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16th International Conference
on Parallel Computing Technologies

Conference Program



RSC



Springer

September 13-18, 2021, Kaliningrad, Russia

Time in Kaliningrad: UTC +02:00

MONDAY, September 13

18:30¹ **Registration**

19:00 **PaCT-2021 WELCOME PARTY: Alexander Nevsky St., 14**

TUESDAY, September 14

8:00- Registration and Welcome Coffee, **Alexander Nevsky St., 14**
9:00

9:00- **OPENING SESSION**
9:10

9:10- **JOB MANAGEMENT** **Chair: Gennady Erokhin**
10:40

Optimization of Resources Allocation in High Performance Distributed Computing
9:10- with Utilization Uncertainty K²
9:40 **Victor Toporkov, Dmitry Yemelyanov, Maksim Grigorenko**

Influence of the execution time forecast accuracy on efficiency of scheduling jobs in a
9:40- distributed network of supercomputers K
10:10 **Artem Tikhomirov, Anton Baranov, Pavel Telegin, Boris Shabanov**

Performance estimation of a BOINC-based Desktop Grid for large-scale molecular
10:10- docking Video
10:40 **Natalia Nikitina, Maxim Manzyuk, Crtomir Podlipnik, Marko Jukic**

10:40- **COFFEE BREAK**
11:00

11:00- **COMPUTING SYSTEMS** **Chair: Victor Toporkov**
12:30

Composable Disaggregated Infrastructure for High performance computing
11:00- implemented with RSC BasIS orchestrator. An example of Intel distributed
11:30 asynchronous object storage (DAOS) deployment Video
Alexander Moskovsky

Execution of NVRAM Programs with Persistent Stack
11:30- **Vitaly Aksenov, Ohad Ben-Baruch, Danny Hendler, Ilya Kokorin, and Matan** K
12:00 **Rusanovsky**

Deterministic OpenMP and the LBP Parallelizing Manycore Processor
12:00- **Bernard Goossens, David Parello, Kenelm Louetsi** Video
12:30

¹ Kaliningrad time: (UTC+02:00)

² K – comes to Kaliningrad to participate, Video – participates remotely

12:30-14:00 **FREE TIME**

14:00-15:30 **TOOLS** **Chair: Sergei Gorlatch**

14:00-14:30 A new model-based approach to performance comparison of MPI collective algorithms, *Emin Nuriyev, Alexey Lastovetsky* Video

14:30-15:00 A Study on the Influence of Monitoring System Noise on MPI Collective Operations
A. A. Khudoleeva, K. S. Stefanov Video

15:00-15:30 Additional Parallelization of Existing MPI Programs Using SAPFOR
Nikita Kataev, Alexander Kolganov Video

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

16:00-17:30 **ALGORITHMS** **Chair: Maxim Gorodnichev**

16:00-16:30 Consensus-Free Ledgers when Operations of Distinct Processes are Commutative
Davide Frey, Lucie Guillou, Michel Raynal, François Taïani Video

16:30-17:00 Mobile agents operating on a grid: some non-conventional issues in parallel computing
Linda Pagli, Fabrizio Luccio Video

17:00-17:30 Optimal Concurrency for List-Based Sets
Vitaly Aksenov, Vincent Gramoli, Petr Kuznetsov, Di Shang, and Srivatsan Ravi Video

TUTORIALS

18:00-19:30 **Tutorial 1:** Building your own processors with High Level Synthesis tools. RISC-V cores defined in C++, synthesized for Zynq FPGA, tested on Pynq Z1/Z2 board
Bernard Goossens Video

WEDNESDAY, September 15

9:00-10:30 **SYSTEMS PROGRAMMING** **Chair: Vladislav Perepelkin**

9:00-9:30 Design and Implementation of Highly Scalable Quantifiable Data Structures
Victor Cook, Christina Peterson, Zachary Painter, Damian Dechev K

9:30-10:00 High-Efficiency Specialized Support for Dense Linear Algebra Arithmetic in LuNA System
Nikolay Belyaev, Vladislav Perepelkin K

10:00- Resource-Independent Description of Information Graphs with Associative Operations Video

in Set@l Programming Language
10:30 *Ilya Levin, Alexey Dordopulo, Ivan Pisarenko, Denis Mikhailov, and Andrey Melnikov*

10:30-
11:00 **COFFEE BREAK**

11:00- **NUMERICAL PROBLEMS AND COMPUTING SYSTEMS I**
12:40 **Chair: Victor Cook**

11:00- Sparse System Solution Methods For Complex Problems
11:25 *Igor Konshin and Kirill Terekhov* K

Parallelization of Robust Multigrid Technique using OpenMP technology
11:25- *Sergey Martynenko, Weixing Zhou, İskender Gökalp, Vladimir Bakhtin, and Pavel*
11:50 *Toktaliev* Video

11:50- Evaluating the performance of Kunpeng 920 processors on modern HPC applications
12:15 *Ilya Afanasyev, Dmitry Lichmanov* K

12:15- Scalability Issues in FFT Computation
12:40 *Alan Ayala, Stanimire Tomov, Miroslav Stoyanov, and Jack Dongarra* Video

12:40-
14:00 **FREE TIME**

14:00- **NUMERICAL PROBLEMS AND COMPUTING SYSTEMS II**
15:30 **Chair: Alexey Lastovetsky**

14:00- Implicit Data Layout Optimization for Portable Parallel Programming in C++
14:30 *Vladyslav Kucher, Sergei Gorlatch* Video

14:30- *On Defragmentation Algorithms for GPU-native Octree-Based AMR Grids*
15:00 **Pavel Pavlukhin**, Igor Menshov Video

High Performance Implementation of Boris Particle Pusher on DPC++. A First Look at
15:00- oneAPI
15:30 *Valentin Volokitin, Alexey Bashinov, Evgeny Emenko, Arkady Gonoskov, and Iosif*
Meyerov Video

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

16:00- **APPLICATIONS**
17:30 **Chair: Iosif Meyerov**

16:00- Efficient Cluster Parallelization Technology for Aerothermodynamics Problems
16:30 **Oleg Bessonov** Video

Computational aspects of solving grid equations in heterogeneous computing systems
16:30- *Alexander Sukhinov, Vladimir Litvinov, Alexander Chistyakov, Alla Nikitina, Natalia*
17:00 *Gracheva, and Nelli Rudenko* Video

17:00-	Network Reliability Calculation with Use of GPUs	
17:30	Denis A. Migov , <i>Tatyana V. Snytnikova, Alexey S. Rodionov, and Vyacheslav I. Kanevsky</i>	Video

TUTORIALS

18:00-	Tutorial 2: Building your own processors with High Level Synthesis tools. RISC-V cores defined in C++, synthesized for Zynq FPGA, tested on Pynq Z1/Z2 board	
19:30	Bernard Goossens	Video

THURSDAY, September 16

SOCIAL DAY

City Tour and Excursion to the Curonian Spit

FRIDAY, September 17

9:00-10:40	COMPUTING SERVICES	Chair: Vladislav Perepelkin
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9:00-9:25	Implementing autonomic Internet of Things ecosystems - practical consideration <i>Kumar Nalinaksh, Piotr Lewandowski, Maria Ganzha, Marcin Paprzycki, Wiesław Pawłowski, and Katarzyna Wasielewska-Michniewska</i>	Video
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9:25-9:50	Information-Analytical System to Support the Solution of Compute-Intensive Problems of Mathematical Physics on Supercomputers Yury Zagorulko , <i>Galina Zagorulko, Alexey Snytnikov, Boris Glinskiy, and Vladimir Shestakov</i>	Video
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9:50-10:15	Parallel Computations in Integrated Environment of Engineering Modeling and Global Optimization <i>Victor Gergel, Vladimir Grishagin, Alexei Liniov, and Sergey Shumikhin</i>	Video
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10:15-10:40	The web platform for storing biotechnologically significant properties of bacterial strains Aleksey M. Mukhin , <i>Fedor V. Kazantsev, Alexandra I. Klimenko, Tatiana N. Lakhova, Pavel S. Demenkov, and Sergey A. Lashin</i>	Video
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10:40-11:10	COFFEE BREAK	
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11:10-12:10	CELLULAR AUTOMATA	Chair: Anastasia Kireeva
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11:10-11:40	Minimal Covering of the Space by Domino Tiles <i>Rolf Hoffmann, Dominique Désérable, and Franciszek Seredyński</i>	Video
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11:40-12:10	Application of the Generalized Extremal Optimization and Sandpile Model in Search for the Airborne Contaminant Source Miroslaw Szaban, Anna Wawrzynczak, Monika Berendt-Marchel, and Lukasz Marchel	Video
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12:10-14:00	FREE TIME	
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14:00- **NUMERICAL PROBLEMS AND COMPUTING SYSTEMS II**
15:30 **Chair: Sergey Kireev**

14:00- Zipped Data Structure for Adaptive Mesh Refinement
14:30 *Anton Ivanov, **Anastasia Perepelkina*** Video

14:30- *Automatic Parallel Tiled Code Generation Based on Dependence Approximation*
15:00 **Wlodzimierz Bielecki, Maciej Poliwoda** Video

15:00- Optimized Hybrid Execution of Dense Matrix-Matrix Multiplication on Clusters of
Heterogeneous Multicore and Many-core Platforms Video
-15:30 **Gerassimos Barlas**

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

16:00- **SYSTEMS PROGRAMMING** **Chair: Gennady Erokhin**
17:30

Precompiler for the ACELAN-COMPOS package solvers
16:00- *Aleksandr Vasilenko, Vadim Veselovskiy, Elena Metelitsa, Nikita Zhivykh, Boris
16:30 Steinberg, and **Oleg Steinberg*** Video

High-level synthesis of scalable solutions from C-programs for reconfigurable
16:30- computer systems Video
17:00 **A.I. Dordopulo, I.I. Levin, V.A. Gudkov, and A.A. Gulenok**

17:00- Trace-Based Optimization of Fragmented Programs Execution in LuNA System
17:30 *Victor Malyshkin, **Vladislav Perepelkin*** K

17:30- **CLOSING SESSION**
17:40

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- Immanuel Kant Baltic Federal University
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