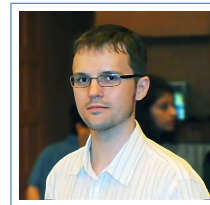


Dmitry Mikushin

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Academic experience

- 2015–present Research Associate, University of Zurich, Institut für Banking und Finance, Switzerland.
HPC/GPU programming & optimization for high-dimensional dynamic stochastic economic models.
- 2012–present Doctoral Assistant, University of Lugano, Switzerland.
Assisting education and research activities lead by Prof. Olaf Schenk.
- 2013 Visiting Scholar, Rutgers University, New Jersey, US.
Joint research activities with Prof. Eddy Zheng Zhang. Analyzed the efficiency of atomics on different families of NVIDIA GPUs. Tuned GPU kernels optimizations in KernelGen compiler.
- 2011–2012 Book editor.
Parallel computing on GPU. Architecture and CUDA programming model (in Russian). Alexey Boreskov, Alexander Kharlamov, Nikolay Markovskiy, Dmitry Mikushin, Evgeny Mortikov, Alexander Myltsev, Nikolai Sakharlykh, Vladimir Frolov. MSU Publishing (June 2012).
- 2009–2010 Lecturer, GPU Programming Course & HPC Summer School, Lomonosov Moscow State University.
Presented lectures and hands-ons on integrating CUDA with MPI and multi-threading, and on debugging CUDA applications.
- 2008–2011 Junior scientist, Supercomputer simulation laboratory for climate modeling, Research Computing Center, Lomonosov Moscow State University, Russia.
Numerical and performance evaluation of various mesoscale and regional models. Experimented with deploying key model dynamics blocks on CellBE and GPUs.
- 2006–2007 Contractor, Global Energy Problems Lab, Moscow Energy Institute.
Implemented toolbox for Voronoi tessellation and regression analysis in C#.

Professional experience

- 2014–present Owner, Applied Parallel Computing LLC (CUDA Education & Research in EMEA), <http://parallel-computing.pro/>.
- 2011–present Project lead, KernelGen open-source compiler toolchain, <http://kernelgen.org/>.
Design and development of LLVM-based compiler for identifying parallel loops in C/Fortran code and converting them into GPU kernels. Strategic planning, interacting with community, creating new partnerships.
- 2011–2012 CTO, Applied Parallel Computing LLC (CUDA Education & Research in EMEA), Dubna, Moscow Region, Russia, <http://parallel-computing.pro/>.
Managing technological aspects in company's GPGPU training and software development business. Created course list on comprehensive CUDA training program, implemented original presentations and hands-ons, later used in CUDA 4.x Handbook in Russian. Served as trainer on events in Germany, Ireland and Russia. Organizing and reviewing work of 7 company's contracted trainers/developers. Responsible for interaction with customers and partners worldwide.
- 2009–2011 DevTech Engineer, NVIDIA, Moscow, Russia.
Ported parts of numerical weather prediction models onto GPUs: spectral solver benchmark (Russian Met Office), GPU kernels generator for COSMO model (Deutscher Wetterdienst et al). Supported customers and developers on CUDA programming in HPC applications, provided training sessions. PhysX game physics engine: implemented SPU-interacting radix sort for rigid bodies broad phase algorithm on Cell Broadband Engine processor (Sony PlayStation 3), made first experimental Tegra/ARM ports of PhysX engine, helped with Linux port.

Awards

- 2013 PhD fellowship, Rutgers University, Department of Computer Science.
- 2011 CUDA Certificate 016-2011/29.10.2011, NVIDIA, Moscow, Massively parallel processors, CUDA architecture and programming environment.
- 2008 PhD fellowship, Institute of Numerical Mathematics, Russian Academy of Science.
- 2008 T-Platforms PowerXCell 8i Programmers Contest, second award, Optimization of mathematical modeling package for hydrodynamics “GeoPhyCell”.
- 2008 Best Student Diploma, second award, Numerical modeling of mesoscale aerosol transfer due to hydrological inhomogeneity of the boundary layer.

Education

- 2012–present PhD, University of Lugano, Institute of Computational Science, Switzerland.
- 2008–2011 PhD (ABD – passed qualification and comprehensive examinations), Institute of Numerical Mathematics, Russian Academy of Science, Moscow.
- 2003–2008 Specialist (5-year B.S. + M.S program), Faculty of Computational Mathematics and Cybernetics, Lomonosov Moscow State University, Computational Technologies and Modeling.

Master thesis

- title Numerical modeling of mesoscale aerosol transfer due to hydrological inhomogeneity of the boundary layer
 - supervisors Dr. Vasily N. Lykossov, Dr. Victor M. Stepanenko
- Implemented and analyzed Smolarkiewicz transport scheme, the positive-definite method of LaxWendroff class. Resulting source code was incorporated into regional non-hydrostatic model of atmosphere and boundary layer (NH3D) and used to trace passive aerosol. Experiments with real terrains showed significant numerical accuracy improvement both in mass conservation and approximation order over leapfrog and first order transport schemes.

Publications

Dmitry Mikushin, Nikolay Likhogrud, Eddy Z. Zhang, and Christopher Bergström. KernelGen – the design and implementation of a next generation compiler platform for accelerating numerical models on gpus. In Proceedings of the 2014 IEEE International Parallel & Distributed Processing Symposium Workshops, IPDPSW '14, pages 1011–1020, Washington, DC, USA, 2014. IEEE Computer Society.

Alexey Boreskov, Alexander Kharlamov, Nikolay Markovskiy, Dmitry Mikushin, Evgeny Mor-tikov, Alexander Myltsev, Nikolai Sakharnykh, and Vladimir Frolov. Parallel computing on GPU. Architecture and CUDA programming model (in Russian). MSU Publishing, 2012.

Dmitry Mikushin and Victor Stepanenko. The implementation of regional atmospheric model numerical algorithms for Cell Broadband Engine Architecture -based clusters. In Roman Wyrzykowski, Jack Dongarra, Konrad Karczewski, and Jerzy Wasniewski, editors, PPAM (1), volume 6067 of Lecture Notes in Computer Science, pages 525–534. Springer, 2009.

Dmitry Mikushin and Victor Stepanenko. Numerical modeling of mesoscale dynamics of the atmosphere and tracer transport above the hydrologically heterogeneous surface. volume 13, Special issue 3 of Computational technologies, 2008.

Selected talks

Dmitry Mikushin, Nikolay Likhogrud, Sergey Kovylov. KernelGen: A Prototype of Auto-parallelizing Fortran/C compiler for NVIDIA GPUs, GPU Technology Conference 2013, [available online](#).

Active skills

- CS/Research Explore new environments/software and teach others to use them, design & perform experiments to analyse hardware/software properties and generalize findings into practically useful methods/tools.
- HPC/Engineer Fluency in full development & support cycle of HPC applications for Linux clusters: programming, parallelization for different architectures, debugging, profiling.
- Compilers Basic knowledge of compilers internal structure, contributions to LLVM. Designed and developed KernelGen – a prototype of auto-parallelizing Fortran/C compiler for NVIDIA GPUs, targeting numerical modelling code.
- Dev
- GPU Experience with NVIDIA GPU binary format and Fermi/Kepler assembler, profiling & optimization.
- low-level
- Numericals Practical experience with linear solvers, PDEs and related cache-aware optimizations.
- NWP Engineer-level experience with numerical weather prediction models: WRF-ARW, COSMO.

Teaching

- 2014 Parallel & Distributed Computing Lab, University of Lugano.
5 practical assignments on code porting, profiling & optimization for TBB, MPI, CUDA, CellBE and Xeon Phi.
- 2014 Parallel & Distributed Computing, University of Lugano.
The fundamentals of concurrent execution. Threading in Java. The basics of OpenMP and MPI.
- 2013 Parallel & Distributed Computing Lab, University of Lugano.
Configuration & deployment of scientific codes on modern GPU-enabled HPC facilities, by example of SWE tsunami simulation model and CSCS “Tödi” cluster

Languages

- English fluent technical
- Russian native