



Thirteenth International Conference
on Parallel Computing Technologies

Conference program

August 31 – September 4, 2015
Petrozavodsk, Russia



SUNDAY, August 30

School-conference for young scientists
“Prospective technologies and computing models”, day 1

MONDAY, August 31

School-conference for young scientists
“Prospective technologies and computing models”, day 2

PaCT-2015 WELCOME PARTY

19:00

TUESDAY, September 1

Registration and Welcome Coffee

08:00-9:00

OPENING SESSION

09:00-9:10

PARALLEL TECHNOLOGIES I

Chairman B. Goossens

09:10-10:40

Hierarchical Optimization of MPI Reduce Algorithms

09:10-09:40

Khalid Hasanov, Alexey Lastovetsky

Job Ranking and Scheduling in Utility Grids VOs

09:40-10:10

Victor Toporkov, Anna Toporkova, Alexey Tselishchev, Dmitry Yemelyanov, Petr Potekhin

Progressive Transactional Memory in Time and Space

10:10-10:40

Petr Kuznetsov, Srivatsan Ravi

COFFEE BREAK

10:40-11:00

MANY-CORE PROGRAMMING

Chairman T. Ludwig

11:00-12:40

Parallelizing Branch-and-Bound on GPUs for Optimization of Multiproduct Batch Plants

11:00-11:25

Andrey Borisenko, Michael Haidl, Sergei Gorlatch

Parallelizing Biochemical Stochastic Simulations: A Comparison of GPUs and Intel Xeon Phi processors

11:25-11:50

P. Cazzaniga, F. Ferrara, M.S. Nobile, D. Besozzi, G. Mauri

Use of Xeon Phi Coprocessor for Solving Global Optimization Problems

11:50-12:15

Konstantin Barkalov, Victor Gergel, and Ilya Lebedev

Performance Evaluation of a Human Immune System Simulator on a GPU Cluster **12:15-12:40**
Thiago M. Soares, Micael P. Xavier, Alexandre B. Pigozzo, Ricardo Silva Campos, Rodrigo W. dos Santos, Marcelo Lobosco

GENERAL ANNOUNCEMENTS AND PHOTO SESSION **12:40-13:00**

LUNCH **13:00-14:00**

NUMERICAL SIMULATION I **Chairman R. Wyrzykowski** **14:00-15:30**

Treating Complex Geometries with Cartesian Grids in Problems for Fluid Dynamics **14:00-14:30**
Igor Menshov

Accurate Parallel Algorithm for Tracking Inertial Particles in Large-Scale Direct Numerical Simulations of Turbulence **14:30-14:50**
Takashi Ishihara, Kei Enohata, Koji Morishita, Mitsuo Yokokawa, Katsuya Ishii

Wavelet-Based Local Mesh Adaptation with Application to Gas Dynamics **14:50-15.10**
Kirill Merkulov

Large-scale direct numerical simulation of high Reynolds number turbulent channel flow by means of vector-parallel processors **15:10-15.30**
Yoshinobu Yamamoto, Yoshiyuki Tsuji

COFFEE BREAK **15:30-16:00**

NUMERICAL SIMULATION II **Chairman I. Menshov** **16:00-17:30**

On Implementation High-Scalable CFD Solvers for Hybrid Clusters with Massively-Parallel Architectures **16:00-16:20**
Pavel Pavlukhin, Igor Menshov

Parallelization of 3D MPDATA Algorithm using Many Graphics Processors **16:20-16:50**
Krzysztof Rojek, Roman Wyrzykowski

On Parallel Computational Technologies of Augmented Domain Decomposition Methods **16:50-17:10**
Y.L. Gurieva, V.P.II'in

Development of a Distributed Parallel Algorithm of 3D Hydrodynamic Calculation of Oil Production on the Basis of MapReduce Hadoop and MPI Technologies **17:10-17:30**
Darkhan Akhmed-Zaki, Madina Mansurova, Timur Imankulov, Bazargul Matkerim, Ekaterina Dadykina

WEDNESDAY

September 2

ALGORITHMS

Chairman V. Il'in

9.00-10.30

Dynamic Parallelization Strategies for Multifrontal Sparse Cholesky Factorization

9.00-9.30

Sergey Lebedev, *Dmitry Akhmedzhanov, Evgeniy Kozinov, Iosif Meyerov, Anna Pirova, Alexander Sysoyev*

Highly Parallel Multigrid Solvers for Multicore and Manycore Processors
Oleg Bessonov

9.30-10:00

Dynamic Load Balancing Based on Rectilinear Partitioning in Particle-in-Cell Plasma Simulation

10:00-10:30

Igor Surmin, Alexei Bashinov, Sergey Bastrakov, Evgeny Emenko, Arkady Gonoskov, Iosif Meyerov

POSTER SESSION & COFFEE BREAK

10:30-11:30

- A Modular-Positional Computation Technique for Multiple-Precision Floating-Point Arithmetic
Konstantin Isupov, *Vladimir Knyazkov*
- Creation of Data Mining Algorithms as Functional Expression for Parallel and Distributed Execution
Ivan Kholod, *Ilya Petukhov*
- Control Flow Usage to Improve Performance of Fragmented Programs Execution
Victor E. Malyshkin, Vladislav A. Perepelkin, Anastasia A. Tkacheva
- The Mathematical Model and The Problem of Optimal Partitioning of Shared Memory for Work-Stealing Deques
Andrew Sokolov, *Eugene Barkovsky*
- Constructions Used in Associative Parallel Algorithms for Directed Graphs
Anna Nepomniaschaya
- Using Monte Carlo Method for Searching Partitionings of Hard Variants of Boolean Satisfiability Problem
Alexander Semenov, Oleg Zaikin
- CA - Model of Autowaves Formation in the Bacterial MinCDE System
Anton Vitvitsky

- Agent-Based Approach to Monitoring and Control of Distributed Computing Environment
Igor Bychkov, Gennady Oparin, Alexei Novopashin, Ivan Sidorov
- Partition Algorithm for Association Rules Mining in BOINC-based Enterprise Desktop Grid
Evgeny Ivashko, Alexander Golovin
- Task Scheduling in a Desktop Grid to Minimize the Server Load
Vladimir V. Mazalov, Natalia N. Nikitina, Evgeny E. Ivashko
- An HPC Upgrade/Downgrade that Provides Workload Stability
Alexander Rumyantsev
- Congestion Elimination on Data Storages Network Interfaces in Datacenters
P. M. Vdovin, I. A. Zotov, V. A. Kostenko, and A. V. Plakunov
- Increasing Efficiency of Data Transfer Between Main Memory and Intel Xeon Phi Coprocessor or NVIDIA GPUS with Data Compression
Konstantin Y. Besedin, Pavel S. Kostenetskiy, Stepan O. Prikazchikov
- Heuristic Algorithms for Optimizing Array Operations in Parallel PGAS programs
Ivan Kulagin, Alexey Paznikov, Mikhail Kurnosov
- HPC Hardware Efficiency for Quantum and Classical Molecular Dynamics
Vladimir V. Stegailov, Nikita D. Orekhov, Grigory S. Smirnov
- Implementation of a Three-Phase Fluid Flow ("Oil-Water-Gas") Numerical Model in the LuNA Fragmented Programming System
Darkhan Akhmed-Zaki, Danil Lebedev, Vladislav A. Perepelkin
- Efficient Parallel Implementation of Coherent Stacking Algorithms in Seismic Data Processing
Maxim Gorodnichev, Anton Duchkov and Alexander Kupchishin

HARDWARE

Chairman V. Prasanna

11:30-13:00

Toward a Core Design to Distribute an Execution on a Manycore Processor
Bernard Goossens, David Parello, Katarzyna Porada, Djallal Rahmoune

11:30-12:00

Cost of Bandwidth-Optimized Sparse Mesh Layouts
Martti Forsell, Ville Leppänen, Martti Penttonen

12:00-12:30

Towards Application Energy Measurement and Modelling Tool Support
Kenneth O'Brien, Alexey Lastovetsky

12:30-13:00

LUNCH

13:00-14:30

FPGA	Chairman A. Lastovetsky	14:30-16:00
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Optimal Dynamic Data Layouts for 2D FFT on 3D Memory Integrated FPGA **14:30-15:00**
*Ren Chen, Shreyas G. Singapura, **Viktor K. Prasanna***

High-Performance Reconfigurable Computer Systems Based on Virtex FPGAs **15:00-15:30**
***Alexey I. Dordopulo**, Ilya I. Levin, Yuri I. Doronchenko, Maxim K. Raskladkin*

Automatic High-Level Programs Mapping onto Programmable Architectures **15:30-16:00**
*Boris Ya. Steinberg, **Denis V. Dubrov**, Yury V. Mikhailuts, Alexander S. Roshal, Roman B. Steinberg*

COFFEE BREAK	16:00-16:30
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FINE GRAIN COMPUTATIONS I	Chairman R. Hoffmann	16:30-18:00
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A behavioral analysis of cellular automata (invited paper) **16:30-17:00**
***Jan M. Baetens**, Bernard De Baets*

A Class of Non-Optimum-Time 3n-Step FSSP Algorithms - A Survey **17:00-17:30**
***Hiroshi Umeo**, Masashi Maeda, Akihiro Sousa, Kiyohisa Taguchi*

Contradiction between Parallelization Efficiency and Stochasticity in Cellular Automata Models of Reaction-Diffusion Phenomena **17:30-18:00**
Olga Bandman

THURSDAY	September 3
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SOCIAL DAY

Tour to Kizhi Island
Conference Dinner (scheduled for 18:00, but will depend on traffic jams etc)

FRIDAY**September 4****FINE GRAIN COMPUTATIONS II****Chairman O. Bandman****9:00-10:30**

A Parallel Genetic Algorithm to Adjust a Cardiac Model Based on Cellular Automaton and Mass-Spring Systems

9:00-9:30

Ricardo Silva Campos, Bernardo Martins Rocha, Luis Paulo da Silva Barra, Marcelo Lobosco, Rodrigo Weber dos Santos

The Influence of Cellular Automaton Topology on the Opinion Formation

9:30-10:00

Tomasz M. Gwizdała

Hexagonal Bravais-Miller Routing by Cellular Automata Agents

10:00-10:30

Dominique Désérable, Rolf Hoffmann

COFFEE BREAK**10:30-11:00****FINE GRAIN COMPUTATIONS III****Chairman T. Gwizdała****11:00-12:00**

Cellular Automata Model of Electrons And Holes Annihilation in an Inhomogeneous Semiconductor

11:00-11:30

A.E. Kireeva, K.K. Sabelfeld

Oscillatory Network Based on Kuramoto Model for Image Segmentation

11:30-12:00

Andrei Novikov, Elena Benderskaya

LUNCH**12:00-13:30****Meeting of the Program Committee****12:00-13:30**

- General discussion
- Papers selection for the special issue of an int. journal

PARALLEL AND DISTRIBUTED TECHNOLOGIES**Chairman V. Toporkov 13:30-15:00**

A Two-Level Parallel Global Search Algorithm for Solution of Computationally Intensive Multiextremal Optimization Problems

13:30-14:00

Victor Gergel and Sergey Sidorov

Virtual Screening in a Desktop Grid: Replication and the Optimal Quorum

14:00-14:30

Ilya A. Chernov, Natalia N. Nikitina

Distributed Algorithm of Data Allocation in the Fragmented Programming System LuNA **14:30-15:00**
*Victor E. Malyshkin, **Vladislav A. Perepelkin**, Georgy A. Schukin*

COFFEE BREAK **15:00-15:20**

PARALLEL TECHNOLOGIES II **Chairman E. Ivashko** **15:20-16:00**

Software System for Maximal Parallelization of Algorithms on The Base on The Conception of Q-determinant **15:20-15:40**
***Valentina N. Aleeva**, Ilya S. Sharabura, Denis E. Suleymanov*

Architecture, Implementation and Performance Optimization in Organizing Parallel Computations for Simulation Environment **15:40-16:00**
***Maria Nasyrova**, Yury Shornikov, Dmitry Dostovalov*

CLOSING SESSION **16:00-16:10**

The conference is organized by The Institute of Computational Mathematics and Mathematical Geophysics (the Russian Academy of Sciences), Novosibirsk State University, Novosibirsk State Technical University, Institute of Applied Mathematical Research (Karelian Research Centre of the Russian Academy of Sciences), and Petrozavodsk State University

Program Committee:

- Victor Malyshkin, Chairman
- Farid Ablaev
- Sergey Abramov
- Farhad Arbab
- Stefania Bandini
- Olga Bandman
- Thomas Casavant
- Pierpaolo Degano
- Dominique Désérable
- Bernard Goossens
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- Carsten Trinitis
- Mateo Valero
- Roman Wyrzykowski

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The Best Paper Award is sponsored by Springer

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