Preface

The Fifth International Conference on Computational Science (ICCS 2005) held in Atlanta, Georgia, USA, May 22-25, 2005, continued in the tradition of previous conferences in the series: ICCS 2004 in Krakow, Poland; ICCS 2003 held simultaneously at two locations, in Melbourne, Australia and St. Petersburg, Russia; ICCS 2002 in Amsterdam, The Netherlands; and ICCS 2001 in San Francisco, California, USA.

Computational science is rapidly maturing as a mainstream discipline. It is central to an ever-expanding variety of fields in which computational methods and tools enable new discoveries with greater accuracy and speed. ICCS 2005 was organized as a forum for scientists from the core disciplines of computational science and numerous application areas to discuss and exchange ideas, results, and future directions. ICCS participants included researchers from many application domains, including those interested in advanced computational methods for physics, chemistry, life sciences, engineering, economics and finance, arts and humanities, as well as computer system vendors and software developers. The primary objectives of this conference were 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 highlighted recent developments in algorithms, computational kernels, next generation computing systems, tools, advanced numerical methods, data-driven systems, and emerging application fields, such as complex systems, finance, bioinformatics, computational aspects of wireless and mobile networks, graphics, and hybrid computation. Keynote lectures were delivered by John Drake – High End Simulation of the Climate and Development of Earth System Models; Marian Bubak – Recent Developments in Computational Science and the CrossGrid Project; Alok Choudhary – Scientific Data Management; and David Keyes – Scientific Discovery through Advanced Computing.

In addition, four invited presentations were delivered by representatives of industry: David Barkai from Intel Corporation, Mladen Karcic from IBM, Tom Rittenberry from SGI and Dan Fay from Microsoft. Seven tutorials preceded the main technical program of the conference: Tools for Program Analysis in Computational Science by Dieter Kranzlmüller and Andreas Knüpfer; Computer Graphics and Geometric Modeling by Andrés Iglesias; Component Software for High Performance Computing Using the CCA by David Bernholdt; Computational Domains for Explorations in Nanoscience and Technology, by Jun Ni, Deepak Srivastava, Shaoping Xiao and M. Meyyappan; Wireless and Mobile Communications by Tae-Jin Lee and Hyunseung Choo; Biomedical Literature Mining and Its Applications in Bioinformatics by Tony Hu; and Alternative Approaches to Grids and Metacomputing by Gunther Stuer; We would like to thank all keynote, invited and tutorial speakers for their interesting and inspiring talks.
Aside from the plenary lectures, the conference included 10 parallel oral sessions and 3 poster sessions. Ever since the first meeting in San Francisco, ICCS has attracted an increasing number of researchers involved in the challenging field of computational science. For ICCS 2005, we received 464 contributions for the main track and over 370 contributions for 24 originally-proposed workshops. Of these submissions, 134 were accepted as full papers accompanied by oral presentations, and 89 for posters in the main track, while 241 papers were accepted for presentations at 21 workshops. This selection was possible thanks to the hard work of the 88-member Program Committee and 362 reviewers. The author index contains 1395 names, and over 500 participants from 41 countries and all continents attended the conference. The ICCS 2005 proceedings consists of three volumes. The first volume, LNCS 3514 contains the full papers from the main track of the conference, while volumes 3515 and 3516 contain the papers accepted for the workshops and short papers. The papers cover a wide range of topics in computational science, ranging from numerical methods, algorithms, and computational kernels to programming environments, grids, networking and tools. These contributions, which address foundational and computer science aspects are complemented by papers discussing computational applications in a variety of domains. ICCS continues its tradition of printed proceedings, augmented by CD-ROM versions. We would like to thank Springer-Verlag for their cooperation and partnership. We hope that the ICCS 2005 proceedings will serve as a major intellectual resource for computational science researchers for many years to come. During the conference the best papers from the main track and workshops as well as the best posters were nominated and commended on the ICCS 2005 Website. A number of papers will also be published in special issues of selected journals.

We owe thanks to all workshop organizers and members of the Program Committee for their diligent work, which led to the very high quality of the event. We would like to express our gratitude to Emory University and Emory College in general, and the Department of Mathematics and Computer Science in particular, for their wholehearted support of ICCS 2005. We are indebted to all the members of the Local Organizing Committee for their enthusiastic work towards the success of ICCS 2005, and to numerous colleagues from various Emory University units for their help in different aspects of organization. We very much appreciate the help of Emory University students during the conference. We owe special thanks to our corporate sponsors: Intel, IBM, Microsoft Research, SGI, and Springer-Verlag; and to ICIS, Math & Computer Science, Emory College, the Provost’s Office, and the Graduate School at Emory University for their generous support. ICCS 2005 was organized by the Distributed Computing Laboratory at the Department of Mathematics and Computer Science at Emory University, with support from the Innovative Computing Laboratory at the University of Tennessee and the Computational Science Section at the University of Amsterdam, in cooperation with the Society for Industrial and Applied Mathematics (SIAM). We invite you to visit the ICCS 2005 Website (http://www.iccsmeeing.org/ICCS2005/) to recount the events leading up to the conference, to
view the technical program, and to recall memories of three and a half days of engagement in the interest of fostering and advancing Computational Science.

June 2005  Vaidy Sunderam, Scientific Chair, ICCS 2005

on behalf of the co-editors:
G. Dick van Albada, Workshops Chair, ICCS 2005
Jack J. Dongarra, ICCS Series Overall co-Chair
Peter M.A. Sloot, ICCS Series Overall Chair
Organization

ICCS 2005 was organized by the Distributed Computing Laboratory, Department of Mathematics and Computer Science, Emory University, Atlanta, GA, USA. in cooperation with Emory College, Emory University (USA), the University of Tennessee (USA), the University of Amsterdam (The Netherlands), and the Society for Industrial and Applied Mathematics (SIAM). The conference took place on the campus of Emory University, in Atlanta, Georgia, USA.

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Jens Volkert - GUP, Joh. Kepler University Linz, Austria
# Table of Contents – Part II

**Workshop On “High Performance Computing in Academia: Systems and Applications”**

Teaching High-Performance Computing on a High-Performance Cluster  
*Martin Bernreuther, Markus Brenk, Hans-Joachim Bungartz, Ralf-Peter Mundani, Ioan Lucian Muntean* .............................. 1

Teaching High Performance Computing Parallelizing a Real Computational Science Application  
*Giovanni Aloisio, Massimo Cafaro, Italo Epicoco, Gianvito Quarta* . . 10

Introducing Design Patterns, Graphical User Interfaces and Threads Within the Context of a High Performance Computing Application  
*James Roper, Alistair P. Rendell* ......................................... 18

High Performance Computing Education for Students in Computational Engineering  
*Uwe Fabricius, Christoph Freundl, Harald Köstler, Ulrich Rüde* . . 27

Integrating Teaching and Research in HPC: Experiences and Opportunities  
*M. Berzins, R.M. Kirby, C.R. Johnson* .................................... 36

Education and Research Challenges in Parallel Computing  
*L. Ridgway Scott, Terry Clark, Babak Bagheri* .......................... 44

Academic Challenges in Large-Scale Multiphysics Simulations  
*Michael T. Heath, Xiangmin Jiao* ........................................ 52

Balancing Computational Science and Computer Science Research on a Terascale Computing Facility  
*Calvin J. Ribbens, Srinidhi Varadarajan, Malar Chinnusamy, Gautam Swaminathan* ...................................................... 60

Computational Options for Bioinformatics Research in Evolutionary Biology  
*Michael A. Thomas, Mitch D. Day, Luobin Yang* ....................... 68

Financial Computations on Clusters Using Web Services  
*Shirish Chinchalkar, Thomas F. Coleman, Peter Mansfield* ........... 76
“Plug-and-Play” Cluster Computing: HPC Designed for the Mainstream Scientist
   Dean E. Dauger, Viktor K. Decyk ........................................ 84
Building an HPC Watering Hole for Boulder Area Computational Science
   E.R. Jessup, H.M. Tufo, M.S. Woitaszek .............................. 91
The Dartmouth Green Grid
   James E. Dobson, Jeffrey B. Woodward, Susan A. Schwarz,
   John C. Marchesini, Hany Farid, Sean W. Smith .................... 99
Resource-Aware Parallel Adaptive Computation for Clusters
   James D. Teresco, Laura Effinger-Dean, Arjun Sharma .......... 107

Workshop on “Tools for Program Development and Analysis in Computational Science”

New Algorithms for Performance Trace Analysis Based on Compressed Complete Call Graphs
   Andreas Knüpfer and Wolfgang E. Nagel ............................ 116
PARADIS: Analysis of Transaction-Based Applications in Distributed Environments
   Christian Glasner, Edith Spiegl, Jens Volkert ...................... 124
Automatic Tuning of Data Distribution Using Factoring in Master/Worker Applications
   Anna Morajko, Paola Caymes, Tomàs Margalef, Emilio Luque ...... 132
DynTG: A Tool for Interactive, Dynamic Instrumentation
   Martin Schulz, John May, John Gyllenhaal .......................... 140
Rapid Development of Application-Specific Network Performance Tests
   Scott Pakin ............................................................... 149
Providing Interoperability for Java-Oriented Monitoring Tools with JINEXT
   Włodzimierz Funika, Arkadiusz Janik ............................... 158
RDVIS: A Tool That Visualizes the Causes of Low Locality and Hints Program Optimizations
   Kristof Beyls, Erik H. D’Hollander, Frederik Vandeputte ....... 166
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CacheIn: A Toolset for Comprehensive Cache Inspection</td>
<td>Jie Tao, Wolfgang Karl</td>
<td>174</td>
</tr>
<tr>
<td>Optimization-Oriented Visualization of Cache Access Behavior</td>
<td>Jie Tao, Wolfgang Karl</td>
<td>182</td>
</tr>
<tr>
<td>Collecting and Exploiting Cache-Reuse Metrics</td>
<td>Josef Weidendorfer, Carsten Trinitis</td>
<td>191</td>
</tr>
<tr>
<td>Modelling and Animating Hand Wrinkles</td>
<td>X.S. Yang, Jian J. Zhang</td>
<td>199</td>
</tr>
<tr>
<td>Simulating Wrinkles in Facial Expressions on an Anatomy-Based Face</td>
<td>Yu Zhang, Terence Sim, Chew Lim Tan</td>
<td>207</td>
</tr>
<tr>
<td>A Multiresolutional Approach for Facial Motion Retargetting Using</td>
<td>Kyungha Min, Moon-Ryul Jung</td>
<td>216</td>
</tr>
<tr>
<td>Subdivision Wavelets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New 3D Graphics Rendering Engine Architecture for Direct Tessellation</td>
<td>Adrian Sfarti, Brian A. Barsky, Todd J. Kosloff, Egon Pasztor,</td>
<td>224</td>
</tr>
<tr>
<td>of Spline Surfaces</td>
<td>Alex Kozlowski, Eric Roman, Alex Perelman</td>
<td></td>
</tr>
<tr>
<td>Fast Water Animation Using the Wave Equation with Damping</td>
<td>Y. Nishidate, G.P. Nikishkov</td>
<td>232</td>
</tr>
<tr>
<td>A Comparative Study of Acceleration Techniques for Geometric Visualization</td>
<td>Pascual Castelló, José Francisco Ramos, Miguel Chover</td>
<td>240</td>
</tr>
<tr>
<td>Building Chinese Ancient Architectures in Seconds</td>
<td>Hua Liu, Qing Wang, Wei Hua, Dong Zhou, Hujun Bao</td>
<td>248</td>
</tr>
<tr>
<td>Accelerated 2D Image Processing on GPUs</td>
<td>Bryson R. Payne, Saeid O. Belkasim, G. Scott Owen, Michael C. Weeks,</td>
<td>256</td>
</tr>
<tr>
<td>Ying Zhu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Spherical Parameterization</td>
<td>Arul Asirvatham, Emil Praun, Hugues Hoppe</td>
<td>265</td>
</tr>
</tbody>
</table>
Mesh Smoothing via Adaptive Bilateral Filtering
  Qibin Hou, Li Bai, Yangsheng Wang .......................... 273

Towards a Bayesian Approach to Robust Finding Correspondences in
Multiple View Geometry Environments
  Cristian Canton-Ferrer, Josep R. Casas, Montse Pardàs ........ 281

Managing Deformable Objects in Cluster Rendering
  Thomas Convard, Patrick Bourdot, Jean-Marc Vézien .......... 290

Revolute Quadric Decomposition of Canal Surfaces and Its Applications
  Jinyuan Jia, Ajay Joneja, Kai Tang .......................... 298

Adaptive Surface Modeling Using a Quadtree of Quadratic Finite
Elements
  G. P. Nikishkov .............................................. 306

MC Slicing for Volume Rendering Applications
  A. Benassarou, E. Bittar, N. W. John, L. Lucas ............. 314

Modelling and Sampling Ramified Objects with Substructure-Based
Method
  Weiwei Yin, Marc Jaeger, Jun Teng, Bao-Gang Hu ............. 322

Integration of Multiple Segmentation Based Environment Models
  SeungTaek Ryoo, CheungWoon Jho ............................ 327

On the Impulse Method for Cloth Animation
  Juntao Ye, Robert E. Webber, Irene Gargantini ............... 331

Remeshing Triangle Meshes with Boundaries
  Yong Wu, Yuanjun He, Hongming Cai .......................... 335

SACARI: An Immersive Remote Driving Interface for Autonomous
Vehicles
  Antoine Tarault, Patrick Bourdot, Jean-Marc Vézien .......... 339

A 3D Model Retrieval Method Using 2D Freehand Sketches
  Jiantao Pu, Karthik Ramani ................................. 343

A 3D User Interface for Visualizing Neuron Location in Invertebrate
Ganglia
  Jason A. Pamplin, Ying Zhu, Paul S. Katz,
  Rajshekhar Sunderraman ..................................... 347
### Workshop on “Modelling of Complex Systems by Cellular Automata”

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Dynamics of General Fuzzy Cellular Automata</td>
<td>Angelo B. Mingarelli</td>
<td>351</td>
</tr>
<tr>
<td>A Cellular Automaton SIS Epidemiological Model with Spatially Clustered Recoveries</td>
<td>David Hiebeler</td>
<td>360</td>
</tr>
<tr>
<td>Simulating Market Dynamics with CD++</td>
<td>Qi Liu, Gabriel Wainer</td>
<td>368</td>
</tr>
<tr>
<td>A Model of Virus Spreading Using Cell-DEVS</td>
<td>Hui Shang, Gabriel Wainer</td>
<td>373</td>
</tr>
<tr>
<td>A Cellular Automata Model of Competition in Technology Markets with Network Externalities</td>
<td>Judy Frels, Debra Heisler, James Reggia, Hans-Joachim Schuetze</td>
<td>378</td>
</tr>
<tr>
<td>Self-organizing Dynamics for Optimization</td>
<td>Stefan Boettcher</td>
<td>386</td>
</tr>
<tr>
<td>Constructibility of Signal-Crossing Solutions in von Neumann 29-State Cellular Automata</td>
<td>William R. Buckley, Amar Mukherjee</td>
<td>395</td>
</tr>
<tr>
<td>Evolutionary Discovery of Arbitrary Self-replicating Structures</td>
<td>Zhijian Pan, James Reggia</td>
<td>404</td>
</tr>
<tr>
<td>Modelling Ant Brood Tending Behavior with Cellular Automata</td>
<td>Daniel Merkle, Martin Middendorf, Alexander Scheidler</td>
<td>412</td>
</tr>
<tr>
<td>A Realistic Cellular Automata Model to Simulate Traffic Flow at Urban Roundabouts</td>
<td>Ruili Wang, Mingzhe Liu</td>
<td>420</td>
</tr>
<tr>
<td>Probing the Eddies of Dancing Emergence: Complexity and Abstract Painting</td>
<td>Tara Krause</td>
<td>428</td>
</tr>
</tbody>
</table>

### Workshop on “Wireless and Mobile Systems”

<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced TCP with End-to-End Bandwidth and Loss Differentiation Estimate over Heterogeneous Networks</td>
<td>Le Tuan Anh, Choong Seon Hong</td>
<td>436</td>
</tr>
<tr>
<td>Title</td>
<td>Authors</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Content-Aware Automatic QoS Provisioning for UPnP AV-Based Multimedia Services over Wireless LANs</td>
<td>Yeali S. Sun, Chang-Ching Yan, Meng Chang Chen</td>
<td>444</td>
</tr>
<tr>
<td>Simulation Framework for Wireless Internet Access Networks</td>
<td>Hyoung-Kee Choi, Jitae Shin</td>
<td>453</td>
</tr>
<tr>
<td>Forwarding Scheme Extension for Fast and Secure Handoff in Hierarchical MIPv6</td>
<td>Hoseong Jeon, Jungmuk Lim, Hyunseung Choo, Gyung-Leen Park</td>
<td>468</td>
</tr>
<tr>
<td>Back-Up Chord: Chord Ring Recovery Protocol for P2P File Sharing over MANETs</td>
<td>Hong-Jong Jeong, Dongkyun Kim, Jeomki Song, Byung-yeub Kim, Jeong-Su Park</td>
<td>477</td>
</tr>
<tr>
<td>Practical and Provably-Secure Multicasting over High-Delay Networks</td>
<td>Junghyun Nam, Hyunjue Kim, Seungjoo Kim, Dongho Won, Hyungkyu Yang</td>
<td>493</td>
</tr>
<tr>
<td>A Novel IDS Agent Distributing Protocol for MANETs</td>
<td>Jin Xin, Zhang Yao-Xue, Zhou Yue-Zhi, Wei Yaya</td>
<td>502</td>
</tr>
<tr>
<td>ID-Based Secure Session Key Exchange Scheme to Reduce Registration Delay with AAA in Mobile IP Networks</td>
<td>Kwang Cheol Jeong, Hyunseung Choo, Sang Yong Ha</td>
<td>510</td>
</tr>
<tr>
<td>An Efficient Wireless Resource Allocation Based on a Data Compressor Predictor</td>
<td>Min Zhang, Xiaolong Yang, Hong Jiang</td>
<td>519</td>
</tr>
<tr>
<td>A Seamless Handover Mechanism for IEEE 802.16e Broadband Wireless Access</td>
<td>Kyung-ah Kim, Chong-Kwon Kim, Tongsok Kim</td>
<td>527</td>
</tr>
<tr>
<td>Fault Tolerant Coverage Model for Sensor Networks</td>
<td>Doina Bein, Wolfgang W. Bein, Srilaxmi Malladi</td>
<td>535</td>
</tr>
</tbody>
</table>
Detection Algorithms Based on Chip-Level Processing for DS/CDMA Code Acquisition in Fast Fading Channels
   Seokho Yoon, Jee-Hyong Lee, Sun Yong Kim ......................... 543

Clustering-Based Distributed Precomputation for Quality-of-Service Routing
   Yong Cui, Jianping Wu ............................................. 551

Traffic Grooming Algorithm Using Shortest EDPs Table in WDM Mesh Networks
   Seungsoo Lee, Tae-Jin Lee, Min Young Chung, Hyunseung Choo .... 559

Efficient Indexing of Moving Objects Using Time-Based Partitioning with R-Tree
   Youn Chul Jung, Hee Yong Youn, Ungmo Kim ....................... 568

Publish/Subscribe Systems on Node and Link Error Prone Mobile Environments
   Sangyoon Oh, Sangmi Lee Pallickara, Sunghoon Ko, Jai-Hoon Kim, Geoffrey Fox .............................................. 576

A Power Efficient Routing Protocol in Wireless Sensor Networks
   Hyunsook Kim, Jungpil Ryu, Kijun Han .............................. 585

Applying Mobile Agent to Intrusion Response for Ad Hoc Networks
   Ping Yi, Yiping Zhong, Shiyong Zhang .............................. 593

A Vertical Handoff Decision Process and Algorithm Based on Context Information in CDMA-WLAN Interworking
   Jang-Sub Kim, Min-Young Chung, Dong-Ryeol Shin .................. 601

Workshop on “Dynamic Data Driven Application Systems”

Dynamic Data Driven Applications Systems: New Capabilities for Application Simulations and Measurements
   Frederica Darema ..................................................... 610

Dynamic Data Driven Methodologies for Multiphysics System Modeling and Simulation
   J. Michopoulos, C. Farhat, E. Houstis, P. Tsompanopoulou,
   H. Zhang, T. Gullaud .............................................. 616
Towards Dynamically Adaptive Weather Analysis and Forecasting in LEAD

Beth Plale, Dennis Gannon, Dan Reed, Sara Graves, Kelvin Droegemeier, Bob Wilhelmson, Mohan Ramamurthy ....... 624

Towards a Dynamic Data Driven Application System for Wildfire Simulation

Jan Mandel, Lynn S. Bennethum, Mingshi Chen, Janice L. Coen, Craig C. Douglas, Leopoldo P. Franca, Craig J. Johns, Minjeong Kim, Andrew V. Knyazev, Robert Kremens, Vaibhav Kulkarni, Guan Qin, Anthony Vodacek, Jianjia Wu, Wei Zhao, Adam Zornes ............................................. 632

Multiscale Interpolation, Backward in Time Error Analysis for Data-Driven Contaminant Simulation


Ensemble–Based Data Assimilation for Atmospheric Chemical Transport Models

Adrian Sandu, Emil M. Constantinescu, Wenyuan Liao, Gregory R. Carmichael, Tianfeng Chai, John H. Seinfeld, Dacian Dăescu ................................................................. 648

Towards Dynamic Data-Driven Optimization of Oil Well Placement

Manish Parashar, Vincent Matossian, Wolfgang Bangerth, Hector Klie, Benjamin Rutt, Tahsin Kurc, Umit Catalyurek, Joel Saltz, Mary F. Wheeler ....................................................... 656

High-Fidelity Simulation of Large-Scale Structures

Christoph Hoffmann, Ahmed Sameh, Ananth Grama ............... 664

A Dynamic Data Driven Grid System for Intra-operative Image Guided Neurosurgery

Amit Majumdar, Adam Birnbaum, Dong Ju Choi, Abhishek Trivedi, Simon K. Warfield, Kim Baldridge, Petr Krysl .............................. 672

Structure-Based Integrative Computational and Experimental Approach for the Optimization of Drug Design

Dimitrios Morikis, Christodoulos A. Floudas, John D. Lambris .... 680

Simulation and Visualization of Air Flow Around Bat Wings During Flight

I.V. Pivkin, E. Hueso, R. Weinstein, D.H. Laidlaw, S. Swartz, G.E. Karniadakis ................................................................. 689
Integrating Fire, Structure and Agent Models

A Dynamic, Data-Driven, Decision Support System for Emergency Medical Services
Mark Gaynor, Margo Seltzer, Steve Moulton, Jim Freedman .......... 703

Dynamic Data Driven Coupling of Continuous and Discrete Methods for 3D Tracking
Dimitris Metaxas, Gabriel Tsechpenakis ........................................ 712

Semi-automated Simulation Transformation for DDDAS
David Brogan, Paul Reynolds, Robert Bartholet, Joseph Carnahan, Yannick Loitière ......................................................... 721

The Development of Dependable and Survivable Grids
Andrew Grimshaw, Marty Humphrey, John C. Knight, Anh Nguyen-Tuong, Jonathan Rowanhill, Glenn Wasson, Jim Basney ................................................................. 729

On the Fundamental Tautology of Validating Data-Driven Models and Simulations
John Michopoulos, Sam Lambrakos ............................................. 738

Workshop on “Practical Aspects of High-Level Parallel Programming (PAPP)”

Managing Heterogeneity in a Grid Parallel Haskell
A. Al Zain, P.W. Trinder, H-W. Loidl, G.J. Michaelson ............... 746

An Efficient Equi-semi-join Algorithm for Distributed Architectures
M. Bamha, G. Hains ................................................................. 755

Two Fundamental Concepts in Skeletal Parallel Programming
Anne Benoit, Murray Cole ....................................................... 764

A Formal Framework for Orthogonal Data and Control Parallelism Handling
Sonia Campa ........................................................................... 772

Empirical Parallel Performance Prediction from Semantics-Based Profiling
Norman Scaife, Greg Michaelson, Susumu Horiguchi ............... 781
Dynamic Memory Management in the *Loci* Framework  
*Yang Zhang, Edward A. Luke* ................................. 790

**Workshop on “New Computational Tools for Advancing Atmospheric and Oceanic Sciences”**

On Adaptive Mesh Refinement for Atmospheric Pollution Models  
*Emil M. Constantinescu, Adrian Sandu* ......................... 798

Total Energy Singular Vectors for Atmospheric Chemical Transport Models  
*Wenyuan Liao, Adrian Sandu* .................................. 806

Application of Static Adaptive Grid Techniques for Regional-Urban Multiscale Air Quality Modeling  
*Daewon Byun, Peter Percell, Tanmay Basak* ...................... 814

On the Accuracy of High-Order Finite Elements in Curvilinear Coordinates  
*Stephen J. Thomas, Amik St.-Cyr* ................................ 821

Analysis of Discrete Adjoints for Upwind Numerical Schemes  
*Zheng Liu and Adrian Sandu* ..................................... 829

The Impact of Background Error on Incomplete Observations for 4D-Var Data Assimilation with the FSU GSM  
*I. Michael Navon, Dacian N. Daescu, Zhuo Liu* .................. 837

**2005 International Workshop on Bioinformatics Research and Applications**

Disjoint Segments with Maximum Density  
*Yen Hung Chen, Hsueh-I Lu, Chuan Yi Tang* .................... 845

Wiener Indices of Balanced Binary Trees  
*Sergey Bereg, Hao Wang* .......................................... 851

What Makes the Arc-Preserving Subsequence Problem Hard?  
*Guillaume Blin, Guillaume Fertin, Romeo Rizzi, Stéphane Vialette* 860

An Efficient Dynamic Programming Algorithm and Implementation for RNA Secondary Structure Prediction  
*Guangming Tan, Xinchun Liu, Ninghui Sun* ....................... 869
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Evaluation of Protein Sequence Clustering Tools</td>
<td>Haifeng Liu, Loo-Nin Teow</td>
<td>877</td>
</tr>
<tr>
<td>A Data-Adaptive Approach to cDNA Microarray Image Enhancement</td>
<td>Rastislav Lukac, Konstantinos N. Plataniotis, Bogdan Smolka, Anastasios N. Venetsanopoulos</td>
<td>886</td>
</tr>
<tr>
<td>String Kernels of Imperfect Matches for Off-target Detection in RNA Interference</td>
<td>Shibin Qiu, Terran Lane</td>
<td>894</td>
</tr>
<tr>
<td>A New Kernel Based on High-Scored Pairs of Tri-peptides and Its Application in Prediction of Protein Subcellular Localization</td>
<td>Zhengdeng Lei, Yang Dai</td>
<td>903</td>
</tr>
<tr>
<td>Reconstructing Phylogenetic Trees of Prokaryote Genomes by Randomly Sampling Oligopeptides</td>
<td>Osamu Maruyama, Akiko Matsuda, Satoru Kuhara</td>
<td>911</td>
</tr>
<tr>
<td>Phylogenetic Networks, Trees, and Clusters</td>
<td>Luay Nakhleh, Li-San Wang</td>
<td>919</td>
</tr>
<tr>
<td>SWAT: A New Spliced Alignment Tool Tailored for Handling More Sequencing Errors</td>
<td>Yifeng Li, Hesham H. Ali</td>
<td>927</td>
</tr>
<tr>
<td>Simultaneous Alignment and Structure Prediction of RNAs Are Three Input Sequences Better Than Two?</td>
<td>Beeta Masoumi, Marcel Turcotte</td>
<td>936</td>
</tr>
<tr>
<td>Clustering Using Adaptive Self-organizing Maps (ASOM) and Applications</td>
<td>Yong Wang, Chengyong Yang, Kalai Mathee, Giri Narasimhan</td>
<td>944</td>
</tr>
<tr>
<td>Experimental Analysis of a New Algorithm for Partial Haplotype Completion</td>
<td>Paola Bonizzoni, Gianluca Della Vedova, Riccardo Dondi, Lorenzo Mariani</td>
<td>952</td>
</tr>
<tr>
<td>Improving the Sensitivity and Specificity of Protein Homology Search by Incorporating Predicted Secondary Structures</td>
<td>Bin Ma, Lieyu Wu, Kaizhong Zhang</td>
<td>960</td>
</tr>
<tr>
<td>Profiling and Searching for RNA Pseudoknot Structures in Genomes</td>
<td>Chunmei Liu, Yinglei Song, Russell L. Malmberg, Liming Cai</td>
<td>968</td>
</tr>
</tbody>
</table>
Integrating Text Chunking with Mixture Hidden Markov Models for Effective Biomedical Information Extraction
  Min Song, Il-Yeol Song, Xiaohua Hu, Robert B. Allen .......... 976

k-Recombination Haplotype Inference in Pedigrees
  Francis Y.L. Chin, Qiangfeng Zhang, Hong Shen ............... 985

Improved Tag Set Design and Multiplexing Algorithms for Universal Arrays
  Ion I. Măndoiu, Claudia Prăjescu, Dragoș Trincă ............ 994

A Parallel Implementation for Determining Genomic Distances Under Deletion and Insertion
  Vijaya Smitha Kolli, Hui Liu, Michelle Hong Pan, Yi Pan ..... 1003

Phasing and Missing Data Recovery in Family Trios
  Dumitru Brinza, Jingwu He, Weidong Mao, Alexander Zelikovsky .. 1011

Highly Scalable Algorithms for Robust String Barcoding
  B. DasGupta, K.M. Konwar, I.I. Măndoiu, A.A. Shvartsman .... 1020

Optimal Group Testing Strategies with Interval Queries and Their Application to Splice Site Detection
  Ferdinando Cicalese, Peter Damaschke, Ugo Vaccaro .......... 1029

Virtual Gene: A Gene Selection Algorithm for Sample Classification on Microarray Datasets
  Xian Xu, Aidong Zhang ........................................ 1038

Workshop on “Programming Grids and Metacomputing Systems – PGaMS2005”

Bulk Synchronous Parallel ML: Modular Implementation and Performance Prediction
  Frédéric Loulergue, Frédéric Gava, David Billiet .............. 1046

Fast Expression Templates
  Jochen Härdtlein, Alexander Linke, Christoph Pflaum .......... 1055

Solving Coupled Geoscience Problems on High Performance Computing Platforms
  Dany Kemmler, Panagiotis Adamidis, Wenqing Wang,
  Sebastian Bauer, Olaf Kolditz .................................. 1064
H2O Metacomputing - Jini Lookup and Discovery

Dirk Gorissen, Gunther Stuer, Kurt Vanmechelen,
Jan Broeckhove ................................................. 1072

User Experiences with Nuclear Physics Calculations on a H2O
Metacomputing System and on the BEgrid

P. Hellinckx, K. Vanmechelen, G. Stuer, F. Arickx, J. Broeckhove . 1080

Author Index .................................................. 1089
# Table of Contents – Part I

## Numerical Methods

Computing for Eigenpairs on Globally Convergent Iterative Method for Hermitian Matrices  
*Ran Baik, Karabi Datta, Yoopyo Hong*  
.......................... 1

2D FE Quad Mesh Smoothing via Angle-Based Optimization  
*Hongtao Xu, Timothy S. Newman*  
.............................. 9

Numerical Experiments on the Solution of the Inverse Additive Singular Value Problem  
*G. Flores-Becerra, Victor M. Garcia, Antonio M. Vidal*  
........... 17

Computing Orthogonal Decompositions of Block Tridiagonal or Banded Matrices  
*Wilfried N. Gansterer*  
........................................... 25

Adaptive Model Trust Region Methods for Generalized Eigenvalue Problems  
*P.-A. Absil, C.G. Baker, K.A. Gallivan, A. Sameh*  
 ................... 33

On Stable Integration of Stiff Ordinary Differential Equations with Global Error Control  
*Gennady Yur’evich Kulikov, Sergey Konstantinovich Shindin*  
........... 42

Bifurcation Analysis of Large Equilibrium Systems in MATLAB  
*David S. Bindel, James W. Demmel, Mark J. Friedman, Willy J.F. Govaerts, Yuri A. Kuznetsov*  
.......................... 50

Sliced-Time Computations with Re-scaling for Blowing-Up Solutions to Initial Value Differential Equations  
*Nabil R. Nassif, Dolly Fayyad, Maria Cortas*  
............... 58

Application of the Pseudo-Transient Technique to a Real-World Unsaturated Flow Groundwater Problem  
*Fred T. Tracy, Barbara P. Donnell, Stacy E. Howington, Jeffrey L. Hensley*  
.......................... 66

Optimization of Spherical Harmonic Transform Computations  
*J.A.R. Blais, D.A. Provins, M.A. Soofi*  
.......................... 74
Predictor-Corrector Preconditioned Newton-Krylov Method for Cavity Flow
   Jianwei Ju, Giovanni Lapenta ........................................ 82

Algorithms and Computational Kernels

A High-Order Recursive Quadratic Learning Algorithm
   Qi Zhu, Shaohua Tan, Ying Qiao ........................................ 90

Vectorized Sparse Matrix Multiply for Compressed Row Storage Format

A Multipole Based Treecode Using Spherical Harmonics for Potentials of the Form $r^{-\lambda}$
   Kasthuri Srinivasan, Hemant Mahawar, Vivek Sarin .................. 107

Numerically Stable Real Number Codes Based on Random Matrices
   Zizhong Chen, Jack Dongarra ........................................... 115

On Iterated Numerical Integration
   Shujun Li, Elise de Doncker, Karlis Kaugars .......................... 123

Semi-Lagrangian Implicit-Explicit Two-Time-Level Scheme for Numerical Weather Prediction
   Andrei Bourchtein .......................................................... 131

Occlusion Activity Detection Algorithm Using Kalman Filter for Detecting Occluded Multiple Objects
   Heungkyu Lee, Hanseok Ko ................................................ 139

A New Computer Algorithm Approach to Identification of Continuous-Time Batch Bioreactor Model Parameters
   Suna Ertunc, Bulent Akay, Hale Hapoglu, Mustafa Alpbaz .......... 147

Automated Operation Minimization of Tensor Contraction Expressions in Electronic Structure Calculations
   Albert Hartono, Alexander Sibiryakov, Marcel Nooijen,
   Gerald Baumgartner, David E. Bernholdt, So Hirata,
   Chi-Chung Lam, Russell M. Pitzer, J. Ramanujam,
   P. Sadayappan ............................................................. 155

Regularization and Extrapolation Methods for Infrared Divergent Loop Integrals
   Elise de Doncker, Shujun Li, Yoshimitsu Shimizu, Junpei Fujimoto,
   Fukuko Yuasa ............................................................. 165
Use of a Least Squares Finite Element Lattice Boltzmann Method to Study Fluid Flow and Mass Transfer Processes
Yusong Li, Eugene J. LeBoeuf, P.K. Basu ................................. 172

Nonnumerical Algorithms

On the Empirical Efficiency of the Vertex Contraction Algorithm for Detecting Negative Cost Cycles in Networks
K. Subramani, D. Desovski ............................................. 180

Minimal Load Constrained Vehicle Routing Problems
İmdat Kara, Tolga Bektaş ............................................. 188

Multilevel Static Real-Time Scheduling Algorithms Using Graph Partitioning
Kayhan Erciyes, Zehra Soysert ...................................... 196

A Multi-level Approach for Document Clustering
Suely Oliveira, Sang-Cheol Seok .................................. 204

A Logarithmic Time Method for Two’s Complementation
Jung-Yup Kang, Jean-Luc Gaudiot ................................. 212

Parallel Algorithms

The Symmetric–Toeplitz Linear System Problem in Parallel
Pedro Alonso, Antonio Manuel Vidal .............................. 220

Parallel Resolution with Newton Algorithms of the Inverse Non-symmetric Eigenvalue Problem
Pedro V. Alberti, Victor M. García, Antonio M. Vidal ............. 229

Computational Challenges in Vector Functional Coefficient Autoregressive Models
Ioana Banicescu, Ricolindo L. Cariño, Jane L. Harvill,
John Patrick Lestrade .................................................. 237

Multi-pass Mapping Schemes for Parallel Sparse Matrix Computations
Konrad Malkowski, Padma Raghavan .............................. 245

High-Order Finite Element Methods for Parallel Atmospheric Modeling
Amik St.-Cyr, Stephen J. Thomas ................................. 256
Environments and Libraries

Continuation of Homoclinic Orbits in MATLAB
M. Friedman, W. Govaerts, Yu.A. Kuznetsov, B. Sautois ........... 263

A Numerical Tool for Transmission Lines
Hervé Bolvin, André Chambarel, Philippe Neveux ..................... 271

The COOLFluiD Framework: Design Solutions for High Performance Object Oriented Scientific Computing Software
Andrea Lani, Tiago Quintino, Dries Kimpe, Herman Deconinck,
Stefan Vandewalle, Stefaan Poedts ....................................... 279

A Problem Solving Environment for Image-Based Computational Hemodynamics
Lilit Abrahamyan, Jorrit A. Schaap, Alfons G. Hoekstra,
Denis Shamonin, Frike M.A. Box, Rob J. van der Geest,
Johan H.C. Reiber, Peter M.A. Sloot ...................................... 287

MPL: A Multiprecision MATLAB-Like Environment
Walter Schreppers, Franky Backeljauw, Annie Cuyt .................... 295

Performance and Scalability

Performance and Scalability Analysis of Cray X1 Vectorization and Multistreaming Optimization
Sadaf Alam, Jeffrey Vetter ..................................................... 304

Super-Scalable Algorithms for Computing on 100,000 Processors
Christian Engelmann, Al Geist ................................................. 313

“gRpas”, a Tool for Performance Testing and Analysis
Laurentiu Cucos, Elise de Doncker ........................................... 322

Statistical Methods for Automatic Performance Bottleneck Detection in MPI Based Programs
Michael Kluge, Andreas Knüpfer, Wolfgang E. Nagel .................. 330

Programming Techniques

Source Templates for the Automatic Generation of Adjoint Code Through Static Call Graph Reversal
Uwe Naumann, Jean Utke .................................................... 338
A Case Study in Application Family Development by Automated Component Composition: h-p Adaptive Finite Element Codes

Nasim Mahmood, Yusheng Feng, James C. Browne ......................... 347

Determining Consistent States of Distributed Objects Participating in a Remote Method Call

Magdalena Sławinska, Bogdan Wiszniewski ............................... 355

Storage Formats for Sparse Matrices in Java

Mikel Luján, Anila Usman, Patrick Hardie, T.L. Freeman,
John R. Gurd ........................................................................... 364

Coupled Fusion Simulation Using the Common Component Architecture

Wael R. Elwasif, Donald B. Batchelor, David E. Bernholdt,
Lee A. Berry, Ed F. D’Azevedo, Wayne A. Houlberg, E.F. Jaeger,
James A. Kohl, Shuhui Li ..................................................... 372

Networks and Distributed Algorithms

A Case Study in Distributed Locking Protocol on Linux Clusters

Sang-Jun Hwang, Jaechun No, Sung Soon Park ......................... 380

Implementation of a Cluster Based Routing Protocol for Mobile Networks

Geoffrey Marshall, Kayhan Erciyes ........................................... 388

A Bandwidth Sensitive Distributed Continuous Media File System Using the Fibre Channel Network

Cuneyt Akinlar, Sarit Mukherjee ............................................. 396

A Distributed Spatial Index for Time-Efficient Aggregation Query Processing in Sensor Networks

Soon-Young Park, Hae-Young Bae ............................................ 405

Fast Concurrency Control for Distributed Inverted Files

Mauricio Marín ................................................................. 411

An All-Reduce Operation in Star Networks Using All-to-All Broadcast Communication Pattern

Eunseuk Oh, Hongsik Choi, David Primeaux ............................. 419

Parallel and Distributed Computing

$S^2 F^2 M$ - Statistical System for Forest Fire Management

Germán Bianchini, Ana Cortés, Tomás Margalef, Emilio Luque .... 427
### Grid Computing

- Design and Implementation of Services for a Synthetic Seismogram Calculation Tool on the Grid
  *Choonhan Youn, Tim Kaiser, Cindy Santini, Dogan Seber*  ........................................ 469

- Toward GT3 and OGSI.NET Interoperability: GRAM Support on OGSI.NET
  *James V.S. Watson, Sang-Min Park, Marty Humphrey*  ........................................ 477

- GEDAS: A Data Management System for Data Grid Environments
  *Jaechun No, Hyoungwoo Park*  ............................................................. 485

- SPURport: Grid Portal for Earthquake Engineering Simulations
  *Tomasz Haupt, Anand Kalyanasundaram, Nisreen Ammari, Krishnendu Chandra, Kamakhya Das, Shravan Durvasula*  ........................................ 493

- Extending Existing Campus Trust Relationships to the Grid Through the Integration of Pubcookie and MyProxy
  *Jonathan Martin, Jim Basney, Marty Humphrey*  ........................................ 501

- Generating Parallel Algorithms for Cluster and Grid Computing
  *Ulisses Kendi Hayashida, Kunio Okuda, Jairo Panetta, Siand Wun Song*  ........................................ 509

- Relationship Networks as a Survivable and Adaptive Mechanism for Grid Resource Location
  *Lei Gao, Yongsheng Ding*  ............................................................. 517

- Deployment-Based Security for Grid Applications
  *Isabelle Attali, Denis Caromel, Arnaud Contes*  ........................................ 526
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Resource Selection by Application Benchmarking for Computational Haemodynamics Applications</td>
<td>Alfredo Tirado-Ramos, George Tsouloupas, Marios Dikaiakos, Peter Sloot</td>
<td>534</td>
</tr>
<tr>
<td>Failure Handling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reducing Transaction Abort Rate of Epidemic Algorithm in Replicated Databases</td>
<td>Huaizhong Lin, Zengwei Zheng, Chun Chen</td>
<td>552</td>
</tr>
<tr>
<td>Snap-Stabilizing $k$-Wave Synchronizer</td>
<td>Doina Bein, Ajoy K. Datta, Mehmet H. Karaata, Safaa Zaman</td>
<td>560</td>
</tr>
<tr>
<td>A Service Oriented Implementation of Distributed Status Monitoring and Fault Diagnosis Systems</td>
<td>Lei Wang, Peiyu Li, Zhaohui Wu, Shangjian Chen</td>
<td>568</td>
</tr>
<tr>
<td>Adaptive Fault Monitoring in Fault Tolerant CORBA</td>
<td>Soo Myoung Lee, Hee Yong Youn, We Duke Cho</td>
<td>576</td>
</tr>
<tr>
<td>Optimization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulated Annealing Based-GA Using Injective Contrast Functions for BSS</td>
<td>J.M. Górriz, C.G. Puntonet, J.D. Morales, J.J. delaRosa</td>
<td>585</td>
</tr>
<tr>
<td>A DNA Coding Scheme for Searching Stable Solutions</td>
<td>Intaek Kim, HeSong Lian, Hwan Il Kang</td>
<td>593</td>
</tr>
<tr>
<td>Study on Asymmetric Two-Lane Traffic Model Based on Cellular Automata</td>
<td>Xianchuang Su, Xiaogang Jin, Yong Min, Bo Peng</td>
<td>599</td>
</tr>
<tr>
<td>Simulation of Parasitic Interconnect Capacitance for Present and Future ICs</td>
<td>Grzegorz Tosik, Zbigniew Lisik, Malgorzata Langer, Janusz Wozny</td>
<td>607</td>
</tr>
<tr>
<td>Self-optimization of Large Scale Wildfire Simulations</td>
<td>Jingmei Yang, Huoping Chen, Salim Hariri, Manish Parashar</td>
<td>615</td>
</tr>
</tbody>
</table>
Modeling and Simulation

Description of Turbulent Events Through the Analysis of POD Modes in Numerically Simulated Turbulent Channel Flow
Giancarlo Alfonsi, Leonardo Primavera ........................................ 623

Computational Modeling of Human Head Conductivity
Adnan Salman, Sergei Turovets, Allen Malony, Jeff Eriksen, Don Tucker ................................................................. 631

Modeling of Electromagnetic Waves in Media with Dirac Distribution of Electric Properties
André Chambarel, Hervé Bolvin .................................................. 639

Simulation of Transient Mechanical Wave Propagation in Heterogeneous Soils
Arnaud Mesgouez, Gaëlle Lefeuve-Mesgouez, André Chambarel .... 647

Practical Modelling for Generating Self-similar VBR Video Traffic
Jong-Suk R. Lee, Hae-Duck J. Jeong ........................................... 655

Image Analysis and Processing

A Pattern Search Method for Image Registration
Hong Zhou, Benjamin Ray Seyfarth ............................................. 664

Water Droplet Morphing Combining Rigid Transformation
Lanfen Lin, Shenghui Liao, RuoFeng Tong, JinXiang Dong .......... 671

A Cost-Effective Private-Key Cryptosystem for Color Image Encryption
Rastislav Lukac, Konstantinos N. Plataniotis .............................. 679

On a Generalized Demosaicking Procedure: A Taxonomy of Single-Sensor Imaging Solutions
Rastislav Lukac, Konstantinos N. Plataniotis .............................. 687

Tile Classification Using the CIELAB Color Model
Christos-Nikolaos Anagnostopoulos, Athanassios Koutsonas, Ioannis Anagnostopoulos, Vassily Loumos, Eleftherios Kayafas .... 695

Graphics and Visualization

A Movie Is Worth More Than a Million Data Points
Hans-Peter Bischof, Jonathan Coles .......................................... 703
A Layout Algorithm for Signal Transduction Pathways as Two-Dimensional Drawings with Spline Curves
*Donghoon Lee, Byoung-Hyon Ju, Kyungsook Han* .......................... 711

Interactive Fluid Animation and Its Applications
*Jeongjin Lee, Helen Hong, Yeong Gil Shin* .......................... 719

ATDV: An Image Transforming System
*Paula Farago, Ligia Barros, Gerson Cunha, Luiz Landau, Rosa Maria Costa* .......................... 727

An Adaptive Collision Detection and Resolution for Deformable Objects Using Spherical Implicit Surface
*Sunhwa Jung, Min Hong, Min-Hyung Choi* .......................... 735

**Computation as a Scientific Paradigm**

Automatic Categorization of Traditional Chinese Painting Images with Statistical Gabor Feature and Color Feature
*Xiaohui Guan, Gang Pan, Zhaohui Wu* .......................... 743

Nonlinear Finite Element Analysis of Structures Strengthened with Carbon Fibre Reinforced Polymer: A Comparison Study
*X.S. Yang, J.M. Lees, C.T. Morley* .......................... 751

Machine Efficient Adaptive Image Matching Based on the Nonparametric Transformations
*Boguslaw Cyganek* .......................... 757

Non-gradient, Sequential Algorithm for Simulation of Nascent Polypeptide Folding
*Lech Znamirowski* .......................... 766

**Hybrid Computational Methods**

Time Delay Dynamic Fuzzy Networks for Time Series Prediction
*Yusuf Oysal* .......................... 775

A Hybrid Heuristic Algorithm for the Rectangular Packing Problem
*Defu Zhang, Ansheng Deng, Yan Kang* .......................... 783

Genetically Dynamic Optimization Based Fuzzy Polynomial Neural Networks
*Ho-Sung Park, Sung-Kwun Oh, Witold Pedrycz, Yongkab Kim* .......................... 792
Genetically Optimized Hybrid Fuzzy Neural Networks Based on Simplified Fuzzy Inference Rules and Polynomial Neurons

Sung-Kwun Oh, Byoung-Jun Park, Witold Pedrycz, Tae-Chon Ahn... 798

Modelling and Constraint Hardness Characterisation of the Unique-Path OSPF Weight Setting Problem

Changyong Zhang, Robert Rodosek ................................. 804

Complex Systems

Application of Four-Dimension Assignment Algorithm of Data Association in Distributed Passive-Sensor System

Li Zhou, You He, Xiao-jing Wang ................................. 812

Using Rewriting Techniques in the Simulation of Dynamical Systems: Application to the Modeling of Sperm Crawling

Antoine Spicher, Olivier Michel ................................. 820

Specifying Complex Systems with Bayesian Programming. An Alife Application

Fidel Aznar, Mar Pujol, Ramón Rizo ................................. 828

Optimization Embedded in Simulation on Models Type System Dynamics – Some Case Study

Elżbieta Kasperska, Damian Slota ................................. 837


Gonca Tuncel, Gunhan Mirac Bayhan ................................. 843

Applications

Mesoscopic Simulation for Self-organization in Surface Processes

David J. Horntrop ................................. 852

Computer Simulation of the Anisotropy of Fluorescence in Ring Molecular Systems

Pavel Heřman, Ivan Barvík ................................. 860

The Deflation Accelerated Schwarz Method for CFD

J. Verkaik, C. Vuik, B.D. Paarhuis, A. Tverda ................................. 868
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Numerical Approach to Analysis of Microchannel Cooling Systems</td>
<td>Ewa Raj, Zbigniew Lisik, Małgorzata Langer, Grzegorz Tosik, Janusz Wozny</td>
<td>876</td>
</tr>
<tr>
<td>Simulation of Nonlinear Thermomechanical Waves with an Empirical</td>
<td>Linxiang Wang, Roderick V.N. Melnik</td>
<td>884</td>
</tr>
<tr>
<td>Low Dimensional Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Computational Risk Assessment Model for Breakwaters</td>
<td>Can Elmar Balas</td>
<td>892</td>
</tr>
<tr>
<td>Wavelets and Wavelet Packets Applied to Termite Detection</td>
<td>Juan-José González de-la-Rosa, Carlos García Puntonet, Isidro Lloret Galiana, Juan Manuel Górriz</td>
<td>900</td>
</tr>
<tr>
<td>Algorithms for the Estimation of the Concentrations of Chlorophyll A</td>
<td>Yanning Guan, Shan Guo, Jianguui Liu, Xia Zhang</td>
<td>908</td>
</tr>
<tr>
<td>and Carotenoids in Rice Leaves from Airborne Hyperspectral Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiresolution Reconstruction of Pipe-Shaped Objects from Contours</td>
<td>Kyungha Min, In-Kwon Lee</td>
<td>916</td>
</tr>
<tr>
<td>Biomedical Applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-resolution LOD Volume Rendering in Medicine</td>
<td>Kai Xie, Jie Yang, Yue Min Zhu</td>
<td>925</td>
</tr>
<tr>
<td>Automatic Hepatic Tumor Segmentation Using Statistical Optimal</td>
<td>Seung-Jin Park, Kyung-Sik Seo, Jong-An Park</td>
<td>934</td>
</tr>
<tr>
<td>Threshold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatio-Temporal Patterns in the Depth EEG During the Epileptic</td>
<td>Jung Ae Kim, Sunyoung Cho, Sang Kun Lee, Hyunwoo Nam, Seung Kee Han</td>
<td>941</td>
</tr>
<tr>
<td>Seizure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prediction of Ribosomal Frameshift Signals of User-Defined Models</td>
<td>Yanga Byun, Sanghoon Moon, Kyungsook Han</td>
<td>948</td>
</tr>
<tr>
<td>Effectiveness of Vaccination Strategies for Infectious Diseases</td>
<td>Fumihiko Takeuchi, Kenji Yamamoto</td>
<td>956</td>
</tr>
<tr>
<td>according to Human Contact Networks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Mining and Computation

A Shape Constraints Based Method to Recognize Ship Objects from High Spatial Resolution Remote Sensed Imagery
  Min Wang, Jiancheng Luo, Chenghu Zhou, Dongping Ming  .............. 963

Statistical Inference Method of User Preference on Broadcasting Content
  Sanggil Kang, Jeongyeon Lim, Munchurl Kim  ......................... 971

Density-Based Spatial Outliers Detecting
  Tianqiang Huang, Xiaolin Qin, Chongcheng Chen, Qinmin Wang  ... 979

The Design and Implementation of Extensible Information Services
  Guiyi Wei, Guangming Wang, Yao Zheng, Wei Wang  .................. 987

Approximate B-Spline Surface Based on RBF Neural Networks
  Xumin Liu, Houkuan Huang, Weixiang Xu  ............................. 995

Efficient Parallelization of Spatial Approximation Trees
  Mauricio Marín, Nora Reyes  ........................................... 1003

Education in Computational Science

The Visualization of Linear Algebra Algorithms in Apt Apprentice
  Christopher Andrews, Rodney Cooper, Ghislain Deslongchamps,
  Olivier Spet  .......................................................... 1011

A Visual Interactive Framework for Formal Derivation
  Paul Agron, Leo Bachmair, Frank Nielsen  ......................... 1019

ECVlab: A Web-Based Virtual Laboratory System for Electronic Circuit Simulation
  Ouyang Yang, Dong Yabo, Zhu Miaoliang, Huang Yuewei,
  Mao Song, Mao Yunjie  ............................................... 1027

MTES: Visual Programming Environment for Teaching and Research in Image Processing
  JeongHeon Lee, YoungTak Cho, Hoon Heo, OkSam Chae  ........... 1035

Emerging Trends

Advancing Scientific Computation by Improving Scientific Code Development: Symbolic Execution and Semantic Analysis
  Mark Stewart  .......................................................... 1043
Scale-Free Networks: A Discrete Event Simulation Approach
   Rex K. Kincaid, Natalia Alexandrov ........................................ 1051

Impediments to Future Use of Petaflop Class Computers for Large-Scale
Scientific/Engineering Applications in U.S. Private Industry
   Myron Ginsberg ........................................................................ 1059

The SCore Cluster Enabled OpenMP Environment: Performance
Prospects for Computational Science
   H’sien. J. Wong, Alistair P. Rendell ......................................... 1067

Author Index .............................................................................. 1077
Table of Contents – Part III

Workshop on “Simulation of Multiphysics Multiscale Systems”

Multiscale Finite Element Modeling of the Coupled Nonlinear Dynamics of Magnetostrictive Composite Thin Film
  Debiprosad Roy Mahapatra, Debi Prasad Ghosh, Gopalakrishnan Srinivasan .................................................. 1

Large-Scale Fluctuations of Pressure in Fluid Flow Through Porous Medium with Multiscale Log-Stable Permeability
  Olga Soboleva ................................................................. 9

A Computational Model of Micro-vascular Growth
  Dominik Szczerba, Gábor Székely ........................................... 17

A Dynamic Model for Phase Transformations in 3D Samples of Shape Memory Alloys
  D.R. Mahapatra, R.V.N. Melnik ............................................. 25

3D Finite Element Modeling of Free-Surface Flows with Efficient $k - \epsilon$ Turbulence Model and Non-hydrostatic Pressure
  Célestin Leupi, Mustafa Siddik Altinakar .................................. 33

Cluster Computing for Transient Simulations of the Linear Boltzmann Equation on Irregular Three-Dimensional Domains
  Matthias K. Gobbert, Mark L. Breitenbach, Timothy S. Cale .......... 41

The Use of Conformal Voxels for Consistent Extractions from Multiple Level-Set Fields
  Max O. Bloomfield, David F. Richards, Timothy S. Cale ............... 49

Nonlinear OIFS for a Hybrid Galerkin Atmospheric Model
  Amik St.-Cyr, Stephen J. Thomas .......................................... 57

Flamelet Analysis of Turbulent Combustion
  R.J.M. Bastiaans, S.M. Martin, H. Pitsch, J.A. van Oijen,
  L.P.H. de Goey .............................................................. 64

Entropic Lattice Boltzmann Method on Non-uniform Grids
  C. Shyam Sunder, V. Babu .................................................. 72
A Data-Driven Multi-field Analysis of Nanocomposites for Hydrogen Storage  
*John Michopoulos, Nick Tran, Sam Lambrakos* .......................... 80

Plug and Play Approach to Validation of Particle-Based Algorithms  
*Giovanni Lapenta, Stefano Markidis* ........................................ 88

Multiscale Angiogenesis Modeling  
*Shuyu Sun, Mary F. Wheeler, Mandri Obeyesekere, Charles Patrick Jr* ........................................ 96

The Simulation of a PEMFC with an Interdigitated Flow Field Design  
*S.M. Guo* ........................................................................ 104

Multiscale Modelling of Bubbly Systems Using Wavelet-Based Mesh Adaptation  
*Tom Liu, Phil Schwarz* ........................................................ 112

Computational Study on the Effect of Turbulence Intensity and Pulse Frequency in Soot Concentration in an Acetylene Diffusion Flame  
*Fernando Lopez-Parra, Ali Turan* ........................................... 120

Application Benefits of Advanced Equation-Based Multiphysics Modeling  
*Lars Langemyr, Nils Malm* .................................................... 129

Large Eddy Simulation of Spanwise Rotating Turbulent Channel and Duct Flows by a Finite Volume Code at Low Reynolds Numbers  
*Kursad Melih Guleren, Ali Turan* ........................................... 130

Modelling Dynamics of Genetic Networks as a Multiscale Process  
*Xilin Wei, Roderick V.N. Melnik, Gabriel Moreno-Hagelsieb* ........ 134

Mathematical Model of Environmental Pollution by Motorcar in an Urban Area  
*Valeriy Perminov* ............................................................... 139

The Monte Carlo and Molecular Dynamics Simulation of Gas-Surface Interaction  
*Sergey Borisov, Oleg Sazhin, Olesya Gerasimova* ....................... 143

**Workshop on “Grid Computing Security and Resource Management”**

GIVS: Integrity Validation for Grid Security  
*Giuliano Casale, Stefano Zanero* ........................................... 147
On the Impact of Reservations from the Grid on Planning-Based Resource Management

Felix Heine, Matthias Hovestadt, Odej Kao, Achim Streit ........ 155

Genius: Peer-to-Peer Location-Aware Gossip Using Network Coordinates

Ning Ning, Dongsheng Wang, Yongquan Ma, Jinfeng Hu, Jing Sun, Chongnan Gao, Weiming Zheng ......................... 163

DCP-Grid, a Framework for Conversational Distributed Transactions on Grid Environments

Manuel Salvadores, Pilar Herrero, María S. Pérez, Víctor Robles ... 171


Hyunjoon Jung, Hyuck Han, Hyungsoo Jung, Heon Y. Yeom .................. 179

GridSec: Trusted Grid Computing with Security Binding and Self-defense Against Network Worms and DDoS Attacks

Kai Hwang, Yu-Kwong Kwok, Shanshan Song, Min Cai Yu Chen, Ying Chen, Runfang Zhou, Xiaosong Lou ......................... 187

Design and Implementation of DAG-Based Co-scheduling of RPC in the Grid

JiHyun Choi, DongWoo Lee, R.S. Ramakrishna, Michael Thomas, Harvey Newman .................................................. 196

Performance Analysis of Interconnection Networks for Multi-cluster Systems

Bahman Javadi, J.H. Abawajy, Mohammad K. Akbari ..................... 205

Autonomic Job Scheduling Policy for Grid Computing

J.H. Abawajy .......................................................... 213

A New Trust Framework for Resource-Sharing in the Grid Environment

Hualiang Hu, Deren Chen, Changqin Huang ............................. 221

An Intrusion-Resilient Authorization and Authentication Framework for Grid Computing Infrastructure

Yuanbo Guo, Jianfeng Ma, Yadi Wang ................................. 229
2nd International Workshop on Active and Programmable Grids Architectures and Components (APGAC2005)

An Active Platform as Middleware for Services and Communities Discovery
   Sylvain Martin, Guy Leduc ........................................... 237

p2pCM: A Structured Peer-to-Peer Grid Component Model
   Carles Pairot, Pedro García, Rubén Mondéjar,
   Antonio F. Gómez Skarmeta ................................... 246

Resource Partitioning Algorithms in a Programmable Service Grid Architecture
   Pieter Thysebaert, Bruno Volckaert, Marc De Leenheer,
   Filip De Turck, Bart Dhoedt, Piet Demeester ................. 250

Triggering Network Services Through Context-Tagged Flows
   Roel Ocampo, Alex Galis, Chris Todd ............................ 259

Dependable Execution of Workflow Activities on a Virtual Private Grid Middleware
   A. Machì, F. Collura, S. Lombardo ............................... 267

Cost Model and Adaptive Scheme for Publish/Subscribe Systems on Mobile Grid Environments
   Sangyoon Oh, Sangmi Lee Pallickara, Sunghoon Ko, Jai-Hoon Kim,
   Geoffrey Fox .......................................................... 275

Near-Optimal Algorithm for Self-configuration of Ad-hoc Wireless Networks
   Sung-Eok Jeon, Chuanyi Ji ........................................... 279

International Workshop on ComputationalNano-Science and Technology

The Applications of Meshfree Particle Methods at the Nanoscale
   Weixuan Yang, Shaoping Xiao ...................................... 284

Numerical Simulation of Self-heating InGaP/GaAs Heterojunction Bipolar Transistors
   Yiming Li, Kuen-Yu Huang ......................................... 292

Adaptive Finite Volume Simulation of Electrical Characteristics of Organic Light Emitting Diodes
   Yiming Li, Pu Chen ................................................... 300
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characterization of a Solid State DNA Nanopore Sequencer Using</td>
<td>Jerry Jenkins, Debasis Sengupta, Shankar Sundaram</td>
<td>309</td>
</tr>
<tr>
<td>Multi-scale (Nano-to-Device) Modeling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison of Nonlinear Conjugate-Gradient Methods for Computing</td>
<td>Stanimire Tomov, Julien Langou, Andrew Canning, Lin-Wang Wang, Jack</td>
<td>317</td>
</tr>
<tr>
<td>the Electronic Properties of Nanostructure Architectures</td>
<td>Dongarra</td>
<td></td>
</tr>
<tr>
<td>A Grid-Based Bridging Domain Multiple-Scale Method for</td>
<td>Shaowen Wang, Shaoping Xiao, Jun Ni</td>
<td>326</td>
</tr>
<tr>
<td>Computational Nanotechnology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Cascades Analysis in Nanoprocesses with Distributed Database</td>
<td>Dariusz Mrozek, Bożena Makłysik, Jacek Fraczek, Paweł Kasprowski</td>
<td>334</td>
</tr>
<tr>
<td>System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop on “Collaborative and Cooperative Environments”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual States and Transitions, Virtual Sessions and Collaboration</td>
<td>Dimitri Bourilkov</td>
<td>342</td>
</tr>
<tr>
<td>A Secure Peer-to-Peer Group Collaboration Scheme for Healthcare</td>
<td>Byong-In Lim, Kee-Hyun Choi, Dong-Ryeol Shin</td>
<td>346</td>
</tr>
<tr>
<td>System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tools for Collaborative VR Application Development</td>
<td>Adrian Haffegee, Ronan Jamieson, Christoph Anthes, Vassil Alexandrov</td>
<td>350</td>
</tr>
<tr>
<td>Multicast Application Sharing Tool – Facilitating the eMinerals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual Organisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Collaborative P-GRADE Grid Portal</td>
<td>Gareth J. Lewis, S. Mehmood Hasan, Vassil N. Alexandrov, Martin T.</td>
<td>359</td>
</tr>
<tr>
<td>Dove, Mark Calleja</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An Approach for Collaboration and Annotation in Video Post-production</td>
<td>Karsten Morisse, Thomas Sempf</td>
<td>375</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A Toolbox Supporting Collaboration in Networked Virtual Environments
  *Christoph Anthes, Jens Volkert* ........................................... 383

A Peer-to-Peer Approach to Content Dissemination and Search in Collaborative Networks
  *Ismail Bhana, David Johnson* ............................................... 391

**Workshop on “Autonomic Distributed Data and Storage Systems Management – ADSM2005”**

TH-VSS: An Asymmetric Storage Virtualization System for the SAN Environment
  *Da Xiao, Jiwu Shu, Wei Xue, Weimin Zheng* .............................. 399

Design and Implementation of the Home-Based Cooperative Cache for PVFS
  *In-Chul Hwang, Hanjo Jung, Seung-Ryoul Maeng, Jung-Wan Cho* .... 407

Improving the Data Placement Algorithm of Randomization in SAN
  *Nianmin Yao, Jiwu Shu, Weimin Zheng* .................................. 415

Safety of a Server-Based Version Vector Protocol Implementing Session Guarantees
  *Jerzy Brzeziński, Cezary Sobaniec, Dariusz Wawrzyniak* ............. 423

Scalable Hybrid Search on Distributed Databases
  *Jungkee Kim, Geoffrey Fox* ................................................. 431

Storage QoS Control with Adaptive I/O Deadline Assignment and Slack-Stealing EDF
  *Young Jin Nam, Chanik Park* ............................................... 439

High Reliability Replication Technique for Web-Server Cluster Systems
  *M. Mat Deris, J.H. Abawajy, M. Zarina, R. Mamat* ...................... 447

An Efficient Replicated Data Management Approach for Peer-to-Peer Systems
  *J.H. Abawajy* ........................................................................ 457

**Workshop on “GeoComputation”**

Explore Disease Mapping of Hepatitis B Using Geostatistical Analysis Techniques
  *Shaobo Zhong, Yong Xue, Chunxiang Cao, Wuchun Cao,
    Xiaowen Li, Jianping Guo, Liqun Fang* .................................... 464
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>eMicrob: A Grid-Based Spatial Epidemiology Application</td>
<td>Jianping Guo, Yong Xue, Chunxiang Cao, Wuchun Cao, Xiaowen Li, Jianqin Wang, Liqun Fang</td>
<td>472</td>
</tr>
<tr>
<td>Self-organizing Maps as Substitutes for K-Means Clustering</td>
<td>Fernando Baçao, Victor Lobo, Marco Painho</td>
<td>476</td>
</tr>
<tr>
<td>Key Technologies Research on Building a Cluster-Based Parallel</td>
<td>Guoqing Li, Dingsheng Liu</td>
<td>484</td>
</tr>
<tr>
<td>Computing System for Remote Sensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grid Research on Desktop Type Software for Spatial Information</td>
<td>Guoqing Li, Dingsheng Liu, Yi Sun</td>
<td>492</td>
</tr>
<tr>
<td>Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Java-Based Grid Service Spread and Implementation in Remote Sensing</td>
<td>Yanguang Wang, Yong Xue, Jianqin Wang, Chaolin Wu, Yincui Hu, Ying Luo, Shaobo Zhong, Jiakui Tang, Guoyin Cai</td>
<td>496</td>
</tr>
<tr>
<td>Applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern Computational Techniques for Environmental Data;</td>
<td>Costas Varotsos</td>
<td>504</td>
</tr>
<tr>
<td>Application to the Global Ozone Layer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PK+ Tree: An Improved Spatial Index Structure of PK Tree</td>
<td>Xiaolin Wang, Yingwei Luo, Lishan Yu, Zuoqun Xu</td>
<td>511</td>
</tr>
<tr>
<td>Design Hierarchical Component-Based WebGIS</td>
<td>Yingwei Luo, Xiaolin Wang, Guomin Xiong, Zuoqun Xu</td>
<td>515</td>
</tr>
<tr>
<td>Workshop on “Computational Economics and Finance”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive Smoothing Neural Networks in Foreign Exchange Rate</td>
<td>Lean Yu, Shouyang Wang, Kin Keung Lai</td>
<td>523</td>
</tr>
<tr>
<td>Forecasting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit Scoring via PCALWM</td>
<td>Jianping Li, Weizuan Xu, Yong Shi</td>
<td>531</td>
</tr>
<tr>
<td>Optimization of Bandwidth Allocation in Communication Networks with</td>
<td>Jun Wu, Wuyi Yue, Shouyang Wang</td>
<td>539</td>
</tr>
<tr>
<td>Penalty Cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Improving Clustering Analysis for Credit Card Accounts Classification  
*Yi Peng, Gang Kou, Yong Shi, Zhengxin Chen* .......................... 548

A Fuzzy Index Tracking Portfolio Selection Model  
*Yong Fang, Shou-Yang Wang* ........................................ 554

Application of Activity-Based Costing in a Manufacturing Company:  
A Comparison with Traditional Costing  
*Gonca Tuncel, Derya Eren Akyol, Gunhan Mirac Bayhan, Utku Koker* .................................................. 562

Welfare for Economy Under Awareness  
*Ken Horie, Takashi Matsuhisa* ........................................ 570

On-line Multi-attributes Procurement Combinatorial Auctions Bidding Strategies  
*Jian Chen, He Huang* .................................................. 578

**Workshop on “Computer Algebra Systems and Applications, CASA 2005”**

An Algebraic Method for Analyzing Open-Loop Dynamic Systems  
*W. Zhou, D.J. Jeffrey, G.J. Reid* ...................................... 586

Pointwise and Uniform Power Series Convergence  
*C. D’Apice, G. Gargiulo, R. Manzo* .................................. 594

Development of SyNRAC  
*Hitoshi Yanami, Hirokazu Anai* ..................................... 602

A LiE Subroutine for Computing Prehomogeneous Spaces Associated with Complex Nilpotent Orbits  
*Steven Glenn Jackson, Alfred G. Noël* ................................ 611

Computing Valuation Popov Forms  
*Mark Giesbrecht, George Labahn, Yang Zhang* ..................... 619

Modeling and Simulation of High-Speed Machining Processes Based on Matlab/Simulink  
*Rodolfo E. Haber, J.R. Alique, S. Ros, R.H. Haber* ............. 627

Remote Access to a Symbolic Computation System for Algebraic Topology: A Client-Server Approach  
*Mirian Andrés, Vico Pascual, Ana Romero, Julio Rubio* ............ 635
Symbolic Calculation of the Generalized Inertia Matrix of Robots with a Large Number of Joints
_ Ramutis Bansevičius, Algimantas Čepulkauskas, Regina Kulvietienė, Genadijus Kulvietis_ .......................... 643

Revisiting Some Control Schemes for Chaotic Synchronization with Mathematica
_ Andrés Iglesias, Akemi Galvez_ .................................. 651

Three Brick Method of the Partial Fraction Decomposition of Some Type of Rational Expression
_ Damian Slota, Roman Witula_ .................................. 659

Non Binary Codes and “Mathematica” Calculations: Reed-Solomon Codes Over GF (2^n)
_ Igor Gashkov_ .......................................................... 663

Stokes-Flow Problem Solved Using Maple
_ Pratibha, D.J. Jeffrey_ .................................................. 667

**Workshop on “Intelligent Agents in Computing Systems” – The Agent Days 2005 in Atlanta**

Grounding a Descriptive Language in Cognitive Agents Using Consensus Methods
_ Agnieszka Pieczynska-Kuchtiak_ .................................. 671

Fault-Tolerant and Scalable Protocols for Replicated Services in Mobile Agent Systems
_ JinHo Ahn, Sung-Gi Min_ ........................................... 679

Multi-agent System Architectures for Wireless Sensor Networks
_ Richard Tynan, G.M.P. O’Hare, David Marsh, Donal O’Kane_ .... 687

ACCESS: An Agent Based Architecture for the Rapid Prototyping of Location Aware Services
_ Robin Strahan, Gregory O’Hare, Conor Muldoon, Donnacha Phelan, Rem Collier_ .......................... 695

Immune-Based Optimization of Predicting Neural Networks
_ Aleksander Byrski, Marek Kisiel-Dorohinicki_ .................... 703

Algorithm of Behavior Evaluation in Multi-agent System
_ Gabriel Rojek, Renata Cięciwa, Krzysztof Cetnarowicz_ ............ 711
   Sebastian Rodriguez, Vincent Hilaire, Abder Koukam

The Dynamics of Computing Agent Systems
   M. Smolka, P. Uhruski, R. Schaefer, M. Grochowski

Workshop on “Parallel Monte Carlo Algorithms for Diverse Applications in a Distributed Setting”

A Superconvergent Monte Carlo Method for Multiple Integrals on the Grid
   Sofiya Ivanovska, Emanouil Atanassov, Aneta Karaivanova

A Sparse Parallel Hybrid Monte Carlo Algorithm for Matrix Computations
   Simon Branford, Christian Weihrauch, Vassil Alexandrov

Parallel Hybrid Monte Carlo Algorithms for Matrix Computations
   V. Alexandrov, E. Atanassov, I. Dimov, S. Branford, A. Thandavan,
   C. Weihrauch

An Efficient Monte Carlo Approach for Solving Linear Problems in Biomolecular Electrostatics
   Charles Fleming, Michael Mascagni, Nikolai Simonov

Finding the Smallest Eigenvalue by the Inverse Monte Carlo Method with Refinement
   Vassil Alexandrov, Aneta Karaivanova

On the Scrambled Sobol Sequence
   Hongmei Chi, Peter Beerli, Deidre W. Evans, Michael Mascagni

Poster Session I

Reconstruction Algorithm of Signals from Special Samples in Spline Spaces
   Jun Xian, Degao Li

Fast In-place Integer Radix Sorting
   Fouad El-Aker

Dimension Reduction for Clustering Time Series Using Global Characteristics
   Xiaozhe Wang, Kate A. Smith, Rob J. Hyndman
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Algorithm for Estimation of Selecting Core</td>
<td>Youngjin Ahn, Moonseong Kim, Young-Cheol Bang, Hyunseung Choo</td>
<td>796</td>
</tr>
<tr>
<td>A Hybrid Mining Model Based on Neural Network and Kernel Smoothing Technique</td>
<td>Defu Zhang, Qingshan Jiang, Xin Li</td>
<td>801</td>
</tr>
<tr>
<td>An Efficient User-Oriented Clustering of Web Search Results</td>
<td>Keke Cai, Jiajun Bu, Chun Chen</td>
<td>806</td>
</tr>
<tr>
<td>Artificial Immune System for Medical Data Classification</td>
<td>Wiesław Wajs, Piotr Wais, Mariusz Święcicki, Hubert Wojtowicz</td>
<td>810</td>
</tr>
<tr>
<td>EFox: A Scalable Method for Extracting Frequent Subtrees</td>
<td>Juryon Paik, Dong Ryeol Shin, Ungmo Kim</td>
<td>813</td>
</tr>
<tr>
<td>An Efficient Real-Time Frequent Pattern Mining Technique Using Diff-Sets</td>
<td>Rajanish Dass, Ambuj Mahanti</td>
<td>818</td>
</tr>
<tr>
<td>Improved Fully Automatic Liver Segmentation Using Histogram Tail Threshold Algorithms</td>
<td>Kyung-Sik Seo</td>
<td>822</td>
</tr>
<tr>
<td>Directly Rasterizing Straight Line by Calculating the Intersection Point</td>
<td>Hua Zhang, Changqian Zhu, Qiang Zhao, Hao Shen</td>
<td>826</td>
</tr>
<tr>
<td>PrefixUnion: Mining Traversal Patterns Efficiently in Virtual Environments</td>
<td>Shao-Shin Hung, Ting-Chia Kuo, Damon Shing-Min Liu</td>
<td>830</td>
</tr>
<tr>
<td>Efficient Interactive Pre-integrated Volume Rendering</td>
<td>Heewon Kye, Helen Hong, Yeong Gil Shin</td>
<td>834</td>
</tr>
<tr>
<td>Ncvtk: A Program for Visualizing Planetary Data</td>
<td>Alexander Pletzer, Remik Ziemlinski, Jared Cohen</td>
<td>838</td>
</tr>
<tr>
<td>Efficient Multimodality Volume Fusion Using Graphics Hardware</td>
<td>Helen Hong, Juhee Bae, Heewon Kye, Yeong Gil Shin</td>
<td>842</td>
</tr>
<tr>
<td>Gl Continuity Triangular Patches Interpolation Based on PN Triangles</td>
<td>Zhihong Mao, Lizhuang Ma, Mingxi Zhao</td>
<td>846</td>
</tr>
<tr>
<td>Estimating 3D Object Coordinates from Markerless Scenes</td>
<td>Ki Woon Kwon, Sung Wook Baik, Seong-Whan Lee</td>
<td>850</td>
</tr>
<tr>
<td>Title</td>
<td>Authors</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Stochastic Fluid Model Analysis for Campus Grid Storage Service</td>
<td>Xiaofeng Shi, Huifeng Xue, Zhiqun Deng</td>
<td>854</td>
</tr>
<tr>
<td>Grid Computing Environment Using Ontology Based Service</td>
<td>Ana Marilza Pernas, Mario Dantas</td>
<td>858</td>
</tr>
<tr>
<td>Distributed Object-Oriented Wargame Simulation on Access Grid</td>
<td>Joong-Ho Lim, Tae-Dong Lee, Chang-Sung Jeong</td>
<td>862</td>
</tr>
<tr>
<td>RTI Execution Environment Using Open Grid Service Architecture</td>
<td>Ki-Young Choi, Tae-Dong Lee, Chang-Sung Jeong</td>
<td>866</td>
</tr>
<tr>
<td>Heterogeneous Grid Computing: Issues and Early Benchmarks</td>
<td>Eamonn Kenny, Brian Coglan, George Tsouloupas, Marios Dikaiakos, John Walsh, Stephen Childs, David O’Callaghan, Geoff Quigley</td>
<td>870</td>
</tr>
<tr>
<td>GRAMS: Grid Resource Analysis and Monitoring System</td>
<td>Hongning Dai, Minglu Li, Linpeng Huang, Yi Wang, Feng Hong</td>
<td>875</td>
</tr>
<tr>
<td>Transaction Oriented Computing (Hive Computing) Using GRAM-Soft</td>
<td>Kaviraju Ramanna Dyapur, Kiran Kumar Patnaik</td>
<td>879</td>
</tr>
<tr>
<td>Data-Parallel Method for Georeferencing of MODIS Level 1B Data Using Grid Computing</td>
<td>Yincui Hu, Yong Xue, Jiakui Tang, Shaobo Zhong, Guoyin Cai</td>
<td>883</td>
</tr>
<tr>
<td>An Engineering Computation Oriented Grid Project: Design and Implementation</td>
<td>Xianqing Wang, Qinhui Zeng, Dingwu Feng, Changqin Huang</td>
<td>887</td>
</tr>
<tr>
<td>Iterative and Parallel Algorithm Design from High Level Language Traces</td>
<td>Daniel E. Cooke, J. Nelson Rushton</td>
<td>891</td>
</tr>
<tr>
<td>An Application of the Adomian Decomposition Method for Inverse Stefan Problem with Neumann’s Boundary Condition</td>
<td>Radoslaw Grzymkowski, Damian Skota</td>
<td>895</td>
</tr>
<tr>
<td>Group Homotopy Algorithm with a Parameterized Newton Iteration for Symmetric Eigen Problems</td>
<td>Ran Baik, Karabi Datta, Yoopyo Hong</td>
<td>899</td>
</tr>
<tr>
<td>Numerical Simulation of Three-Dimensional Vertically Aligned Quantum Dot Array</td>
<td>Weichung Wang, Tsung-Min Hwang</td>
<td>908</td>
</tr>
</tbody>
</table>
### Semi-systolic Architecture for Modular Multiplication over GF($2^m$)

*Hyun-Sung Kim, Il-Soo Jeon*

912

### Poster Session II

**Meta Services: Abstract a Workflow in Computational Grid Environments**

*Sangkeon Lee, Jaeyoung Choi*

916

**CEGA: A Workflow PSE for Computational Applications**

*Yoonhee Kim*

920

**A Meta-heuristic Applied for a Topologic Pickup and Delivery Problem with Time Windows Constraints**

*Jesús Fabián López Pérez*

924

**Three Classifiers for Acute Abdominal Pain Diagnosis – Comparative Study**

*Míchal Wozniak*

929

**Grid-Technology for Chemical Reactions Calculation**

*Gabriel Balint-Kurti, Alexander Bogdanov, Ashot Gevorkyan, Yuriy Gorbachev, Tigran Hakobyan, Gunnar Nyman, Irina Shoshmina, Elena Stankova*

933

**A Fair Bulk Data Transmission Protocol in Grid Environments**

*Fanjun Su, Xuezeng Pan, Yong lv, Lingdi Ping*

937

**A Neural Network Model for Classification of Facial Expressions Based on Dimension Model**

*Young-Suk Shin*

941

**A Method for Local Tuning of Fuzzy Membership Functions**

*Ahmet Çinar*

945

**QoS-Enabled Service Discovery Using Agent Platform**

*Kee-Hyun Choi, Ho-Jin Shin, Dong-Ryeol Shin*

950

**A Quick Generation Method of Sequence Pair for Block Placement**

*Mingxu Huo, Koubao Ding*

954

**A Space-Efficient Algorithm for Pre-distributing Pairwise Keys in Sensor Networks**

*Taeckyun Kim, Sangjin Kim, Heekuck Oh*

958
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Architecture for Lightweight Service Discovery Protocol in MANET</td>
<td>Byong-In Lim, Kee-Hyun Choi, Dong-Ryeol Shin</td>
<td>963</td>
</tr>
<tr>
<td>An Enhanced Location Management Scheme for Hierarchical Mobile IPv6 Networks</td>
<td>Myung-Kyu Yi</td>
<td>967</td>
</tr>
<tr>
<td>A Parallel Algorithm for Computing Shortest Paths in Large-Scale Networks</td>
<td>Guozhen Tan, Xiaohui Ping</td>
<td>975</td>
</tr>
<tr>
<td>Exploiting Parallelization for RNA Secondary Structure Prediction in Cluster</td>
<td>Guangming Tan, Shengzhong Feng, Ninghui Sun</td>
<td>979</td>
</tr>
<tr>
<td>Improving Performance of Distributed Haskell in Mosix Clusters</td>
<td>Lori Collins, Murray Gross, P.A. Whitlock</td>
<td>983</td>
</tr>
<tr>
<td>Investigation of Cache Coherence Strategies in a Mobile Client/Server Environment</td>
<td>C.D.M. Berkenbrock, M.A.R. Dantas</td>
<td>987</td>
</tr>
<tr>
<td>Parallel Files Distribution</td>
<td>Laurentiu Cucos, Elise de Doncker</td>
<td>991</td>
</tr>
<tr>
<td>Dynamic Dominant Index Set for Mobile Peer-to-Peer Networks</td>
<td>Wei Shi, Shanping Li, Gang Peng, Xin Lin</td>
<td>995</td>
</tr>
<tr>
<td>Task Mapping Algorithm for Heterogeneous Computing System Allowing High Throughput and Load Balancing</td>
<td>Sung Chune Choi, Hee Yong Youn</td>
<td>1000</td>
</tr>
<tr>
<td>An Approach for Eye Detection Using Parallel Genetic Algorithm</td>
<td>A. Cagatay Talay</td>
<td>1004</td>
</tr>
<tr>
<td>Graph Representation of Nested Software Structure</td>
<td>Leszek Kotulski</td>
<td>1008</td>
</tr>
<tr>
<td>Transaction Routing in Real-Time Shared Disks Clusters</td>
<td>Kyungoh Ohn, Sangho Lee, Haengrae Cho</td>
<td>1012</td>
</tr>
</tbody>
</table>
Implementation of a Distributed Data Mining System
   *Ju Cho, Sung Baik, Jerzy Bala* ............................................. 1016

Hierarchical Infrastructure for Large-Scale Distributed Privacy-Preserving Data Mining
   *Jinlong Wang, Congfu Xu, Huifeng Shen, Yunhe Pan* ............... 1020

**Poster Session III**

Prediction of Protein Interactions by the Domain and Sub-cellular Localization Information
   *Jinsun Hong, Kyungsook Han* .............................................. 1024

Online Prediction of Interacting Proteins with a User-Specified Protein
   *Byungkyu Park, Kyungsook Han* ........................................ 1028

An Abstract Model for Service Compositions Based on Agents
   *Jinkui Xie, Linpeng Huang* ................................................. 1032

An Approach of Nonlinear Model Multi-step-ahead Predictive Control Based on SVM
   *Weimin Zhong, Daoying Pi, Youxian Sun* ............................. 1036

Simulation Embedded in Optimization – A Key for the Effective Learning Process in (about) Complex, Dynamical Systems
   *Elżbieta Kasperska, Elwira Mateja-Losa* ............................... 1040

Analysis of the Chaotic Phenomena in Securities Business of China
   *Chong Fu, Su-Ju Li, Hai Yu, Wei-Yong Zhu* ........................... 1044

Pulsating Flow and Platelet Aggregation
   *Xin-She Yang* ................................................................. 1048

Context Adaptive Self-configuration System
   *Seunghwa Lee, Eunseok Lee* .............................................. 1052

   *Karina Cantillo, Rodolfo E. Haber, Angel Alique, Ramón Galán* ... 1056

Architecture Modeling and Simulation for Supporting Multimedia Services in Broadband Wireless Networks
   *Do-Hyeon Kim, Beongku An* .............................................. 1060
Visualization for Genetic Evolution of Target Movement in Battle Fields
S. Baik, J. Bala, A. Hadjarian, P. Pachowicz, J. Cho, S. Moon .... 1064

Comfortable Driver Behavior Modeling for Car Following of Pervasive Computing Environment
Yanfei Liu, Zhaohui Wu .................................................. 1068

A Courseware Development Methodology for Establishing Practice-Based Network Course
Jahwan Koo, Seongjin Ahn ................................................. 1072

Solving Anisotropic Transport Equation on Misaligned Grids
J. Chen, S.C. Jardin, H.R. Strauss ........................................... 1076

The Design of Fuzzy Controller by Means of Evolutionary Computing and Neurofuzzy Networks
Sung-Kwun Oh, Seok-Beom Roh ............................................. 1080

Boundary Effects in Stokes’ Problem with Melting
Arup Mukherjee, John G. Stevens ........................................... 1084

A Software Debugging Method Based on Pairwise Testing
Liang Shi, Changhai Nie, Baowen Xu ..................................... 1088

Heuristic Algorithm for Anycast Flow Assignment in Connection-Oriented Networks
Krzysztof Walkowiak ........................................................... 1092

Isotropic Vector Matrix Grid and Face-Centered Cubic Lattice Data Structures
J.F. Nystrom, Carryn Bellomo .................................................. 1096

Design of Evolutionally Optimized Rule-Based Fuzzy Neural Networks Based on Fuzzy Relation and Evolutionary Optimization
Byoung-Jun Park, Sung-Kwun Oh, Witold Pedrycz, Hyun-Ki Kim .. 1100

Uniformly Convergent Computational Technique for Singularly Perturbed Self-adjoint Mixed Boundary-Value Problems
Rajesh K. Bawa, S. Natesan .................................................. 1104

Fuzzy System Analysis of Beach Litter Components
Can Elmar Balas ............................................................... 1108

Exotic Option Prices Simulated by Monte Carlo Method on Market Driven by Diffusion with Poisson Jumps and Stochastic Volatility
Magdalena Broszkiewicz, Aleksander Janicki ......................... 1112
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computational Complexity and Distributed Execution in Water Quality Management</td>
<td>Maria Chtepen, Filip Claeys, Bart Dhoedt, Peter Vanrolleghem, Piet Demeester</td>
<td>1116</td>
</tr>
<tr>
<td>Traffic Grooming Based on Shortest Path in Optical WDM Mesh Networks</td>
<td>Yeo-Ran Yoon, Tae-Jin Lee, Min Young Chung, Hyunseung Choo</td>
<td>1120</td>
</tr>
<tr>
<td>Prompt Detection of Changepoint in the Operation of Networked Systems</td>
<td>Hyunsoo Kim, Hee Yong Youn</td>
<td>1125</td>
</tr>
<tr>
<td>Author Index</td>
<td></td>
<td>1131</td>
</tr>
</tbody>
</table>