

Proceedings of the International Conference on Computational Science (ICCS 2012)

Procedia Computer Science Volume 9

**Omaha, Nebraska, USA
4-6 June 2012**

Volume 1 of 3

Editors:

**Hesham Ali
Yong Shi
Deepak Khazanchi
Michael Lees**

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

**ISBN: 978-1-62748-816-7
ISSN: 1877-0509**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Volume 1

Empowering Science through Computing, Preface for ICCS 2012	1
<i>Hesham Ali, Yong Shi, Deepak Khazanchi, Michael Lees, G. Dick Van Albada, Jack Dongarra, Peter M. A. Sloot</i>	
Block-asynchronous Multigrid Smoothers for GPU-accelerated Systems	7
<i>Hartwig Anzt, Stanimire Tomov, Mark Gates, Jack Dongarra, Vincent Heuveline</i>	
A Class of Communication-avoiding Algorithms for Solving General Dense Linear Systems on CPU/GPU Parallel Machines	17
<i>Marc Baboulin, Simplice Donfack, Jack Dongarra, Laura Grigori, Adrien Rémy, Stanimire Tomov</i>	
Mining Concepts from Texts	27
<i>João Ventura, Joaquim Silva</i>	
One-sided Dense Matrix Factorizations on a Multicore with Multiple GPU Accelerators	37
<i>Ichitaro Yamazaki, Stanimire Tomov, Jack Dongarra</i>	
Heterogeneous Computational Model for Landform Attributes Representation on Multicore and Multi-GPU Systems	47
<i>Murilo Boratto, Pedro Alonso, Carla Ramiro, Marcos Barreto</i>	
The Sliced COO Format for Sparse Matrix-Vector Multiplication on CUDA-enabled GPUs	57
<i>Hoang-Vu Dang, Bertil Schmidt</i>	
Parallel LU Factorization on GPU Cluster	67
<i>E. D'Azevedo, J. C. Hill</i>	
An MPI-CUDA Implementation and Optimization for Parallel Sparse Equations and Least Squares (LSQR)	76
<i>He Huang, Liqiang Wang, En-Jui Lee, Po Chen</i>	
Frequent Items Mining Acceleration Exploiting Fast Parallel Sorting on the GPU	86
<i>Ugo Erra, Bernardino Frola</i>	
A Fast Implementation and Performance Analysis of Collisionless N-body Code Based on GPGPU	96
<i>Yohei Miki, Daisuke Takahashi, Masao Mori</i>	
Multi-GPU Implementation of LU Factorization	106
<i>Yulu Jia, Piotr Luszczek, Jack Dongarra</i>	
Headphone-based Spatial Sound with a GPU Accelerator	116
<i>Jose A. Belloch, Miguel Ferrer, Alberto Gonzalez, F. J. Martinez-Zaldivar, Antonio M. Vidal</i>	
Effective Implementation of DGEMM on Modern Multicore CPU	126
<i>Pawel Gepner, Victor Gamayunov, David L. Fraser</i>	
A VMD Plugin for NAMD Simulations on Amazon EC2	136
<i>Adam K. L. Wong, Andrzej M. Goscinski</i>	
Parallelism Reduction Based on Pattern Substitution in Dataflow Oriented Programming Languages	146
<i>Loïc Cudennec, Renaud Sirdey</i>	
Data Life Cycle Management and Analytics Code Execution Strategies for the Breath Gas Analysis Domain	156
<i>Ibrahim Elsayed, Thomas Ludescher, Alexander Wöhrer, Thomas Feilhauer, Peter Brezany</i>	
ADFT: An Adaptive Framework for Fault Tolerance on Large Scale Systems using Application Malleability	166
<i>Cijo George, Sathish S. Vadhiyar</i>	
Composite Scheduling Strategies in Distributed Computing with Non-dedicated Resources	176
<i>Victor Toporkov, Alexey Tselishchev, Dmitry Yemelyanov, Alexander Bobchenkov</i>	
An Evaluation of Molecular Dynamics Performance on the Hybrid Cray XK6 Supercomputer	186
<i>W. Michael Brown, Trung D. Nguyen, Miguel Fuentes-Cabrera, Jason D. Fowlkes, Philip D. Rack, Mark Berger, Arthur S. Bland</i>	
Evaluation of the Stretch S6 Hybrid Reconfigurable Embedded CPU Architecture for Power-Efficient Scientific Computing	196
<i>Thang Viet Huynh, Manfred Mücke, Wilfried N. Gansterer</i>	
Elastic Infrastructure for Interactive Data Farming Experiments	206
<i>Dariusz Krol, Bartosz Kryza, Michal Wrzeszcz, Lukasz Dutka, Jacek Kitowski</i>	
High Performance Dense Linear System Solver with Resilience to Multiple Soft Errors	216
<i>Peng Du, Piotr Luszczek, Jack Dongarra</i>	
Dimensioning Scientific Computing Systems to Improve Performance of Map-Reduce based Applications	226
<i>Gabriel G. Castañé, Alberto Núñez, Rosa Filgueira, Jesús Carretero</i>	

International Conference on Computational Science, ICCS 2012 A Theory of Data Movement in Parallel Computations	236
<i>Victor Eijkhout</i>	
BSP vs MapReduce	246
<i>Matthew Felice Pace</i>	
Efficient Shared-array Accesses in Ab Initio Nuclear Structure Calculations on Multicore Architectures	256
<i>Avinash Srinivasa, Masha Sosonkina, Pieter Maris, James P. Vary</i>	
A Hybrid Simulation Model to Test Behaviour Designs in an Emergency Evacuation	266
<i>Pablo Cristian Tissera, A. Marcela Printista, Emilio Luque</i>	
Parallel Multi-level Genetic Ensemble for Numerical Weather Prediction Enhancement	276
<i>Hisham Ihsaish, Ana Cortés, Miquel A. Senar</i>	
Physically Accurate Granular Flow Simulation	286
<i>S. Oliveira, D. E. Stewart</i>	
HPC Simulations of Information Propagation Over Social Networks	292
<i>Jiangming Jin, Stephen John Turner, Bu-Sung Lee, Jianlong Zhong, Bingsheng He</i>	
Post-frontal Combustion Heat Modeling in DEVS-fire for Coupled Atmosphere-fire Simulation	302
<i>Haidong Xue, Xiaolin Hu, Nathan Dahl, Ming Xue</i>	
Genetic Algorithm Characterization for the Quality Assessment of Forest Fire Spread Prediction	312
<i>Andrés Cencerrado, Ana Cortés, Tomàs Margalef</i>	
Comparative Performance of Modified Simulated Annealing with Simple Simulated Annealing for Graph Coloring Problem	321
<i>Anindya Jyoti Pal, Biman Ray, Nordin Zakaria, Samar Sen Sarma</i>	
Proximity Load Balancing for Distributed Cluster-based Individual-oriented Fish School Simulations	328
<i>Roberto Solar, Remo Suppi, Emilio Luque</i>	
Real-time Simulation of Dynamic Vehicle Models using a High-performance Reconfigurable Platform	338
<i>Madhu Monga, Manoj Karkee, Song Sun, Lakshmi Kirantondehal, Brian Steward, Atulkelkar, Joseph Zambreno</i>	
Theoretical Study on the 3D Aromaticity in Cationic X₄⁴⁺ (X=O, S, Se, and Te) Clusters	348
<i>Xian X. Chi</i>	
Fastsg: A Fast Routines Library for Sparse Grids	354
<i>Alin Murarasu, Gerrit Buse, Dirk Pflüger, Josef Weidendorfer, Arndt Bode</i>	
A Fast GIS-tool to Compute the Maximum Solar Energy on Very Large Terrains	364
<i>S. Tabik, A. Villegas, E. L. Zapata, L. F. Romero</i>	
Measuring Gene Expression Noise in Early Drosophila Embryos: Nucleus-to-Nucleus Variability	373
<i>Nina E. Golyandina, David M. Holloway, Francisco J. P. Lopes, Alexander V. Spirov, Ekaterina N. Spirova, Konstantin D. Usevich</i>	
Reusing Random Walks in Monte Carlo Methods for Linear Systems	383
<i>Hao Ji, Yaohang Li</i>	
Adaptive Interpolation of Multidimensional Scaling	393
<i>Seung-Hee Bae, Judy Qiu, Geoffrey Fox</i>	
HASCH: High Performance Automatic Spell Checker for Portuguese Texts from the Web	403
<i>G. Andrade, F. Teixeira, C. R. Xavier, R. S. Oliveira, L. C. Rocha, A. G. Evsukoff</i>	
Effective Utilization of Tensor Symmetry in Operation Optimization of Tensor Contraction Expressions	412
<i>Pai-Wei Lai, Huaijian Zhang, Samyam Rajbhandari, Edward Valeev, Karol Kowalski, P. Sadayappan</i>	
A Numerical Method for Handling Boundary and Transmission Conditions in Some Linear Partial Differential Equations	422
<i>Franck Assous, Michael Michaeli</i>	
Tracking Epileptogenesis Progressions with Layered Fuzzy K-means and K-medoid Clustering	432
<i>Rory Lewis, Chad A. Mello, Andrew M. White</i>	
Literate Program Execution for Reproducible Research and Executable Papers	439
<i>Sébastien Li-Thiao-Té</i>	
Improving the Automatic Derivation of Choreography-Conforming Web Services Systems	449
<i>Pablo Rabanal, Ismael Rodríguez, Jose A. Mateo, Gregorio Díaz</i>	
GRB_WAPI, a RESTful Framework for Grid Portals	459
<i>Valerio De Luca, Italo Epicoco, Daniele Lezzi, Giovanni Aloisio</i>	
A High-level Petri Net Based Approach for Modeling and Composition of Web Services	469
<i>Sofiane Chemaa, Faycal Bachtarzi, Allaoua Chaoui</i>	
Agent Based Priority Heuristic for Job Scheduling on Computational Grids	479
<i>Syed Nasir Mehmood Shah, M. Nordin B. Zakaria, Ahmad Kamil Bin Mahmood, Anindya Jyoti Pal, Nazleen Haron</i>	

Fragment Molecular Orbital Method Adaptations for Heterogeneous Computing Platforms	489
<i>Sai Kiran Talamudupula, Masha Sosonkina, Alexander Gaenko, Michael W. Schmidt</i>	
Optimizing the Trade-offs Between Cost and Performance in Scientific Computing	498
<i>Alberto Núñez, César Andrés, Mercedes G. Merayo</i>	
Effectiveness of Hybrid Workflow Systems for Computational Science	508
<i>Beth Plale, Eran Chinthaka Withana, Chathura Herath, Kavitha Chandrasekar, Yuan Luo</i>	
Comparative Analysis of Software Repository Metrics in BioPerl, BioJava and BioRuby	518
<i>M. Rahmani, D. Bastola, L. Najjar</i>	
Learning Programming at the Computational Thinking Level via Digital Game-Play	522
<i>Cağın Kazımoglu, Mary Kiernan, Liz Bacon, Lachlan Mackinnon</i>	
Development of a Database Course for Bioinformatics	532
<i>Zhengxin Chen</i>	
The Human Microbiome Project: An Opportunity to Engage Undergraduates in Research	540
<i>Anne G. Rosenwald, Gaurav S. Arora, Ramana Madupu, Jennifer Roecklein-Carfield, Janet S. Russell</i>	
Motifs and Motif Generalization in Chinese Word Networks	550
<i>Jianyu Li, Feng Xiao, Jie Zhou, Zhanxin Yang</i>	
A Fast Algorithm to Find All-Pairs Shortest Paths in Complex Networks	557
<i>Wei Peng, Xiaofeng Hu, Feng Zhao, Jinshu Su</i>	
Characterizing the Structure of Affiliation Networks	567
<i>Dajie Liu, Norbert Blenn, Piet Van Mieghem</i>	
Similarity Graph Neighborhoods for Enhanced Supervised Classification	577
<i>Anirban Chatterjee, Padma Raghavan</i>	
Function-preserving Filters for Sampling in Biological Networks	587
<i>Kathryn Dempsey, Sanjukta Bhowmick, Hesham Ali</i>	
A Distributed Multiscale Computation of a Tightly Coupled Model Using the Multiscale Modeling Language	596
<i>Joris Borgdorff, Carles Bona-Casas, Mariusz Mamonski, Krzysztof Kurowski, Tomasz Piontek, Bartosz Bosak, Katarzyna Rycerz, Eryk Ciepiela, Tomasz Gubala, Daniel Harezlak, Marian Bubak, Eric Lorenz, Alfons G. Hoekstra</i>	
Multiscale Modeling Framework for Lung Airways Inflammation	606
<i>Ramana M. Pidaparti, Kittisak Koombua, Kevin R. Ward</i>	
Multiphysics Modeling and Simulation of Fluid-structure Interaction Applied to Biological Problems	615
<i>Felix Mihai, Inja Youn, Padmanabhan Seshaiyer</i>	
Coulomb Few-Body Systems in the Framework of a Set of Coupled Integral-Differential Equations: Application to e^+e^- and $\bar{p} + (e^+e^-)$	624
<i>Renat A. Sultanov, Dennis Guster</i>	
Monte Carlo Simulation to Investigate the Cascade Transition of a Permuted Polyelectrolyte Chain	634
<i>Sahin Uyaver</i>	
Multiscale Quantum Simulation of Resistance Switching in Amorphous Carbon	641
<i>G. N. Shumkin, F. Zipoli, A. M. Popov, A. Curioni</i>	
A Conditionally Stable Scheme for a Transient Flow of a Non-Newtonian Fluid Saturating a Porous Medium	651
<i>M. F. El-Amin, Amgad Salama, Shuyu Sun</i>	
An Equation-Type Approach for the Numerical Solution of the Partial Differential Equations Governing Transport Phenomena in Porous Media	661
<i>Shuyu Sun, Amgad Salama, M. F. El-Amin</i>	
Time Integration Techniques for Richards Equation	670
<i>Victor Ginting</i>	

Volume 2

A Mathematical Model for Intracellular HIV-1 Gag Protein Transport and its Parallel Numerical Simulations	679
<i>Jiangguo Liu, Roberto Munoz-Alicea, Tingwen Huang, Simon Tavener, Chaoping Chen</i>	
An Efficient Two-grid Method for a Two-phase Mixed-domain Model of Polymer Exchange Membrane Fuel Cell	689
<i>Mingyan He, Ziping Huang, Cheng Wang, Pengtao Sun</i>	
Slope Stability Assessment using Stochastic Rainfall Simulation	699
<i>Joshua A. White, Dashi I. Singham</i>	
Multiple Markov Chains Monte Carlo Approach for Flow Forecasting in Porous Media	707
<i>V. Ginting, F. Pereira, A. Rahumanthan</i>	

Towards a Navier Stokes-Darcy Upscaling Based on Permeability Tensor Computation	717
<i>M. Lieb, T. Neckel, H.-J. Bungartz, S. Sun</i>	
A Mass Conservation Algorithm For Adaptive Unrefinement Meshes Used By Finite Element Methods	727
<i>Hung V. Nguyen, Jing-Ru C. Cheng, Charlie R. Berger, Gaurav Savant</i>	
Nanoscale Analysis of Plasticity and Fracture of the Sheet Metal Structures	737
<i>A. Schmidt</i>	
A Simple NOVCA: Near Optimal Vertex Cover Algorithm	747
<i>Sanjaya Gajurel, Roger Bielefeld</i>	
Improved Algorithms for the K Overlapping Maximum Convex Sum Problem	754
<i>Mohammed Thaher, Tadao Takaoka</i>	
Knowledge-Based Response Correction and Adaptive Design Specifications for Microwave Design Optimization	764
<i>Slawomir Koziel, Stanislav Ogurtsov, Leifur Leifsson</i>	
Simulation and Performance Study of Large Scale Computer Cluster Configuration: Combined Multi-level Approach	774
<i>Grigory Rechistov, Alexander Ivanov, Pavel Shishpor, Vladimir Pentkovski</i>	
Modelling of A Pulsating Heat Pipe and Startup Asymptotics	784
<i>Xin-She Yang, Tao Luan</i>	
On Modelling, Simulating and Verifying a Decentralized Mission Control Algorithm for a Fleet of Collaborative UAVs	792
<i>Pu Gao, Hong P. Liu, David P. Gluch</i>	
An Algorithm for Excluding Redundant Assessments in a Multiattribute Utility Problem	802
<i>Yerkin G. Abdildin, Ali E. Abbas</i>	
An Optimized A-MSDU Frame Aggregation with Subframe Retransmission in IEEE 802.11n Wireless Networks	812
<i>Anwar Saif, Mohamed Othman, Shamala K. Subramaniam, Nor Asila Wati Abdul Hamid</i>	
Numerical Optimization and Experimental Validation of a Low Speed Wind Tunnel Contraction	822
<i>Leifur Leifsson, Slawomir Koziel, Fannar Andrason, Kristjan Magnusson, Armann Gylfason</i>	
Scaling Properties of Multi-Fidelity Shape Optimization Algorithms	832
<i>Slawomir Koziel, Leifur Leifsson</i>	
Low-Fidelity Model Mesh Density and the Performance of Variable-Resolution Shape Optimization Algorithms	842
<i>Leifur Leifsson, Slawomir Koziel, Stanislav Ogurtsov</i>	
Computational Optimization, Modelling and Simulation: Smart Algorithms and Better Models	852
<i>Xin-She Yang, Slawomir Koziel, Leifur Leifsson</i>	
Epirur Cattle: A Spatially Explicit Agent-based Simulator of Beef Cattle Movements	857
<i>Hong Liu, Phillip Schumm, Anton Lyubinin, Caterina Scoglio</i>	
TECA: A Parallel Toolkit for Extreme Climate Analysis	866
<i>Prabhat, Oliver Rübél, Surendra Byna, Kesheng Wu, Fuyu Li, Michael Wehner, Wes Bethel</i>	
Practical Application of Parallel Coordinates for Climate Model Analysis	877
<i>Chad A. Steed, Galen Shipman, Peter Thornton, Daniel Ricciuto, David Erickson, Marcia Branstetter</i>	
Sub-daily Statistical Downscaling of Meteorological Variables Using Neural Networks	887
<i>Jitendra Kumar, Bjørn-Gustaf J. Brooks, Peter E. Thornton, Michael C. Dietze</i>	
Climate Classifications: The Value of Unsupervised Clustering	897
<i>Jakob Zscheischler, Miguel D. Mahecha, Stefan Harmeling</i>	
Probabilistic Change Detection Framework for Analyzing Settlement Dynamics Using Very High-resolution Satellite Imagery	907
<i>Ranga R. Vatsavai, Jordan Graesser</i>	
Visualizing Climate Variability with Time-Dependent Probability Density Functions, Detecting It Using Information Theory	917
<i>J. Walter Larson</i>	
hp-HGS Strategy for Inverse 3D DC Resistivity Logging Measurement Simulations	927
<i>Ewa Gajda-Zagórska, Maciej Paszyński, Robert Schaefer, David Pardo, Victor Calo</i>	
Detecting Earthquakes around Salton Sea Following the 2010 Mw7.2 El Mayor-Cucapah Earthquake Using GPU Parallel Computing	937
<i>Xiaofeng Meng, Xiao Yu, Zhigang Peng, Bo Hong</i>	
A New Parallel 3D Front Propagation Algorithm for Fast Simulation of Geological Folds	947
<i>Tor Gillberg, Mohammed Sourouri, Xing Cai</i>	
A Performance Study of an Anelastic Wave Propagation Code Using Auto-tuned Stencil Computations	956
<i>Matthias Christen, Olaf Schenk</i>	

High Performance Parallelization of COMPSYN on a Cluster of Multicore Processors with GPUs	966
<i>Ferdinando Alessi, Annalisa Massini, Roberto Basili</i>	
Hands-on Performance Tuning of 3D Finite Difference Earthquake Simulation on GPU Fermi Chipset	976
<i>Jun Zhou, Didem Unat, Dong Ju Choi, Clark C. Guest, Yifeng Cui</i>	
Coupling a Basin Modeling and a Seismic Code using MOAB	986
<i>Mi Yan, Kirk Jordan, Dinesh Kaushik, Michael Perrone, Vipin Sachdeva, Timothy J. Tautges, John Magerlein</i>	
Integrating a Scalable and Efficient Semi-lagrangian Multi-tracer Transport Scheme in HOMME	994
<i>Christoph Erath, Peter H. Lauritzen, Jose H. Garcia, Henry M. Tufo</i>	
Fourth Order Transport Model on Yin-Yang Grid by Multi-moment Constrained Finite Volume Scheme	1004
<i>Xingliang Li, Xueshun Shen, Xindong Peng, Feng Xiao, Zhaorong Zhuang, Chungang Chen</i>	
Characterizing the Elements of Earth's Radiative Budget: Applying Uncertainty Quantification to the CESM	1014
<i>R. Archibald, M. Chakoumakos, T. Zhuang</i>	
An Adjoint Based Implementation of the Parareal Algorithm	1021
<i>Vishwas Rao, Adrian Sandu</i>	
GPU Acceleration of a Cloud Resolving Model using CUDA	1030
<i>Hong Zhang, Jose Garcia</i>	
A Second-order Diagonally-Implicit-Explicit Multi-Stage Integration Method	1039
<i>Hong Zhang, Adrian Sandu</i>	
Information Theoretic Metrics to Characterize Observations in Variational Data Assimilation	1047
<i>K. Singh, A. Sandu, M. Jardak, M. Lee, K. Bowman</i>	
Towards Improving Numerical Weather Predictions by Evolutionary Computing Techniques	1056
<i>Hisham Ihshaish, Ana Cortés, Miquel A. Senar</i>	
An Efficient Implementation of the Ensemble Kalman Filter Based on Iterative Sherman Morrison Formula	1064
<i>Elias D. Niño, Adrian Sandu, Jeffrey L. Anderson</i>	
A New Application of Dynamic Data Driven System in the Talbot-Ogden Model for Groundwater Infiltration	1073
<i>Han Yu, Craig C. Douglas, Fred L. Ogden</i>	
An Introduction to a Porous Shape Memory Alloy Dynamic Data Driven Application System	1081
<i>Craig C. Douglas, Yalchin Efendiev, Peter Popov, Victor M. Calo</i>	
A DDDAS Framework for Volcanic Ash Propagation and Hazard Analysis	1090
<i>A. Patra, M. Bursik, J. Dehn, M. Jones, M. Pavolonis, E. B. Pitman, T. Singh, P. Singla, P. Webley</i>	
Assimilation of Perimeter Data and Coupling with Fuel Moisture in a Wildland Fire–Atmosphere DDDAS	1100
<i>Jan Mandel, Jonathan D. Beezley, Adam K. Kochanski, Volodymyr Y. Kondratenko, Minjeong Kim</i>	
Coupling Wind Dynamics into a DDDAS Forest Fire Propagation Prediction System	1110
<i>Carlos Brun, Tomàs Artés, Tomàs Margalef, Ana Cortés</i>	
Agent-based Trust Management and Prediction using D3-FRT	1119
<i>Olufunmilola Onolaja, Rami Bahsoon, Georgios Theodoropoulos</i>	
Polynomial Chaos Quadrature-based Minimum Variance Approach for Source Parameters Estimation	1129
<i>R. Madankan, P. Singla, A. Patra, M. Bursik, J. Dehn, M. Jones, M. Pavolonis, B. Pitman, T. Singh, P. Webley</i>	
A Programming Model for Spatio-temporal Data Streaming Applications	1139
<i>Shigeru Imai, Carlos A. Varela</i>	
Toward a Computational Steering Framework for Large-Scale Composite Structures Based on Continually and Dynamically Injected Sensor Data	1149
<i>Y. Bazilevs, A. L. Marsden, F. Lanza Di Scalea, A. Majumdar, M. Tatineni</i>	
Adaptive Optical Sensing in an Object Tracking DDDAS	1159
<i>Anthony Vodacek, John P. Kerekes, Matthew J. Hoffman</i>	
A Dynamic Data-Driven Simulation Approach for Preventing Service Level Agreement Violations in Cloud Federation	1167
<i>Funmilade Faniyi, Rami Bahsoon, Georgios Theodoropoulos</i>	
Applying DDDAS Principles to Command, Control and Mission Planning for UAV Swarms	1177
<i>Gregory R. Madey, M. Brian Blake, Christian Poellabauer, Hongsheng Lu, R. Ryan McCune, Yi Wei</i>	
Quantifying Uncertainty for Coherent Structures	1187
<i>S. Ravela</i>	
Improving System Predictability and Performance via Hardware Accelerated Data Structures	1197
<i>Chetan Kumar Ng, Sudhanshu Vyas, Jonathan A. Shidal, Ronk. Cytron, Christopher D. Gill, Joseph Zambreno, Phillip H. Jones</i>	

Dynamic Data Driven Methods for Self-aware Aerospace Vehicles	1206
<i>D. Allaire, G. Biro, J. Chambers, O. Ghattas, D. Kordonowy, K. Willcox</i>	
Sequential Static-Dynamic Hedging for Long-term Derivatives	1211
<i>Tim Leung</i>	
A Comprehensive Look at the Predictive Information in Japanese Candlestick	1219
<i>Haibin Xie, Xiujuan Zhao, Shouyang Wang</i>	
The Analysis of Peasant Household's Credit Behavior	1228
<i>Gang Lv, Bulei Yu, Zhangqi Chen, Zongfang Zhou, Yong Shi</i>	
Regularized Multiple Criteria Linear Programming via Linear Programming	1234
<i>Zhiquan Qi, Yingjie Tian, Yong Shi</i>	
Knowledge-based Support Vector Machine Classifiers via Nearest Points	1240
<i>Xuchan Ju, Yingjie Tian</i>	
Entity Disambiguation with Textual and Connection Information	1249
<i>Lingfeng Niu, Jianmin Wu, Yong Shi</i>	
Quality Credit Evaluation based on TOPSIS: Evidence from Air-conditioning Market in China	1256
<i>Xiaoqian Zhu, Fei Wang, Changzhi Liang, Jianping Li, Xiaolei Sun</i>	
A New Application of the Support Vector Regression on the Construction of Financial Conditions Index to CPI Prediction	1263
<i>Ye Wang, Bo Wang, Xinyang Zhang</i>	
ACIX Model with Interval Dummy Variables and Its Application in Forecasting Interval-valued Crude Oil Prices	1273
<i>Wei Yang, Ai Han, Kuo Cai, Shouyang Wang</i>	
Multicriteria Decision Making Approach for Cluster Validation	1283
<i>Yi Peng, Yong Zhang, Gang Kou, Jun Li, Yong Shi</i>	
Impact of US Financial Crisis on Different Countries: Based on the Method of Functional Analysis of Variance	1292
<i>Wen Long, Nan Li, Huiwen Wang, Siwei Cheng</i>	
Cluster Analysis on City Real Estate Market of China: Based on a New Integrated Method for Time Series Clustering	1299
<i>Kun Guo, Jue Wang, Gushan Shi, Xuehui Cao</i>	
Parallel Genetic Algorithms for Stock Market Trading Rules	1306
<i>Janko Straßburg, Christian González-Martel, Vassil Alexandrov</i>	
Domain Knowledge Based Personalized Recommendation Model and Its Application in Cross-selling	1314
<i>Lingling Zhang, Caifeng Hu, Quan Chen, Yibing Chen, Yong Shi</i>	
Credit Risk Evaluation Modeling Using Evolutionary Linear SVM Classifiers and Sliding Window Approach	1324
<i>Paulius Danenas, Gintautas Garsva</i>	
Initial Pattern Library Algorithm for Human Action Recognition	1334
<i>H. S. Li, B. H. Xu</i>	
Online Social Network Evolving Model Based on Damping Factor	1338
<i>Guoyong Cai, Ruili Wang, Baohua Qiang</i>	

Volume 3

Free-riding Analysis Via Dynamic Game with Incomplete Information	1345
<i>Guo-Yong Cai, Guo-Bin Liu, Gui-Min Huang</i>	
Fibonacci Ring Overlay Networks with Distributed Chunk Storage for P2P VoD Streaming	1354
<i>Pingshan Liu, Guimin Huang, Jiefeng Cheng, Shengzhong Feng, Jianping Fan</i>	
Reachability Analysis of Concurrent Boolean Programs with Symbolic Counter Abstraction	1363
<i>Junyan Qian, Min Li, Lingzhong Zhao</i>	
A Modified Clustering Method Based on Self-Organizing Maps and Its Applications	1371
<i>Le Yang, Zhongbin Ouyang, Yong Shi</i>	
Design and Evaluation of a High Performance Distributed Expert System (HPDES) for Aerospace Ground Verification System	1380
<i>Yang Gao, Ying Liu, Cheng Wang, Xiaojun Li, Guoyu Ou</i>	
Enhancing Mentoring Between Alumni and Students via Smart Alumni System	1390
<i>Hongmei Chi, Edward L. Jones, Lakshmi P. Grandham</i>	
A Social Network Model Exhibiting Tunable Overlapping Community Structure	1400
<i>Dajie Liu, Norbert Blenn, Piet Van Mieghem</i>	
Analysis of Multifractals in Game Behaviors	1410
<i>Jae-Won Jung, Ki-Ho Chang, Young-Jean Choi, Kyungsik Kim</i>	

VizResearch: Linking the Knowledge of People and the People with Knowledge	1416
<i>Sarah Masud, Monjura Afrin, Farhana Murtaza Choudhury, Syed Ishtiaque Ahmed</i>	
Polar Hermeneutics: A Multi-faceted Decision Mechanism	1426
<i>David L. Sallach, Michael J. North, W. A. Rivera</i>	
Petri Nets for Detecting a 3D Deadlock Problem in Hp-adaptive Finite Element Simulations	1434
<i>Anna Paszynska, Maciej Paszynski, Arkadiusz Szymczak, David Pardo</i>	
3D hp-Adaptive Finite Element Simulations of a Magic-T Electromagnetic Waveguide Structure	1444
<i>I. Gomez-Revuelto, L. E. García-Castillo, S. Llorente-Romano, D. Pardo</i>	
Graph Grammar-Based Multi-Frontal Parallel Direct Solver for Two-Dimensional Isogeometric Analysis	1454
<i>Krzysztof Kuznik, Maciej Paszynski, Victor Calo</i>	
Simulation Optimization for Healthcare Emergency Departments	1464
<i>Eduardo Cabrera, Manel Taboada, Ma Luisa Iglesias, Francisco Epelde, Emilio Luque</i>	
On Round-off Error for Adaptive Finite Element Methods	1474
<i>J. Alvarez-Aramberri, D. Pardo, Maciej Paszynski, Nathan Collier, Lisandro Dalcin, Victor M. Calo</i>	
An Agent-particle Model for Taxis-based Aggregation; Emergence and Detection of Structures	1484
<i>Jean Marie Dembele, Christophe Cambier</i>	
Agent-based Algorithm for Spatial Distribution of Objects	1494
<i>Nathan Collier, Marcin Sieniek</i>	
Vehicle Platoon Control with Multi-configuration Ability	1503
<i>Madeleine El-Zaher, Baudouin Dafflon, Franck Gechter, Jean-Michel Contet</i>	
Hybrid OpenMP/MPI Anisotropic Mesh Smoothing	1513
<i>G. J. Gorman, J. Southern, P. E. Farrell, M. D. Piggott, G. Rokos, P. H. J. Kelly</i>	
Dynamic Linear Solver Selection for Transient Simulations Using Multi-label Classifiers	1523
<i>Paul R. Eller, Jing-Ru C. Cheng, Robert S. Maier</i>	
Multi-agent Environment for Modelling and Analysing Market Strategies	1533
<i>Pawel Kolarz, Jan Marszalek, Jaroslaw Kozlak, Malgorzata Zabinska</i>	
OntoPHC: An Ontology Applied For Primary Health Care	1543
<i>Eduardo C. Moraes, Kellyton Brito, Silvio Meira</i>	
Integer Programming Applied to Rule Based Systems	1553
<i>Juan Felix Avila Herrera</i>	
Modeling the Semantics of Contextual and Content-specific Research Metadata using Ontology Languages: Issues on Combining CERIF and OWL	1563
<i>Brigitte Jörg, Jaakko Lappalainen, Kostas Kastrantas</i>	
Contrasting Knowledge Organization Systems for the Description of Research Products: The Case of Overlapping in the Agricultural Domain	1571
<i>Leonardo Lezcano, Elena García-Barriocanal, Miguel-Angel Sicilia</i>	
Using a POWDER Triple Store for Boosting the Real-time Performance of Global Agricultural Data Infrastructures	1578
<i>Pythagoras Karampiperis, Nikos Manouselis, Stasinios Konstantopoulos</i>	
Training and Evaluating a Statistical Part of Speech Tagger for Natural Language Applications using Kepler Workflows	1588
<i>Doug Briesch, Reginald Hobbs, Claire Jaja, Brian Kjersten, Clare Voss</i>	
Prototype of Kepler Processing Workflows For Microscopy And Neuroinformatics	1595
<i>V. Astakhov, A. Bandrowski, A. Gupta, A. W. Kulungowski, J. S. Grethe, J. Bouwer, T. Molin, V. Rowley, S. Penticoff, M. Terada, W. Wong, H. Hakoziaki, O. Kwon, M. E. Martone, M. Ellisman</i>	
Application Scenarios Using Serpens Suite for Kepler Scientific Workflow System	1604
<i>Marcin Plóciennik, Michal Owsiak, Tomasz Zok, Bartek Palak, Antonio Gómez-Iglesias, Francisco Castejón, Marcos Lopez-Caniego, Isabel Campos Plasencia, Alessandro Costantini, Dimitriy Yadykin, Pär Strand</i>	
Kurator: A Kepler Package for Data Curation Workflows	1614
<i>L. Dou, G. Cao, P. J. Morris, R. A. Morris, B. Ludäscher, J. A. Macklin, J. Hanken</i>	
A Framework for Distributed Data-Parallel Execution in the Kepler Scientific Workflow System	1620
<i>Jianwu Wang, Daniel Crawl, Ilkay Altintas</i>	
Early Cloud Experiences with the Kepler Scientific Workflow System	1630
<i>Jianwu Wang, Ilkay Altintas</i>	
Kepler for ‘Omics Bioinformatics	1635
<i>Mark Bieda</i>	
Sliding Window Calculations on Streaming Data using the Kepler Scientific Workflow System	1639
<i>Sven Köhler, Supriya Gulati, Gongjing Cao, Quinn Hart, Bertram Ludäscher</i>	
Solving Optimization Problems in Nimrod/OK using a Genetic Algorithm	1647
<i>Yu Hua Lim, Jefferson Tan, David Abramson</i>	

On the Way of Applying Urgent Computing Solutions to Forest Fire Propagation Prediction	1657
<i>Andrés Cencerrado, Ana Cortés, Tomàs Margalef</i>	
The Case for Smartphones as an Urgent Computing Client Platform	1667
<i>Nicholas Palmer, Roelof Kemp, Thilo Kielmann, Henri Bal</i>	
Urgent Computing of Storm Surge for North Carolina's Coast	1677
<i>Brian Blanton, John McGee, Jason Fleming, Carola Kaiser, Hartmut Kaiser, Howard Lander, Rick Luettich, Kendra Dresback, Randy Kolar</i>	
Implementations of Urgent Computing on Production HPC Systems	1687
<i>K. K. Yoshimoto, D. J. Choi, R. L. Moore, A. Majumdar, E. Hocks</i>	
High-Level Knowledge-Based Structures for Simulation within Urgent Computing Tasks	1694
<i>Sergey V. Kovalchuk, Alexander V. Boukhanovsky</i>	
Urgent Computing for Operational Storm Surge Forecasting in Saint-Petersburg	1704
<i>Alexander V. Boukhanovsky, Sergey V. Ivanov</i>	
Impact of Urgent Computing on Resource Management Policies, Schedules and Resources Utilization	1713
<i>Krzysztof Kurowski, Ariel Oleksiak, Wojciech Piatek, Jan Weglarz</i>	
Literate Program Execution for Teaching Computational Science	1723
<i>Sébastien Li-Thiao-Té</i>	
An Innovative Teaching Strategy to Understand High-Performance Systems through Performance Evaluation	1733
<i>Gonzalo Zarza, Diego Lugones, Daniel Franco, Emilio Luque</i>	
An Innovative Teaching Tool for the Verification of Abstract Data Type Implementations from Formal Algebraic Specifications	1743
<i>Rafael Del Vado Viirseda, Fernando Pérez Morente</i>	
Introducing Life Science Doctoral Students in Oz to the Wizardry of Computational Modeling: Introducing Computational Thinking with CellDesigner™	1753
<i>George W. Shiflet, Angela B. Shifleta</i>	
A Learning System for a Computational Science Related Topic	1763
<i>Mohamed Hamada, Sayota Sato</i>	
ACE - A Model Centered REU Program Standing on the Three Legs of CSE: Analysis, Computation and Experiment	1773
<i>Hong P. Liu, Andrei Ludu</i>	
Hit Me: Blackjack as a Sure Bet for Teaching Algorithmic Skills	1783
<i>Timothy M. Walker</i>	
The Role of Computational Science and Emerging Technologies in the Natural Sciences Education at University Level	1789
<i>Nia Alexandrov, Vassil Alexandrov, Raul Ramirez</i>	
Executing PRAM Programs on GPUs	1799
<i>Jürgen Brenner, Jörg Keller, Christoph Kessler</i>	
Architecture Aware Parallel Programming in Glasgow Parallel Haskell (GPH)	1807
<i>M. K. Aswad, P. W. Trinder, H. W. Loidl</i>	
Data Parallel Skeletons in Java	1817
<i>Herbert Kuchen, Steffen Ernsting</i>	
Parallel Tree Reduction on MapReduce	1827
<i>Kento Emoto, Hiroto Imachi</i>	
A “Minimal Disruption” Skeleton Experiment: Seamless Map & Reduce Embedding in OCaml	1837
<i>M. Danelutto, R. Di Cosmo</i>	
GPU Accelerated Multi-agent Path Planning Based on Grid Space Decomposition	1847
<i>Giuseppe Caggianese, Ugo Erra</i>	
High-Level Manipulation of OpenCL-Based Subvectors and Submatrices	1857
<i>Karl Rupp</i>	
Fourth Workshop on using Emerging Parallel Architectures	1867
<i>Bertil Schmidt, Douglas Maskell</i>	
Speeding up Spatial Database Query Execution using GPUs	1870
<i>Bogdan Simion, Suprio Ray, Angela Demke Brown</i>	
An FPGA Implementation of an Investment Strategy Processor	1880
<i>Christoph Starke, Vasco Grossmann, Lars Wienbrandt, Manfred Schimmler</i>	
Engineering Parallel Sorting for the Intel SCC	1890
<i>Nicolas Melot, Christoph Kessler, Kenan Avdic, Patrick Cichowski, Jörg Keller</i>	
Benchmarking Data and Compute Intensive Applications on Modern CPU and GPU Architectures	1900
<i>Milosz Ciznicki, Michal Kierzynka, Piotr Kopta, Krzysztof Kurowski, Pawel Gepner</i>	

CUDA: Compiling and Optimizing for a GPU Platform	1910
<i>Gautam Chakrabarti, Vinod Grover, Bastiaan Aarts, Xiangyun Kong, Manjunath Kudlur, Yuan Lin, Jaydeep Marathe, Mike Murphy, Jian-Zhong Wang</i>	
Using Performance Measurements to Improve MapReduce Algorithms	1920
<i>Todd D. Plantenga, Yung Ryn Choe, Ann Yoshimura</i>	
Reducing Library Overheads through Source-to-Source Translation	1930
<i>Alden King, Scott Baden</i>	
Debugging Scientific Applications With Statistical Assertions	1940
<i>Minh Ngoc Dinh, David Abramson, Jin Chao, Donny Kurniawan, Andrew Gontarek, Bob Moench, Luiz Derose</i>	
Runtime Tracing of the Community Earth System Model: Feasibility Study and Benefits	1950
<i>Jens Domke, Dali Wang</i>	
SPAPT: Search Problems in Automatic Performance Tuning	1959
<i>Prasanna Balaprakash, Stefan M. Wild, Boyana Norris</i>	
Collecting Distributed Performance Data with Dataheap: Generating and Exploiting a Holistic System View	1969
<i>Michael Kluge, Daniel Hackenberg, Wolfgang E. Nagel</i>	
Enhanced Encoding Techniques for the Open Trace Format 2	1979
<i>Michael Wagner, Andreas Knupfer, Wolfgang E. Nagel</i>	
A Study of Performance Portability Using Piecewise-Parabolic Method (PPM) Gas Dynamics Applications	1988
<i>Pei-Hung Lin, Jagan Jayaraj, Paul Woodward, Pen-Chung Yew</i>	
A Novel, Evolutionary, Simulated Annealing inspired Algorithm for the Multi-Objective Optimization of Combinatorial Problems	1992
<i>Elias D. Nino, Carlos J. Ardila, Anangelica Chinchilla</i>	
Improved Motif Detection in Large Sequence Sets with Random Sampling in a Kepler Workflow	1999
<i>Sven Köhler, Phillip Seitzer, Marc T. Facciotti, Bertram Ludäscher</i>	
Semi-Coarsening in Space and Time for the Hierarchical Transformation Multigrid Method	2000
<i>Benjamin Peherstorfer, Hans-Joachim Bungartz</i>	
Two-Stage Least Squares Algorithms with QR Decomposition for Simultaneous Equations Models on Heterogeneous Multicore and Multi-GPU Systems	2004
<i>Carla Ramiro, Jose J. López-Espín, Domingo Giménez, Antonio M. Vidal</i>	
Mining Hot Topics from Twitter Streams	2008
<i>Jing Guo, Peng Zhang, Jianlong Tan, Li Guo</i>	
An Improvement of Choosing Map-join Candidates in Hive	2012
<i>Fang Wang, Yong Shi</i>	
Evaluation of Two Acceleration Techniques in a Multithreaded 2D Poisson Equation Solver	2016
<i>Andrés Vidal, Damian Dechev, Alain Kassab</i>	
Solving the Flexible Job Shop Problem on Multi-GPU	2020
<i>Wojciech Bozejko, Zdzisław Hejducki, Mariusz Uchronski, Mieczysław Wodecki</i>	
Author Index	