

Johannes Blaschke, PhD

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📍 JBlaschke
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Professional Experience

- 2017 – 2019 **Computational Scientist (Postdoc)**, *Lawrence Berkeley National Lab*, Berkeley, USA.
Research and software development position, working as part of the MFiX-Exa (CFD-DEM multi-phase flow) and FHDeX (fluctuating hydrodynamics) teams. Contributor to the AMReX exascale computing software suite.
- Building partial (stochastic) differential equation solvers capable of adaptive mesh refinement (using C++, Fortran, MPI, openMP, and CUDA). Running simulations on High-Performance Computing systems such as NERSC's Cori system.
 - Analyzing scientific data (using Julia and the Python scientific stack) focusing on the collective dynamics of hydrodynamically and chemically interacting particles in fluids.
 - Training new users, and leading workshops, on the AMReX software framework. Mentoring undergraduate and graduate students, collaborating on funding proposals, and communicating scientific results.
- 2014 – 2017 **Research Scientist (Postdoc)**, *Technische Universität Berlin*, Berlin, Germany.
Research and teaching position in the *Statistical Physics of Soft Matter and Biological Systems* group.
- Designing and implementing parallelized hydrodynamics solvers (using C/C++ and MPI). Deploying simulations on High-Performance Computing systems. Coordinating the implementation of these solvers in other projects within the research group.
 - Analyzing scientific data (using C and the Python scientific stack), and developing novel mathematical models investigating the collective dynamics of biological micro-swimmers.
 - Mentoring students, lecturing, collaborating on funding proposals, and communicating scientific results.
- 2010 – 2014 **PhD Student, from 2014: Postdoctoral Researcher**, *Max Planck Institute for Dynamics and Self-Organization*, Göttingen, Germany.
Research position in the *Dynamics of Complex Fluids* department, with the objective of constructing novel stochastic models for far-from-equilibrium transport processes.
- Building stochastic differential equation, and molecular dynamics, solvers (using Java and C).
 - Developing statistical models (using Cython and analytical techniques).
 - Analyzing scientific data (using C and the Python scientific stack) and communicating scientific results (in conferences and journals).

Professional Activities

Ongoing Grants and Fundraising

- 2019 **Laboratory Directed Research And Development, Co-applicant**, *Lawrence Berkeley National Laboratory*, Two proposals to fund collaborative work-groups on: 1) machine learning for science, and 2) simulation tools for meso-scale chemical systems.

Successful Grants and Fundraising

- 2019 **Project Funding, Co-application**, *Department of Energy Visiting Faculty Program (VFP)*, Funding for a faculty researcher and two students to work at LBL for 10 weeks.
- 2015–2017 **Computing Resources, Principal Applicant**, *North-German Supercomputing Alliance (HLRN)*, Total value of granted computing time: 429 000 EUR.

2017 **Project Funding, Co-applicant**, *German Research Foundation (DFG)*, Funding for one PhD position as part of the DFG priority program SPP 1726.

Other Activities

2014-present **Supervision/Mentoring**, 2 Undergraduate, and 5 Graduate Students.

Referee, for *Nature Scientific Reports*, *Soft Matter (RSC)*, *Chemical Communications (RSC)*, *Physical Chemistry Chemical Physics (RSC)*, *CAMCoS*, and *JSTAT*.

Education

2010–2014 **Ph.D.**, *Georg-August-Universität*, Göttingen, Germany, Grade: *summa cum laude*.

Research was conducted in collaboration with the Max Planck Institute for Dynamics and Self-Organization.

doctoral thesis *Entropic Motors: Directed Motion without Energy Flow*

<http://hdl.handle.net/11858/00-1735-0000-0022-5E50-C>

2008–2010 **M.Sc.**, *Philipps-Universität Marburg*, Marburg, Germany, Grade: 1.3.

Masters degree in Physics. Thesis research was conducted in collaboration with the Max Planck Institute for Dynamics and Self-Organization in Göttingen.

masters thesis *Formation and Evolution of Breath Figures*

<http://archiv.ub.uni-marburg.de/ed/2010/0002/>

2004–2007 **B.A./B.Sc. Conjoint**, *The University of Auckland*, Auckland, New Zealand, Grade point average: 5.9.

Conjoint bachelors degree in Science (Physics major), and Arts (Mathematics major).

Programming Experience

C/C++ 5 years experience, specializing in:

- parallelized code using openMP and MPI for high-performance computing
- three-dimensional computational geometry and hydrodynamics solvers
- extending python modules using C-API

Fortran 2 years experience specializing in finite-volume PDE solvers

CUDA 1 year experience specializing in Monte-Carlo simulations, and finite-volume PDE solvers

Python 6 years experiences, specializing in:

- python scientific stack: *scipy*, *numpy*, *pandas*, *sympy*, and *jupyter*
- parallelized python (*multiprocess* and *ipyprarallel*), and network parallelization using *PyRO4*

Julia 2 years experience specializing in scientific computing

Java 2 years experience, specializing in scientific computing and computational geometry

A collection of open-source projects is publicly available at: gitlab.blaschke.science

Contributor: github.com/AMReX-Codes/amrex, github.com/AMReX-FHD/FHDeX

Peer-Reviewed Publications

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