Mikhail Kurnosov

Contact Information

- **E-mail**: mkurnosov@gmail.com
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Education

2016 **Doctor of Science**, Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia

2009–2012 **Postdoctoral Research**, Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia

2005–2008 **Ph.D. (Computer Science)**, Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia

Dissertation: "Models and Algorithms of Mapping Parallel Programs into Distributed Computer Systems" (Advisor: Corresponding Member of RAS Prof. V.G. Khoroshevsky)

2000–2005 **Diploma in Mathematics**, Gorno-Altaysk State University, Russia

Positions and Experience

2016–present **Head of Computer Systems Department,** Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia

2005–present **Associate Professor**, Computer Systems Department, Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia

Research & Software Development

- Development of algorithms and system software for optimizing collective communications in MPI libraries
- Implementation of tools for benchmarking MPI routines
- Designing and administration of high-performance computer clusters

Teaching courses (www.mkurnosov.net/teaching)

- Parallel Programming (undergrad. and M.Sc. students)
- Theory of Distributed Computer Systems Functioning Organization (undergrad. stud.)
- High-Performance Computing Systems (undergrad. and M.Sc. students)
- Data Structures and Algorithms (undergrad. students)

Advising

Advised various Bachelors, Masters and PhD students research projects

2006–present **Research Scientist**, Computer Systems Laboratory, Rzhanov Institute of Semiconductor Physics Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia

- Development of algorithms and system software for mapping parallel MPI programs into multicore computer clusters
- Creating MPI performance analysis tools based on MPI Profiling Interface and Open Trace Format
- Development of distributed algorithms and system software for task scheduling in computer clusters and Grid systems (decentralized resource allocation, load balancing)

2014–2016 **Lecturer at School of Data Analysis,** Yandex, Novosibirsk, Russia

Course "Parallel and Distributed Computing" (C++11 atomics and multithreading, OpenMP, MPI, MapReduce, Apache Hadoop, distributed algorithms)

Summer 2006 **Software Engineer (Intern)**, Intel Corporation, Nizhny Novgorod, Russia

Porting GNU/Linux version of Intel Thread Profiler runtime library to Pin – dynamic binary instrumentation tool (Pin probes, x86_64, POSIX threads)

1998–2005 **Software Engineer**, Republican Center of Children's Creativity, Gorno-Altaysk, Russia

Software Development

- Development of educational programming language Rapira++ (modifiable parser syntax – Russian and Altay keywords, basic OOP constructions, visual programing, IDE, `www.school-sector.relarn.ru/dckt/projects/rapira`)
- Client-server software for monitoring and remote control of launched application on Windows-based workstations

Teaching courses (high school students): Rapira++, Visual Basic, Delphi, JavaScript; network technologies (TCP/IP, Ethernet switches: VLANs, Spanning Tree, QoS; WiFi protocols)

Interests

- **Parallel and Distributed Programming Models and Runtime Systems** (algorithms, message-passing libraries, threading tools, runtime systems, compilers)
- **Algorithms and Software Optimization** (profiling, benchmarking, vectorization, memory access optimization)
- **High-Performance Computer Systems** (design, implementation and administration)
- **Grid and Cloud Computing** (task scheduling, task mapping, load balancing, monitoring)

Awards

- Award of the Government of the Russian Federation in the field of education, 2012
- Award of Administration of Novosibirsk Region, 2009
- Intel Scholarship in Recognition of Academic Progress and Active Scientific Work, 2008
- Alcatel-Lucent Scholarship, 2007
- Scholarship of the Government of the Russian Federation, 2007
- Scholarship of the Russian Federation President, 2004

Selected Publications (mostly in Russian)

Book Chapters

1. V.G. Khoroshevsky, **M.G. Kurnosov** et al. *Computational Methods, Algorithms and Hardware and Software Tools for Parallel Modelling of Natural Processes*. Chapter 2 on Architecture and Software of Distributed Computer Systems, SB RAS, 2012. – 355 p. (in Russian, ISBN 978-5-7692-1237-6).

Refereed Journal Articles

1. **Kurnosov M.** *Analysis and Optimization of a k-chain Reduction Algorithm for Distributed Computer Systems* // Journal "Numerical Methods and Programming", 2017. – Vol. 17. – pp. 318-328 (in Russian).
2. Kulagin I., **Kurnosov M.** *Instrumentation and optimization of transactional sections execution in multithreaded programs* // Proceedings of the Institute for System Programming. – 2015. – Vol. 27 (6). – pp. 135-150 (in Russian).
3. Kulagin I., Paznikov A. **Kurnosov M.** *Heuristic Algorithms for Optimizing Communications in Parallel PGAS-programs* // Journal "Vestnik SibGUTI", 2014, No. 3, pp. 52-66 (in Russian).
4. Pavsky K., **Kurnosov M.**, Polyakov A. *Software Tools for Optimizing Parallel Modeling of Nanostructures with Quantum Dots*. Journal "Avtometria", 2014, Vol. 50(3), pp. 56-61 (in Russian).

5. **Kurnosov M**., Paznikov A. *Heuristic Algorithms for Mapping Parallel MPI Programs into Multicluster Computer and Grid Systems*. Journal "Vichislitelnie metodi I programmirovanie", 2013, Vol. 14(2), pp. 1-10 (in Russian).
6. **Kurnosov M.** *MPIPerf: a Toolkit for Benchmarking MPI-libraries*. Journal "Vestnik NNGU", 2012, No. 5(2), pp. 385-391 (in Russian).
7. **Kurnosov M.**, Paznikov A. *Modelling of Decentralized Algorithms for Scheduling Jobs in Grid Systems,* Journal "Problemi informatiki", 2012, No. 2, pp. 45-54 (in Russian).
8. **Kurnosov M.**, Paznikov A. *Decentralized Algorithms for Scheduling Parallel Tasks in Geographically-distributed Computer Systems.* Journal "Vestnik TGU. Upravlenie, vichislitelnaya tehnika i informatika", 2012, No. 1(18), pp. 133-142 (in Russian).
9. **Kurnosov M.** *Allgather Algorithms for Hierarchical Distributed Computer Systems*. Journal "Vestnik Komputernih i Informacionnih Tehnologiy", 2011, No. 5, pp. 27-34 (in Russian).
10. Khoroshevsky V.G., **Kurnosov M.G.**, Mamoilenko S.N., *Geographically-distributed Mulitcluster Computer System: Architecture and Software*. Journal "Vestnik TGU. Upravlenie, vichislitelnaya tehnika i informatika", 2011, No. 1(14), pp. 79-84 (in Russian).
11. **Kurnosov M.** *Optimization of Collective Communications Routines in Computer Systems with Hierarchical Networks*. Journal "Vestnik TGU. Upravlenie, vichislitelnaya tehnika i informatika", 2011, No. 2(15), pp. 61-71 (in Russian).
12. **Kurnosov M.**, Paznikov A. *Algorithms and Software Tools for Decentralized Scheduling of MPI Programs in Multicluster Computer Systems*. Journal "Vestnik TGU. Upravlenie, vichislitelnaya tehnika i informatika", 2011, No. 3(16), pp. 78-85 (in Russian).
13. Khoroshevsky V.G., **Kurnosov M.G.**, Mamoilenko S.N., Pavsky K.V., Efimov A.V., Paznikov A.A., Perishkova E.N. *Scalable Software Tools for Parallel Multiprogramming in Distributed Computer Systems*. Journal "Vestnik SibGUTI", 2011, No. 4, pp. 3-18 (in Russian).
14. **Kurnosov M.** *Structure-oriented Method for Optimizing MPI Collective Communications in Distributed Computer Systems*. Journal "Vestnik SibGUTI", 2010, No. 2(10), pp. 54-65 (in Russian).
15. Khoroshevsky V.G., **Kurnosov M.G.**, Mamoilenko S.N., Polyakov A.Yu. *Architecture and Software tools of multicluster computer systems*. Journal "Vestnik SibGUTI", 2010, No. 2(10), pp. 112-122 (in Russian).
16. **Kurnosov M.**, Paznikov A. *Decentralized Scheduling of Parallel Tasks in Geographically-distributed Computer Systems.* Journal "Vestnik SibGUTI", 2010, No. 2(10), pp. 79-86 (in Russian).
17. Khoroshevsky V.G., **Kurnosov M.G.** *Algorithms for Assigning Parallel Program Branches to Computer System Processor Cores* // Optoelectronics, Instrumentation and Data Processing. – 2008. – Vol. 44, No. 2. – P. 135-143.

Conference/Workshop Proceedings

1. **Kurnosov M.** *Dynamic Mapping of All-to-All Collective Operations into Hierarchical Computer Clusters* // Proc. of Int. scientific-technical conference on Actual Problems of Electronic Instrument Engineering (APEIE-2016), 2016. – Vol. 1, Part 2. – 475-478.
2. Kulagin I., **Kurnosov M.** *Optimization of conflict detection in parallel programs with transactional memory* // Proc. of 10th Annual International Scientific Conference on Parallel Computing Technologies (PCT-2016). – pp. 582-594.
3. Kulagin I., Paznikov A., **Kurnosov M.** *Heuristic Algorithms for Optimizing Communications in Parallel PGAS-programs* // Proc. of the 13th International Conference on Parallel Computing Technologies, 2015. – Springer Lecture Notes in Computer Science. Vol. 9251. – pp. 405-409.
4. **Kurnosov M.**, Malikov K. *Efficiency Analysis of Parallel Matrix Multiplication in MPI and Cray Chapel //* Proceedings of Russian Conference "Modern Problems of Telecommunications", – Novosibirsk: SibSUTIS, 2013. – P. 163-164.
5. **Kurnosov M.**, Paznikov A. *Efficiency Analysis of Decentralized Grid Scheduling with Job Migration and Replication //* 7th International ACM Conference on Ubiquitous Information Management and Communication (ICUIMC-2013), Malaysia, 2013. – 7 p.
6. Khoroshevsky V., **Kurnosov M.** *Mapping Parallel Programs into Hierarchical Distributed Computer Systems* // Proceedings of 4th International Conference "Software and Data Technologies (ICSOFT 2009)", – Sofia: INSTICC, 2009. – Vol. 2. – P. 123-128.

7. Khoroshevsky V.G., Mamoilenko S.N., **Kurnosov M.G.**, Medvedeva N.A. *Space-distributed Multicluster Computer System for Training in Parallel Computational Technologies* // Proc. of 7th International Siberian Workshop and Tutorial (EDM-2006). – Erlagol: IEEE Press, 2006. – P. 218-219.
8. **Kurnosov M.G.** *MPIPerf: a Toolkit for Benchmarking MPI-libraries* // Proc. of International conf. "Parallel Computational Technologies", Novosibirsk, Russia, 2012, pp. 212-223 (in Russian).
9. Khoroshevsky V., **Kurnosov M.**, Mamoilenko S. *Scalable Multicluster Computer System* // Proc. of. International conference "Mathematical and Informational Technologies" (MIT-2011), Serbia, Montenegro, 2011, 6 p. (in Russian)
10. **Kurnosov M.G.** *Topology-aware Collective Communication Algorithms for Distributed Computer Systems* // Proc. of Conference "Supercomputer technologies: development, programming, application" (SCT-2010), Divnomorskoe, Russia, 2010, Vol. 2, pp. 62-66 (in Russian).
11. **Kurnosov M.G.** *Structure-oriented Subsystems Allocation in Computer Systems* // Proc. of conference "High-performance parallel computing on clusters", Kazan, Russia, 2008 (in Russian).
12. Khoroshevsky V., **Kurnosov M.** *Modelling of Algorithms for Mapping Parallel Applications into Structures of Computer Systems* // Proc. of international conf. "Simulation-2008", Kiev, Ukraine, 2008, Vol. 2, pp. 435-440 (in Russian).
13. **Kurnosov M.** *Parallel Algorithm for Mapping Communication Graph of MPI Task into Computer System* // Proc. of international conf. "Parallel Computational Technologies", Chelyabinsk, Russia, 2008 (in Russian).
14. **Kurnosov M.** *Experience in Building Computer Clusters with a Remote Diskless Boot* // Proc. of conference "High-performance parallel computing on clusters", Nizhny Novgorod, 2005, pp. 149-154 (in Russian).

Dissertation

- **Kurnosov M.** *Algorithms for Functioning Organization of Hierarchical Distributed Computer Systems* (Doctor of Science), Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia, October 2016.
- **Kurnosov M.** *Models and Algorithms of Mapping Parallel Programs into Distributed Computer Systems,* Ph.D. Dissertation (Candidate of Science), Siberian State University of Telecommunications and Information Sciences, Novosibirsk, Russia, December 2008 (Advisor: Corresponding Member of RAS Prof. V.G. Khoroshevsky).

Research Grants

- *Models, Methods and Software for Efficient Execution of Parallel Programs on Multiarchitectural Computer Systems*, Principle investigator, Russian Foundation for Basic Research, 2011-2013.
- *Topology-aware Algorithms and Software for Functioning Organization of Distributed Computer Systems,* Principle investigator, Russian Foundation for Basic Research, 2008-2010.
- *Development of Tools for Mapping Parallel MPI Programs into Multicore Computer Clusters*, Principle investigator, Foundation for Assistance to Small Innovative Enterprises, 2008-2009.
- Grant of Novosibirsk's Administration, Principle investigator, 2009.

Attended Schools and Workshops

- Course "**Architecture of High-Performance Computer Clusters**", Institute for System Programming of RAS, Moscow, 2009
- **Intel Multicore Programming for Academia**, Intel, Nizhny Novgorod, Russia, 2007
- **Java Programming**, Sun Microsystems, Novosibirsk, 2007
- **Russian-German Schools on Parallel Programming and High-Performance Computing Systems**, Institute of Computational Technologies SB RAS, Novosibirsk, 2006-2008
- **Intel Summer School**, Intel, Nizhny Novgorod, Russia, 2006

Professional Memberships

- **Association for Computing Machinery** (ACM), Member, 2010–2014
- **IEEE Computer Society**, Member, 2006–2007