

# Sergey Litvinov

Chair of Computational Science, ETH Zurich, Switzerland

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## Experience

### 04.2015 – present: Postdoctoral Researcher

#### Chair of Computational Science, ETH Zurich

- Led a team to develop a particle-based code with CUDA and MPI. Established processes for testing, validation and documentation.
- Developed highly efficient code for multi-GPU clusters.
- Developed and implemented various computational and statistical models for bio-medical and industrial applications (C++, parallel data processing, PyTorch, Docker).
- Applied hierarchical Bayesian analysis on big data (PyMC3, probabilistic programming).
- Big data visualization.
- Teaching and supervision of PhD students.
- Authored successful research proposals.
- Authored research papers and presentations at international conferences.

### 05.2006 – 12.2014: Research Associate

#### Institute of Aerodynamics and Fluid Mechanics, TU Munich

- Improved accuracy and performance of particle-based algorithms (C++, parallel computing).
- Simulated complex polymer and microfluidic systems (unix).
- Developed novel particle-based algorithms for image and graph processing.
- Teaching and supervision of Master students.

### 02.2005 – 04.2006: Research Assistant

#### Laboratory of Industrial Chemistry, Ruhr-University Bochum

- Kinetic modeling in heterogeneous catalysis, reactors simulations using finite element method.
- Chemical reactor modeling.

## Education

### 04.2014: PhD, summa cum laude (Mechanical Engineering)

Institute of Aerodynamics and Fluid Mechanics, TU Munich

### 02.2004: Master of Science (Materials Science)

Faculty of Materials Science, Moscow State University

## Skills

- Programming languages: C, C++, Fortran, Python (NumPy, SciPy), MATLAB/Octave, computer algebra (Maxima), shell (sh), AWK, SQL
- Programming tools: unix/linux utilities, version control (git), build automation (make, cmake, Autotools)
- Visualization: gnuplot, Matplotlib, VisIt, paraview, geomview
- Documentation: L<sup>A</sup>T<sub>E</sub>X, org-mode, asciidoc
- Parallel: Data Pipelines, Slurm, Message Passing Interface, computing on graphical processing units (CUDA), supercomputers
- Data analysis: classical statistics (R), Bayesian inference (PyMC3), machine learning (scikit-learn)
- Engineering practice: continuous integration, simple deployment, regression and unit testing, develop tools and libraries

## Publications

Peer-reviewed journals: Phys. Fluids, J. Non-Newtonian Fluid Mech., J. Comp. Phys., J. Chem. Phys., Phys. Rev. E, Energy Environ. Sci., Langmuir, Microfluidics and Nanofluidics  
[scholar.google.com/citations?user=2IhNRREAAAAJ](https://scholar.google.com/citations?user=2IhNRREAAAAJ)

## Awards

- 2019 American Physical Society, the Division of Fluid Dynamics, Gallery of Fluid Motion Award
- 7th Annual European Rheology Conference'11, Soft Matter poster award, runner-up
- DAAD Research Fellowship'04

## Miscellaneous

- Open source packages:
  - [github.com/cselab/aphros](https://github.com/cselab/aphros): a highly efficient and scalable solver, which supports distributed and hybrid execution modes
  - [github.com/cselab/corpuscles](https://github.com/cselab/corpuscles): a library to resolve the elastic energy and force of a membrane surface
  - [amlucas.github.io/udoc](https://amlucas.github.io/udoc): a particle-based GPU code using CUDA and MPI
- Contributed to open source projects: maxima (a computer algebra system), org-mode, pkgsrc (a package management system).
- StackExchange profile: [stackexchange.com/users/123976/slitvinov](https://stackoverflow.com/users/123976/slitvinov)
- Qualified to *Google Code Jam* Round 2 in 2018, 2019, and 2020.

## Coursera

- Asset Pricing, Part I (The University of Chicago, John Cochrane)
- Financial Engineering and Risk Management Part II (Columbia University, Martin Haugh)
- Computing for Data Analysis (Johns Hopkins University)
- Health in Numbers: Quantitative Methods in Clinical and Public Health Research (Harvard University)

## Languages

English: fluent, German: B2.