

## Fabian A. Wermelinger

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CONTACT INFORMATION	CSElab Clausiusstrasse 33 ETH Zurich 8092 Zurich, Switzerland	<i>E-mail:</i> fabianw@mavt.ethz.ch
RESEARCH INTERESTS	Multi-phase flows, compressible and incompressible fluid dynamics, numerical modeling, high performance computing, data compression, algorithms, software design, computer architecture.	
EDUCATION	<b>ETH Zurich</b> , Switzerland PhD, January 2021 <ul style="list-style-type: none"><li>• Dissertation title: Petascale simulations of cloud cavitation collapse</li><li>• Advisor: Prof. Petros Koumoutsakos</li></ul> M.S., Computational Fluid Dynamics, January 2015 <b>University of Applied Sciences &amp; Arts (HSLU)</b> , Luzern, Switzerland B.A., Mechanical Engineering, July, 2010	
HONORS AND AWARDS	HSLU: Muller Martini Diploma Award, 2010 Purdue University: Dean's List & Semester Honors, 2009	
ACADEMIC EXPERIENCE	<b>ETH Zurich</b> , Switzerland <i>Graduate Student</i> <span style="float: right;"><b>May, 2015 - present</b></span> Includes current PhD research, PhD and Masters level coursework and research.  <i>Instructor</i> <span style="float: right;"><b>September, 2018 - present</b></span> Co-taught graduate level course for various Master of Science programs. Shared responsibility for lectures, exams, homework assignments, and grades. <ul style="list-style-type: none"><li>• High Performance Computing for Science and Engineering, Fall 2018</li><li>• High Performance Computing for Science and Engineering, Fall 2019</li></ul> <i>Teaching Assistant</i> <span style="float: right;"><b>May, 2015 - present</b></span> Duties at various times have included office hours and leading weekly computer lab exercises.  <b>California Institute of Technology</b> , USA  <i>Visiting Student Researcher</i> <span style="float: right;"><b>April, 2017 - July, 2017</b></span> Visiting PhD student in the group of Prof. Tim Colonius.  <b>HSLU Department for Fluid Dynamics</b> , Horw, Switzerland  <i>Teaching Assistant</i> <span style="float: right;"><b>August, 2010 - May, 2013</b></span> Duties at various times have included office hours and leading weekly hydraulic laboratory exercises.	

**Purdue University, USA**

*Exchange Semester*

**August, 2009 - December, 2009**

Exchange program in the department of Mechanical Engineering.

PROFESSIONAL  
EXPERIENCE

**HSLU Department for Fluid Dynamics, Horw, Switzerland**

*Research Assistant / Engineer*

**August, 2010 - May, 2013**

Performed numerical simulations of incompressible fluid flows with application to turbo machinery using the OpenFOAM library as well as Ansys CFX.

**HBI Haerter AG, Bern, Switzerland**

*Engineering Internship*

**Fall 2011**

Development of a C++ code for railway tunnel climate simulations. Quantification of measurement and simulation data.

COMPUTER SKILLS

- Languages: C/C++, CUDA, Fortran, Assembly, Python, Bash, Meson/Make/CMake, MPI, OpenMP.
- Visualization: ParaView, VTK, HDF.
- Software: Vim, Git, Unix/Linux, Macintosh.

PUBLICATIONS

A. Khosronejad, S. Kang, F. Wermelinger, P. Koumoutsakos and F. Sotiropoulos, "A computational study of expiratory particle transport and vortex dynamics during breathing with and without face masks", submitted to Physics of Fluids, 2021.

P. Karnakov, G. Arampatzis, I. Kičić, F. Wermelinger, D. Wälchli, C. Papadimitriou, and P. Koumoutsakos, "Data-driven inference of the reproduction number for COVID-19 before and after interventions for 51 European countries," in Swiss Medical Weekly, 150:w20313, 2020.

P. Karnakov, F. Wermelinger, S. Litvinov, and P. Koumoutsakos, "Aphros: high performance software for multiphase flows with large scale bubble and drop clusters," in Proceedings of the platform for advanced scientific computing conference on – PASC '20, 2020.

U. Rasthofer, F. Wermelinger, P. Karnakov, J. Šukys, and P. Koumoutsakos, "Computational study of the collapse of a cloud with 12500 gas bubbles in a liquid," Physical review fluids, vol. 4, p. 63602, 2019.

P. Karnakov, F. Wermelinger, M. Chatzimanolakis, S. Litvinov, and P. Koumoutsakos, "A high performance computing framework for multiphase, turbulent flows on structured grids," in Proceedings of the platform for advanced scientific computing conference on – PASC '19, 2019.

P. E. Hadjidoukas, and F. Wermelinger, "A parallel data compression framework for large scale 3D scientific data," CoRR, 2019, abs/1903.07761.

J. Šukys, U. Rasthofer, F. Wermelinger, P. Hadjidoukas, and P. Koumoutsakos, "Multilevel control variates for uncertainty quantification in simulations of cloud cavitation," SIAM journal on scientific computing, vol. 40, iss. 5, p. B1361–B1390, 2018.

F. Wermelinger, U. Rasthofer, P. E. Hadjidoukas, and P. Koumoutsakos, "Petascale simulations of compressible flows with interfaces," Journal of computational science, vol. 26, p. 217–225, 2018.

U. Rasthofer, F. Wermelinger, P. Hadjidoukas, and P. Koumoutsakos, "Large scale simulation of

cloud cavitation collapse,” *Procedia computer science*, vol. 108, p. 1763–1772, 2017.

F. Wermelinger, B. Hejazialhosseini, P. Hadjidoukas, D. Rossinelli, and P. Koumoutsakos, ”An efficient compressible multicomponent flow solver for heterogeneous CPU/GPU architectures,” in *Proceedings of the platform for advanced scientific computing – PASC ’16*, 2016.

P. E. Hadjidoukas, D. Rossinelli, F. Wermelinger, J. Sukys, U. Rasthofer, C. Conti, B. Hejazialhosseini, and P. Koumoutsakos, ”High throughput simulations of two-phase flows on Blue Gene/Q,” in *Parallel computing: on the road to exascale, proceedings of the international conference on parallel computing, ParCo 2015*, 2015, p. 767–776.