.J. Vicent</i>	
Particle Swarm Optimization for Bézier Surface Reconstruction . . . . .	116
<i>Akemi Gálvez, Angel Cobo, Jaime Puig-Pey, and Andrés Iglesias</i>	
Geometrical Properties of Simulated Packings of Spherocylinders . . . . .	126
<i>Monika Bargiel</i>	
Real-Time Illumination of Foliage Using Depth Maps . . . . .	136
<i>Jesus Gumbau, Miguel Chover, Cristina Rebollo, and Inmaculada Remolar</i>	
On-Line 3D Geometric Model Reconstruction . . . . .	146
<i>H. Zolfaghari and K. Khalili</i>	
Implementation of Filters for Image Pre-processing for Leaf Analyses in Plantations . . . . .	153
<i>Jacqueline Gomes Mertes, Norian Marranghello, and Aledir Silveira Pereira</i>	

## 5th Workshop on Simulation of Multiphysics Multiscale Systems

Simulation of Multiphysics Multiscale Systems, 5th International Workshop . . . . .	165
<i>Valeria V. Krzhizhanovskaya and Alfons G. Hoekstra</i>	
A Hybrid Model of Sprouting Angiogenesis . . . . .	167
<i>Florian Milde, Michael Bergdorf, and Petros Koumoutsakos</i>	
Particle Based Model of Tumor Progression Stimulated by the Process of Angiogenesis . . . . .	177
<i>Rafał Wcisto and Witold Dzwiniel</i>	
A Multiphysics Model of Myoma Growth . . . . .	187
<i>Dominik Szczerba, Bryn A. Lloyd, Michael Bajka, and Gábor Székely</i>	
Computational Implementation of a New Multiphysics Model for Field Emission from CNT Thin Films . . . . .	197
<i>N. Sinha, D. Roy Mahapatra, R.V.N. Melnik, and J.T.W. Yeow</i>	
A Multiphysics and Multiscale Software Environment for Modeling Astrophysical Systems . . . . .	207
<i>Simon Portegies Zwart, Steve McMillan, Breannán Ó Nualláin, Douglas Hoggie, James Lombardi, Piet Hut, Sambaran Banerjee, Houria Belkus, Tassos Fragos, John Fregeau, Michiko Fuji, Evghenii Gaburov, Evert Glebbeek, Derek Groen, Stefan Harfst, Rob Izzard, Mario Jurić, Stephen Justham, Peter Teuben, Joris van Bever, Ofer Yaron, and Marcel Zemp</i>	

Dynamic Interactions in HLA Component Model for Multiscale Simulations .....	217
<i>Katarzyna Rycerz, Marian Bubak, and Peter M.A. Sloot</i>	
An Agent-Based Coupling Platform for Complex Automata .....	227
<i>Jan Hegewald, Manfred Krafczyk, Jonas Tölke, Alfons Hoekstra, and Bastien Chopard</i>	
A Control Algorithm for Multiscale Simulations of Liquid Water .....	234
<i>Evangelos M. Kotsalis and Petros Koumoutsakos</i>	
Multiscale Models of Quantum Dot Based Nanomaterials and Nanodevices for Solar Cells.....	242
<i>Alexander I. Fedoseyev, Marek Turowski, Ashok Raman, Qinghui Shao, and Alexander A. Balandin</i>	
Multi-scale Modelling of the Two-Dimensional Flow Dynamics in a Stationary Supersonic Hot Gas Expansion.....	251
<i>Giannandrea Abbate, Barend J. Thijsse, and Chris R. Kleijn</i>	
Multiscale Three-Phase Flow Simulation Dedicated to Model Based Control .....	261
<i>Dariusz Choński, Mieczysław Metzger, and Witold Nocoń</i>	
Simulation of Sound Emitted from Collision of Droplet with Shallow Water by the Lattice Boltzmann Method .....	271
<i>Shinsuke Tajiri, Michihisa Tsutahara, and Hisao Tanaka</i>	
Multiscale Numerical Models for Simulation of Radiation Events in Semiconductor Devices .....	281
<i>Alexander I. Fedoseyev, Marek Turowski, Ashok Raman, Michael L. Alles, and Robert A. Weller</i>	
Scale-Splitting Error in Complex Automata Models for Reaction-Diffusion Systems.....	291
<i>Alfonso Caiazzo, Jean Luc Falcone, Bastien Chopard, and Alfons G. Hoekstra</i>	
Wavelet Based Spatial Scaling of Coupled Reaction Diffusion Fields ....	301
<i>Sudib K. Mishra, Krishna Muradharan, Pierre Deymier, George Frantziskonis, Srdjan Simunovic, and Sreekanth Pannala</i>	
Domain Decomposition Methodology with Robin Interface Matching Conditions for Solving Strongly Coupled Problems .....	311
<i>François-Xavier Roux</i>	
Transient Boundary Element Method and Numerical Evaluation of Retarded Potentials .....	321
<i>Ernst P. Stephan, Matthias Maischak, and Elke Ostermann</i>	

A Multiscale Approach for Solving Maxwell's Equations in Waveguides with Conical Inclusions . . . . .	331
<i>Franck Assous and Patrick Ciarlet Jr.</i>	

### 3rd Workshop on Computational Chemistry and Its Applications

3rd Workshop on Computational Chemistry and Its Applications (3rd CCA) . . . . .	343
<i>Ponnadurai Ramasami</i>	

First Principle Gas Phase Study of the Trans and Gauche Rotamers of 1,2-Diisocynoethane, 1,2-Diisocyanodisilane and Isocyano(isocyanomethyl)silane . . . . .	344
<i>Ponnadurai Ramasami</i>	

A Density Functional Theory Study of Oxygen Adsorption at Silver Surfaces: Implications for Nanotoxicity . . . . .	353
<i>Brahim Akdim, Saber Hussain, and Ruth Pachter</i>	

Mechanism of Influenza A M2 Ion-Channel Inhibition: A Docking and QSAR Study . . . . .	360
<i>Alexander V. Gaiday, Igor A. Levandovskiy, Kendall G. Byler, and Tatyana E. Shubina</i>	

A Java Tool for the Management of Chemical Databases and Similarity Analysis Based on Molecular Graphs Isomorphism . . . . .	369
<i>Irene Luque Ruiz and Miguel Ángel Gómez-Nieto</i>	

Noncanonical Base Pairing in RNA: Topological and NBO Analysis of Hoogsteen Edge - Sugar Edge Interactions . . . . .	379
<i>Purshotam Sharma, Harjinder Singh, and Abhijit Mitra</i>	

Design of Optimal Laser Fields to Control Vibrational Excitations in Carboxy-myoglobin . . . . .	387
<i>Harjinder Singh, Sitansh Sharma, Praveen Kumar, Jeremy N. Harvey, and Gabriel G. Balint-Kurti</i>	

Computations of Ground State and Excitation Energies of Poly(3-methoxy-thiophene) and Poly(thienylene vinylene) from First Principles . . . . .	396
<i>A.V. Gavrilenko, S.M. Black, A.C. Sykes, C.E. Bonner, and V.I. Gavrilenko</i>	

### Workshop on Computational Finance and Business Intelligence

Workshop on Computational Finance and Business Intelligence . . . . .	407
<i>Yong Shi, Shouyang Wang, and Xiaotie Deng</i>	

Parallelization of Pricing Path-Dependent Financial Instruments on Bounded Trinomial Lattices .....	408
<i>Hannes Schabauer, Ronald Hochreiter, and Georg Ch. Pflug</i>	
Heterogeneity and Endogenous Nonlinearity in an Artificial Stock Model .....	416
<i>Hongquan Li, Wei Shang, and Shouyang Wang</i>	
Bound for the $L_2$ Norm of Random Matrix and Succinct Matrix Approximation .....	426
<i>Rong Liu, Nian Yan, Yong Shi, and Zhengxin Chen</i>	
Select Representative Samples for Regularized Multiple-Criteria Linear Programming Classification .....	436
<i>Peng Zhang, Yingjie Tian, Xingsen Li, Zhiwang Zhang, and Yong Shi</i>	
A Kernel-Based Technique for Direction-of-Change Financial Time Series Forecasting .....	441
<i>Andrew Skabar</i>	
An Optimization-Based Classification Approach with the Non-additive Measure .....	450
<i>Nian Yan, Zhengxin Chen, Rong Liu, and Yong Shi</i>	
A Selection Method of ETF's Credit Risk Evaluation Indicators .....	459
<i>Ying Zhang, Zongfang Zhou, and Yong Shi</i>	
Estimation of Market Share by Using Discretization Technology: An Application in China Mobile .....	466
<i>Xiaohang Zhang, Jun Wu, Xuecheng Yang, and Tingjie Lu</i>	
A Rough Set-Based Multiple Criteria Linear Programming Approach for Classification .....	476
<i>Zhiwang Zhang, Yong Shi, Peng Zhang, and Guangxia Gao</i>	
Predictive Modeling of Large-Scale Sequential Curves Based on Clustering .....	486
<i>Wen Long and Huiwen Wang</i>	
Estimating Real Estate Value-at-Risk Using Wavelet Denoising and Time Series Model .....	494
<i>Kaijian He, Chi Xie, and Kin Keung Lai</i>	
The Impact of Taxes on Intra-week Stock Return Seasonality .....	504
<i>Virgilijus Sakalauskas and Dalia Kriksciuniene</i>	
A Survey of Formal Verification for Business Process Modeling .....	514
<i>Shoichi Morimoto</i>	

## Workshop on Physical, Biological and Social Networks

Network Modeling of Complex Dynamic Systems . . . . .	525
<i>Bosiljka Tadić</i>	
Clustering Organisms Using Metabolic Networks . . . . .	527
<i>Tomasz Arodź</i>	
Influence of Network Structure on Market Share in Complex Market Structures . . . . .	535
<i>Makoto Uchida and Susumu Shirayama</i>	
When the Spatial Networks Split? . . . . .	545
<i>Joanna Natkaniec and Krzysztof Kulakowski</i>	
Search of Weighted Subgraphs on Complex Networks with Maximum Likelihood Methods . . . . .	551
<i>Marija Mitrović and Bosiljka Tadić</i>	
Spectral Properties of Adjacency and Distance Matrices for Various Networks . . . . .	559
<i>Krzysztof Malarz</i>	
Simplicial Complexes of Networks and Their Statistical Properties . . . . .	568
<i>Slobodan Maletić, Milan Rajković, and Danijela Vasiljević</i>	
Movies Recommendation Networks as Bipartite Graphs . . . . .	576
<i>Jelena Grujić</i>	
Dynamical Regularization in Scalefree-Trees of Coupled 2D Chaotic Maps . . . . .	584
<i>Zoran Levnajić</i>	
Physics Based Algorithms for Sparse Graph Visualization . . . . .	593
<i>Milovan Šuvakov</i>	

## Workshop on GeoComputation

High Performance Geocomputation - Preface . . . . .	603
<i>Yong Xue, Dingsheng Liu, Jianwen Ai, and Wei Wan</i>	
Study on Implementation of High-Performance GIServices in Spatial Information Grid . . . . .	605
<i>Fang Huang, Dingsheng Liu, Guoqing Li, Yi Zeng, and Yunxuan Yan</i>	
Numerical Simulation of Threshold-Crossing Problem for Random Fields of Environmental Contamination . . . . .	614
<i>Robert Jankowski</i>	

A Context-Driven Approach to Route Planning . . . . .	622
<i>Hissam Tawfik, Atulya Nagar, and Obinna Anya</i>	
InterCondor: A Prototype High Throughput Computing Middleware for Geocomputation . . . . .	630
<i>Yong Xue, Yanguang Wang, Ying Luo, Jianping Guo, Jianqin Wang, Yincui Hu, and Chaolin Wu</i>	
Discrete Spherical Harmonic Transforms: Numerical Preconditioning and Optimization . . . . .	638
<i>J.A. Rod Blais</i>	
A Data Management Framework for Urgent Geoscience Workflows . . . . .	646
<i>Jason Cope and Henry M. Tufo</i>	
<b>2nd Workshop on Teaching Computational Science</b>	
Second Workshop on Teaching Computational Science – WTCS 2008 . . .	657
<i>A. Tirado-Ramos and Q. Luo</i>	
Using Metaheuristics in a Parallel Computing Course . . . . .	659
<i>Ángel-Luis Calvo, Ana Cortés, Domingo Giménez, and Carmela Pozuelo</i>	
Improving the Introduction to a Collaborative Project-Based Course on Computer Network Applications . . . . .	669
<i>Felix Freitag, Leandro Navarro, and Joan Manuel Marquès</i>	
Supporting Materials for Active e-Learning in Computational Models . . .	678
<i>Mohamed Hamada</i>	
Improving Software Development Process Implemented in Team Project Course . . . . .	687
<i>Iwona Dubielewicz and Bogumiła Hnatkowska</i>	
An Undergraduate Computational Science Curriculum . . . . .	697
<i>Angela B. Shiflet and George W. Shiflet</i>	
Cryptography Adapted to the New European Area of Higher Education . . . . .	706
<i>A. Queiruga Dios, L. Hernández Encinas, and D. Queiruga</i>	
An Introductory Computer Graphics Course in the Context of the European Space of Higher Education: A Curricular Approach . . . . .	715
<i>Akemi Gálvez, Andrés Iglesias, and Pedro Corcuera</i>	
Collaborative Environments through Dialogues and PBL to Encourage the Self-directed Learning in Computational Sciences . . . . .	725
<i>Fernando Ramos-Quintana, Josefina Sámano-Galindo, and Víctor H. Zárate-Silva</i>	



The Simulation Course: An Innovative Way of Teaching Computational Science in Aeronautics . . . . .	735
<i>Ricard González-Cinca, Eduard Santamaria, and J. Luis A. Yebra</i>	
<b>Author Index</b> . . . . .	745