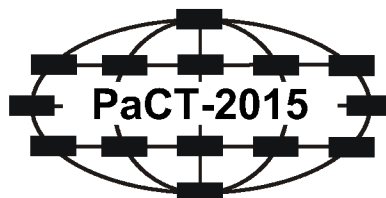

PARALLEL COMPUTING TECHNOLOGIES



PaCT-2015

13th International Conference

Petrozavodsk, Russia

August 31 - September 4, 2015

PROGRAM

**Sponsored by
Russian Fund for Basic Research,
Russian Academy of Science,
Ministry of Education and Science of RF,
Intel Corporation**

Petrozavodsk 2015

SUNDAY, August 30

School-conference for young scientists, day 1

MONDAY, August 31

School-conference for young scientists, day 2

PaCT-2015 WELCOME PARTY

19:00

TUESDAY, September 1

Registration and Welcome Coffee

8:00-9:00

OPENING SESSION

9:00-9:10

PARALLEL TECHNOLOGIES I

Chairman B. Goossens

09:10-10:40

Hierarchical Optimization of MPI Reduce Algorithms

Khalid Hasanov, Alexey Lastovetsky

09:10-09:40

Job Ranking and Scheduling in Utility Grids VOs

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

09:40-10:10

Progressive Transactional Memory in Time and Space

Petr Kuznetsov, Srivatsan Ravi

10:10-10:40

COFFEE BREAK

10:40-11:00

MANY-CORE PROGRAMMING

Chairman A. Dordopulo

11:00-12:40

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

Andrey Borisenko, Michael Haidl, Sergei Gorlatch

11:00-11:25

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

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

11:25-11:50

Use of Xeon Phi Coprocessor for Solving Global Optimization Problems

Konstantin Barkalov, Victor Gergel, and Ilya Lebedev

11:50-12:15

Performance Evaluation of a Human Immune System Simulator on a GPU Cluster

Thiago M. Soares, Micael P. Xavier, Alexandre B. Pigozzo, Ricardo

12:15-12:40

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

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

NUMERICAL SIMULATION I **Chairman R.Wyrzhikovsky** **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** **16:00-17:10**

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 <i>Oleg Bessonov</i>	9.30-10:00
Dynamic Load Balancing Based on Rectilinear Partitioning in Particle-in-Cell Plasma Simulation <i>Igor Surmin, Alexei Bashinov, Sergey Bastrakov, Evgeny Emenko, Arkady Gonoskov, Iosif Meyerov</i>	10:00-10:30
POSTER SESSION & COFFEE BREAK	10:30-11:30
<ul style="list-style-type: none"> • A Modular-Positional Computation Technique for Multiple-Precision Floating-Point Arithmetic <i>Konstantin Isupov, Vladimir Knyazkov</i> • Creation of Data Mining Algorithms as Functional Expression for Parallel and Distributed Execution <i>Ivan Kholod, Ilya Petukhov</i> • Control Flow Usage to Improve Performance of Fragmented Programs Execution <i>Victor E. Malyshkin, Vladislav A. Perepelkin, Anastasia A. Tkacheva</i> • The Mathematical Model and The Problem of Optimal Partitioning of Shared Memory for Work-Stealing Deques <i>Andrew Sokolov, Eugene Barkovsky</i> • Constructions Used in Associative Parallel Algorithms for Directed Graphs <i>Anna Nepomniaschaya</i> • Using Monte Carlo Method for Searching Partitionings of Hard Variants of Boolean Satisfiability Problem <i>Alexander Semenov, Oleg Zaikin</i> • CA - Model of Autowaves Formation in the Bacterial MinCDE System <i>Anton Vitvitsky</i> • Agent-Based Approach to Monitoring and Control of Distributed Computing Environment <i>Igor Bychkov, Gennady Oparin, Alexei Novopashin, Ivan Sidorov</i> • Partition Algorithm for Association Rules Mining in BOINC-based Enterprise Desktop Grid <i>Evgeny Ivashko, Alexander Golovin</i> • Task Scheduling in a Desktop Grid to Minimize the Server Load <i>Vladimir V. Mazalov, Natalia N. Nikitina, Evgeny E. Ivashko</i> • An HPC Upgrade/Downgrade that Provides Workload Stability <i>Alexander Rumyantsev</i> • Congestion Elimination on Data Storages Network Interfaces in Datacenters <i>P. M. Vdovin, I. A. Zotov, V. A. Kostenko, and A. V. Plakunov</i> • Increasing Efficiency of Data Transfer Between Main Memory and Intel Xeon Phi Coprocessor or NVIDIA GPUS with Data Compression <i>Konstantin Y. Besedin, Pavel S. Kostenetskiy, Stepan O. Prikazchikov</i> • Heuristic Algorithms for Optimizing Array Operations in Parallel PGAS programs <i>Ivan Kulagin, Alexey Paznikov, Mikhail Kurnosov</i> • HPC Hardware Efficiency for Quantum and Classical Molecular Dynamics <i>Vladimir V. Stegailov, Nikita D. Orekhov, Grigory S. Smirnov</i> • Implementation of a Three-Phase Fluid Flow ("Oil-Water-Gas") Numerical Model in the LuNA Fragmented Programming System <i>Darkhan Akhmed-Zaki, Danil Lebedev, Vladislav A. Perepelkin</i> • Efficient Parallel Implementation of Coherent Stacking Algorithms in Seismic Data Processing <i>Maxim Gorodnichev, Anton Duchkov and Alexander Kupchishin</i> 	
HARDWARE	11:30-13:00
<p style="text-align: center;">Chairman V. Prasanna</p> <p>Toward a Core Design to Distribute an Execution on a Manycore Processor <i>Bernard Goossens, David Parello, Katarzyna Porada, Djallal Rahmoune</i></p>	11:30-12:00

Cost of Bandwidth-Optimized Sparse Mesh Layouts 12:00-12:30
Martti Forsell, Ville Leppänen, Martti Penttonen

Towards Application Energy Measurement and Modelling Tool Support 12:30-13:00
Kenneth O'Brien, Alexey Lastovetsky

LUNCH 13:00-14:30

FPGA **Chairman A. Lastovetsky** 14:30-16:00

Optimal Dynamic Data Layouts for 2D FFT on 3D Memory Integrated 14:30-15:00
FPGA
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

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

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 17:00-17:30
Models of Reaction-Diffusion Phenomena
Olga Bandman

THURSDAY **September 3**

SOCIAL DAY

Tour to Kizhy 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 9:00-9:30
Automaton and Mass-Spring Systems
*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 <i>Dominique Désérable, Rolf Hoffmann</i>	10:00-10:30
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 <i>A.E. Kireeva, K.K. Sabelfeld</i>	11:00-11:30
Oscillatory Network Based on Kuramoto Model for Image Segmentation <i>Andrei Novikov, Elena Benderskaya</i>	11:30-12:00
LUNCH	12:00-13:30
Meeting of the Program Committee	12:00-13:30
<ul style="list-style-type: none"> • 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 <i>Victor Gergel and Sergey Sidorov</i>	13:30-14:00
Virtual Screening in a Desktop Grid: Replication and the Optimal Quorum <i>Ilya Chernov, Natalia N. Nikitina</i>	14:00-14:30
Distributed Algorithm of Data Allocation in the Fragmented Programming System LuNA <i>Victor E. Malyshkin, Vladislav A. Perepelkin, Georgy A. Schukin</i>	14:30-15:00
COFFEE BREAK	15:00-15:20
PARALLEL TECHNOLOGIES II Chairman	
Software System for Maximal Parallelization of Algorithms on The Base on The Conception of Q-determinant <i>Valentina N. Aleeva, Ilya S. Sharabura, Denis E. Suleymanov</i>	15:20-15:40
Architecture, Implementation and Performance Optimization in Organizing Parallel Computations for Simulation Environment <i>Maria Nasyrova, Yury Shornikov, Dmitry Dostovalov</i>	15:40-16:00
CLOSING SESSION	16:00-16:10