

## **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 Tsujii*

**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. Il'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 **9.30-10:00**  
*Oleg Bessonov*

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*

<b>HARDWARE</b>	<b>Chairman V. Prasanna</b>	<b>11:30-13:00</b>
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Toward a Core Design to Distribute an Execution on a Manycore Processor <i>Bernard Goossens, David Parello, Katarzyna Porada, Djallal Rahmoune</i>	<b>11:30-12:00</b>
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Cost of Bandwidth-Optimized Sparse Mesh Layouts <i>Martti Forsell, Ville Leppänen, Martti Penttonen</i>	<b>12:00-12:30</b>
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Towards Application Energy Measurement and Modelling Tool Support <i>Kenneth O'Brien, Alexey Lastovetsky</i>	<b>12:30-13:00</b>
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<b>LUNCH</b>	<b>13:00-14:30</b>
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<b>FPGA</b>	<b>Chairman A. Lastovetsky</b>	<b>14:30-16:00</b>
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Optimal Dynamic Data Layouts for 2D FFT on 3D Memory Integrated FPGA <i>Ren Chen, Shreyas G. Singapura, Viktor K. Prasanna</i>	<b>14:30-15:00</b>
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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**

**FINE GRAIN COMPUTATIONS I** **Chairman R. Hoffmann** **16:30-18:00**

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**

### 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. Gwizdalla*

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 **11:00-11:30**  
Inhomogeneous Semiconductor  
*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** **13:30-15:00**  
**V. Toporkov**

A Two-Level Parallel Global Search Algorithm for Solution of Computationally **13:30-14:00**  
Intensive Multiextremal Optimization Problems  
*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 **14:30-15:00**  
System LuNA  
*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 **15:20-15:40**  
on The Conception of Q-determinant  
*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
- Sergei Gorlatch
- Yuri G. Karpov
- Alexey Lastovetsky
- Jie Li
- Thomas Ludwig
- Giancarlo Mauri
- Nikolay Mirenkov
- Dana Petcu
- Viktor Prasanna
- Michel Raynal
- Bernard Roux
- Mitsuhsa Sato
- Carsten Trinitis
- Mateo Valero
- Roman Wyrzykowski

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Intel Software

The Best Paper Award is sponsored by Springer

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