# Table of Contents

Preface from the Program Chairs ................................................................. xiii
Preface from the Organizing Chair ............................................................. xiv
Organization .................................................................................................. xv
Program Committee ..................................................................................... xvi
Additional Reviewers ................................................................................... xviii

## Main Track Sessions

### Models and Tools

**A Lightweight C++ Interface to MPI** ......................................................... 3  
_Simone Pellegrini, Radu Prodan, and Thomas Fahringer_

**RobustTrav: NAT Optimisation for the RobustCooperation Suite** .............. 11  
_Christoph Beckmann, Tom Gross, and Ferdinand Kastl_

**TCP: Thread Contention Predictor for Parallel Programs** ....................... 19  
_Aparna Mandke Dani, Bharadwaj Amrutur, Y.N. Srikant,  
and Chiranjib Bhattacharyya_

**Parallel Patterns + Macro Data Flow for Multi-core Programming** .......... 27  
_M. Aldinucci, L. Anardu, M. Danelutto, M. Torquati, and P. Kilpatrick_

**DIMVHCM: An On-line Distributed Monitoring Data Collection Model** ...... 37  
_Rafael Keller Tesser and Philippe Olivier Alexandre Navaux_

**Tackling Algorithmic Skeleton’s Inversion of Control** ............................ 42  
_Gustavo Pabón and Mario Leyton_

**An Effective Approach for Home Services Management** ......................... 47  
_P. Moreaux, F. Sartor, and F. Vernier_
SCTA Tracer: A Distributed Environment for Standardized Awareness Support Assessments .......................................................... 52
  Christoph Oemig and Tom Gross

Parallel Computing
LDPC Decoding on the Intel SCC .......................................................... 57
  Andreas Diavastos, Panayiotis Petrides, Gabriel Falcão, and Pedro Trancoso
Improving Linear Algebra Computation on NUMA Platforms
through Auto-tuned Nested Parallelism .................................................. 66
  Javier Cuenca, Luis P. García, and Domingo Giménez
ArTA: Adaptive Granularity in Transactional Applications ...................... 74
  Ehsan Atoofian
Assessing HPC Failure Detectors for MPI Jobs ...................................... 81
  Kishor Kharbas, Donghoon Kim, Torsten Hoefler, and Frank Mueller
A Performance Study of Virtual Machines on Multicore Architectures ........ 89
  Jie Tao, Karl Fürlinger, Lizhe Wang, and Holger Marten
Reduced Data Communication for Parallel CMA-ES for REACTS ............... 97
  Doug Hakkarinen, Tracy Camp, Zizhong Chen, and Allan Haas

Distributed and Network-Based Computing
Optimal Configuration of High-Radix Combined Switches ........................ 102
  Juan A. Villar, Francisco J. Andújar, José L. Sánchez, Francisco J. Alfaro, and José Duato
File I/O for MPI Applications in Redundant Execution Scenarios ............... 112
  Swen Böhm and Christian Engelmann
QoS Monitoring and Analysis Approach for Publish/Subscribe Systems
Deployed on MANET ............................................................................. 120
  Imene Lahyani, Nesrine Khabou, and Mohamed Jmaiel
A Performance Prediction Approach for MPI Routines on Multi-clusters ....... 125
  Sami Achour and Wahid Nasri

Advanced Algorithms and Applications
An Optimized Degree Strategy for Persistent Sensor Network Data
Distribution ......................................................................................... 130
  Wei Zhang, Qinchao Zhang, Xianghua Xu, and Jian Wan
Analysing the Adaptation Level of Parallel Hyperheuristics Applied
to Multiobjective Benchmark Problems ............................................. 138
  Carlos Segura, Eduardo Segredo, and Coromoto León
Context Map for Navigating the Physical World ................................................................. 146
    Vaskar Raychoudhury, Jiannong Cao, Weiping Zhu, and Ajay D. Kshemkalyani

Robust and Tuneable Family of Gossiping Algorithms ..................................................... 154
    Vincenzo De Florio and Chris Blondia

Efficiency-Aware Jobs Allocation for e-Science Environments ........................................ 162
    Andrea Clematis, Daniele D’Agostino, Antonella Galizia, and Alfonso Quarati

Performance Evaluations of a BSP Algorithm for State Space Construction 
    of Security Protocols .................................................................................................. 170
    Frédéric Gava, Michael Guedj, and Franck Pommereau

A Dynamic Deadlock Detection/Resolution Algorithm with Linear Message 
    Complexity .................................................................................................................. 175
    María Castillo, Federico Fariña, and Alberto Córdoba

A Dynamic Distributed Algorithm for Read Write Locks ................................................. 180
    Soumeya Leila Hernane, Jens Gustedt, and Mohamed Benyettou

Locality-Aware Dynamic Mapping for Multithreaded Applications .................................. 185
    Betul Demiroz, Haluk Rahmi Topcuoglu, Mahmut Kandemir, and Oguz Tosun

Data Intensive Computing

Interaction List Compression in Large Parallel Particle Simulations 
    on Multicore Systems ................................................................................................. 190
    Gudula Rünger and Michael Schwind

A Federated Data Zone for the Arts and Humanities ......................................................... 198
    Danah Tonne, Rainer Stotzka, Thomas Jejkal, Volker Hartmann, Halil Pasic, 
    Andrea Rapp, Philipp Vanscheidt, Bernhard Neumair, Achim Streit, 
    Ariel Garcia, Daniel Kurzawe, Tibor Kálmán, Jedrzej Rybicki, 
    and Beatriz Sanchez Bribian

Bit Rate Reduction Video Transcoding with Distributed Computing .............................. 206
    Fareed Jokhio, Tewodros Deneke, Sébastien Lafond, and Johan Lilius

LAMBDA—The LSDF Execution Framework for Data Intensive Applications ................. 213
    Thomas Jejkal, Volker Hartmann, Rainer Stotzka, Jens Otte, Ariel Garcia, 
    Jos van Wezel, and Achim Streit

Systems and Architectures

Dynamic Serialization: Improving Energy Consumption in Eager-Eager 
    Hardware Transactional Memory Systems ................................................................... 221
    Epifanio Gaona, Rubén Titos-Gil, Manuel E. Acacio, and Juan Fernández

A Runtime Library for Platform-Independent Task Parallelism ..................................... 229
    Panagiotis E. Hadjidoukas, Evaggelos Lappas, and Vassilios V. Dimakopoulos
FT-GReLoSS: A Skeletal-Based Approach towards Application Parallelization and Low-Overhead Fault Tolerance .................................................................237
  Constantinos Makassikis, Stéphane Vialle, and Xavier Warin

A Distributed E2E Recovery Mechanism for MPLS Networks .............................................245
  Ali El Kamel and Habib Youssef

Special Sessions

Security in Networked and Distributed Systems (Security)

A Novel Approach for Single-Packet IP Traceback Based on Routing Path .........................253
  Ning Lu, Yulong Wang, Fangchun Yang, and Maotong Xu

A Methodology for the Analysis and Modeling of Security Threats and Attacks for Systems of Embedded Components ..........................................................261
  Jose Fran Ruiz, Rajesh Harjani, Antonio Maña, Vasily Desnitsky,
  Igor Kotenko, and Andrey Chechulin

Design and Performance Evaluation of Improved Genetic Algorithm for Role Mining Problem .................................................................269
  Igor Saenko and Igor Kotenko

A More Efficient Hybrid Approach for Single-Packet IP Traceback ................................275
  Yulong Wang, Sen Su, Yi Yang, and Ji Ren

Continuous Authorizations in SIP with Usage Control .....................................................283
  Georgios Karopoulos, Paolo Mori, and Fabio Martinelli

Security Requirements for Uniformly Parameterised Cooperations ..................................288
  Peter Ochsenschläger and Roland Rieke

Prototyping a 100G Monitoring System ............................................................................293
  Scott Campbell and Jason Lee

Markovian Modeling and Security Measure Analysis for Networks under Flooding DoS Attacks .................................................................298
  Hendrik Baumann and Werner Sandmann

Modeling, Simulation, and Optimization of Peer-to-Peer Environments (Peer-to-Peer)

A Framework for a Comprehensive Evaluation of Ant-Inspired Peer-to-Peer Protocols ........303
  Amos Brocco and Ingrid Baumgart

Clustering Superpeers in P2P Networks by Growing Neural Gas ..................................311
  Mihai Dumitrascu and Razvan Andonie

Characterizing Dynamic Properties of the SopCast Overlay Network ................................319
  Kênia Carolina Gonçalves, Alex Borges Vieira, Jussara M. Almeida,
  Ana Paula C. da Silva, Humberto Marques-Neto, and Sérgio V.A. Campos
Raptor Codes for P2P Streaming ................................................................. 327
*Philipp M. Eittenberger, Todor Mladenov, and Udo R. Krieger*

Integrating Virtual Execution Environments into Peer-to-Peer Desktop Grids .............................................................................. 333
*Kay Dörnemann, Uwe Boschanski, Alexander Zeiss, and Bernd Freisleben*

Minimizing Wait Latency in Periodic P2P Hypercube Gossiping ................. 341
*Philipp Berndt*


Analysis of Strategies to Save Energy for Message-Passing Dense Linear Algebra Kernels ........................................................................ 346
*Maribel Castillo, Juan Carlos Fernández, Rafael Mayo, Enrique S. Quintana-Ortí, and Vicente Roca*

Saving Energy in the LU Factorization with Partial Pivoting on Multi-core Processors ..................................................................... 353
*Pedro Alonso, Manuel F. Dolz, Francisco D. Igual, Rafael Mayo, and Enrique S. Quintana-Ortí*

Energy-Aware Load Direction for Servers: A Feasibility Study ...................... 359
*Shane Case, Furat Afram, Erdem Aktas, and Kanad Ghose*

**GPU Computing and Hybrid Computing (GPU)**

phiGEMM: A CPU-GPU Library for Porting Quantum ESPRESSO on Hybrid Systems ................................................................. 368
*Filippo Spiga and Ivan Girotto*

Optimization Techniques and Performance Analyses of Two Life Science Algorithms for Novel GPU Architectures .................................... 376
*David Dilch and Eduard Mehofer*

Smoothed Particle Hydrodynamics Simulations on Multi-GPU Systems .......... 384
*E. Rustico, G. Bilotta, G. Gallo, A. Hérault, and C. Del Negro*

Parallel Branch and Bound on a CPU-GPU System.................................. 392
*Abdelamine Boukedjar, Mohamed Esseghir Lalami, and Didier El-Baz*

SIMT Microscheduling: Reducing Thread Stalling in Divergent Iterative Algorithms ............................................................................ 399
*Steffen Frey, Guido Reina, and Thomas Ertl*

Towards Solving the Table Maker's Dilemma on GPU ................................ 407
*Pierre Fortin, Mourad Gouicem, and Stef Graillat*

gpuDCI: Exploiting GPUs in Frequent Itemset Mining ................................ 416
*Claudio Silvestri and Salvatore Orlando*
On Realistic Divisible Load Scheduling in Highly Heterogeneous Distributed Systems ................................................................. 426
Aleksandar Ilic and Leonel Sousa

Accelerating the Production of Synthetic Seismograms by a Multicore Processor Cluster with Multiple GPUs ........................................ 434
Ferdinando Alessi, Annalisa Massini, and Roberto Basili

Applying OOC Techniques in the Reduction to Condensed Form for Very Large Symmetric Eigenproblems on GPUs .......................... 442
Davor Davidovic and Enrique S. Quintana-Ortí

Fast PageRank Computation on a GPU Cluster ........................................................................................................... 450
Arnon Rungsawang and Bundit Manaskasemsak

On-chip Parallel and Network-Based Systems (On-chip)

Chifeng Wang and Nader Bagherzadeh

Effect of Application Mapping on Network-on-Chip Performance ........................................................................... 465
Coskun Çelik and Cüneyt F. Bazlamaçı

Exploring NoC Virtualization Alternatives in CMPs ....................................................................................... 473
F. Triviño, J.L. Sánchez, F.J. Alfaro, and J. Flich

Design and Analysis of a Mesh-based Wireless Network-on-Chip ........................................................................ 483
Wen-Hsiang Hu, Chifeng Wang, and Nader Bagherzadeh

Packet Triggered Prediction Based Task Migration for Network-on-Chip ........................................................................ 491
Chao Wang, Licheng Yu, Li Liu, and Tianzhou Chen

Exploration of Temperature Constraints for Thermal Aware Mapping of 3D Networks on Chip ................................................................. 499
Parisa Khadem Hamedani, Shaahin Hessabi, Hamid Sarbazi-Azad, and Natalie Enright Jerger

An Efficient Hybridization Scheme for Stacked Mesh 3D NoC Architecture ........................................................................ 507
Amir-Mohammad Rahmani, Pasi Liljeberg, Juha Plosila, and Hannu Tenhunen

LATEX: New Selection Policy for Adaptive Routing in Application-Specific NoC ........................................................................ 515
Sanaz Azamanah, Ahmad Khademzadeh, Nader Bagherzadeh, Majid Janidarmian, and Reza Shojaei

LEAR—A Low-Weight and Highly Adaptive Routing Method for Distributing Congestions in On-chip Networks ................................. 520
Masoumeh Ebrahimi, Masoud Daneshtalab, Pasi Liljeberg, Juha Plosila, and Hannu Tenhunen
Global Control in Distributed Programs with Dynamic Process Membership ..................................................525
  J. Borkowski and M. Tudruj

A New Fault Injection Approach for Testing Network-on-Chips .................................................................530
  Luca Sterpone, Davide Sabena, and Matteo Sonza Reorda

Parallel and Distributed Storage Systems (Storage Systems)

On the Influence of PRNGs on Data Distribution ..........................................................................................536
  Ivan Popov, André Brinkmann, and Tom Friedetzky

Analyzing Long-Term Access Locality to Find Ways to Improve Distributed Storage Systems ..........................................................544
  Alberto Miranda and Toni Cortes

IOPm—Modeling the I/O Path with a Functional Representation of Parallel File System and Hardware Architecture ..............................................................................................................554
  Julian M. Kunkel and Thomas Ludwig

Simulation-Aided Performance Evaluation of Server-Side Input/Output Optimizations ..........................................................562
  Michael Kuhn, Julian M. Kunkel, and Thomas Ludwig

Cloud Computing for Computer and Data Intensive Applications (Cloud Computing)

Integrated Monitoring Approach for Seamless Service Provisioning in Federated Clouds ..........................................................567
  A. Kertesz, G. Kecskemeti, A. Marosi, M. Oriol, X. Franch, and J. Marco

Facilitating Self-Adaptable Inter-cloud Management ..................................................................................575
  G. Kecskemeti, M. Maurer, I. Brandic, A. Kertesz, Zs. Nemeth, and S. Dustdar

Running User-Provided Virtual Machines in Batch-Oriented Computing Clusters ..........................................................583
  Vitor Oliveira, António Manuel Pina, and André Rocha

Grid, Parallel, and Distributed Bioinformatics Applications (Bioinformatics Applications)

Parallelization of Virtual Screening in Drug Discovery on Massively Parallel Architectures ..........................................................588
  Ginés D. Guerrero, Horacio E. Pérez-Sánchez, José M. Cecilia, and José M. García

Enabling Parallel Computing of a Brain Connectivity Map Using the MediGRID-Infrastructure and FSL ..........................................................596
  Romanus Gruetz, Benjamin Loehnhardt, Niels K. Focke, Fred Viezens, Andreas Hoheisel, Frank Dickmann, and Dagmar Krefting
On Optimizing the Longest Common Subsequence Problem by Loop Unrolling Along Wavefronts ................................................................. 603
  Johann Steinbrecher and Weijia Shang

A CUDA-based Implementation of the SSAKE Genomics Application ................................................................. 612
  Daniele D'Agostino, Andrea Clematis, Alessandro Guffanti,
  Luciano Milanesi, and Ivan Merelli

High-throughput Molecular Docking Now in Reach for a Wider Biochemical Community ................................................................. 617
  Dhananjay M. Balan, Tomas Malinauskas, Pjotr Prins, and Steffen Möller

Accelerating Fibre Orientation Estimation from Diffusion Weighted Magnetic Resonance Imaging Using GPUs ................................................................. 622
  Moisés Hernández, Gines D. Guerrero, José M. Cecilia, José M. Garcia,
  Alberto Inuggi, and Stamatios N. Sotiropoulos

Author Index ............................................................................................................................................. 627