

Samuel LANTHALER

PERSONAL DATA

• [GOOGLE SCHOLAR](#) • [ARXIV](#) • [ORCID](#) • [WEBSITE](#)

CITIZENSHIP: Switzerland
EMAIL: slanth@caltech.edu

EMPLOYMENT

SINCE 08/2022 | **Postdoc** in Computing + Mathematical Sciences at Caltech, USA
11/2021 – 07/2022 | **Postdoc/Lecturer** in Mathematics at ETH Zurich, Switzerland

EDUCATION

11/2018 – 11/2021 | **PhD in Mathematics** at ETH Zurich, Switzerland
Thesis: “[Computation and analysis of statistical solutions of the incompressible Euler equations](#)”
| Advisor: Prof. Siddhartha Mishra
08/2015 – 08/2020 | **PhD in Physics** at EPF Lausanne, Switzerland
Thesis: “[Kinetic-MHD stability of virtually collisionless plasmas](#)”
| Advisor: Prof. Jonathan P. Graves
09/2013 – 03/2015 | **Master of Science in Mathematics**, ETH Zurich
09/2010 – 09/2013 | **Bachelor of Science in Mathematics**, ETH Zurich

SELECTED PUBLICATIONS

1. “Error estimates for deepnets: A deep learning framework in infinite dimensions”, S. Lanthaler, S. Mishra, G.E. Karniadakis, *Trans Math Appl*, **6**(1), (2022), [tnac001](#),
2. “On universal approximation and error bounds for Fourier neural operators”, N. Kovachki, S. Lanthaler, S. Mishra, *JMLR*, **22**(290), (2021), 1-76
3. “Statistical solutions of the incompressible Euler equations”, S. Lanthaler, S. Mishra, C. Parés-Pulido, *Math. Models Methods Appl. Sci. (M³AS)*, **31**(2), (2021), 223-292
4. “On the conservation of energy in two-dimensional incompressible flows”, S. Lanthaler, S. Mishra, C. Parés-Pulido, *Nonlinearity*, **34**(2), (2021), 1084
5. “On the convergence of the spectral viscosity method for the two-dimensional incompressible Euler equations with rough initial data”, S. Lanthaler, S. Mishra, *Found Comput Math*, **20**, (2020), 1309–1362

TEACHING EXPERIENCE

- **Lecturer** for “Numerical Methods for Hyperbolic PDEs” (ETH Zurich; Spring 2022)
- **Co-supervision of young researchers:** (ETH Zurich, Spring and Autumn 2021)
 - **master theses (3)** (Fabian Jin, 2021, awarded *ETH Medal*; Patrik Hadorn, 2021; Michael Prasthofer, 2021),
 - **semester theses (2)** (Fabian Jin, 2021; Patrik Hadorn, 2021).
- **Head assistant** for **Linear Algebra** (autumn semesters 2019;2020;2021);
 - Conducting and organizing examinations, **350 students**,
 - Organization of exercise classes and exercises, **8 TAs**,
- **Class-room teaching:** TA for various courses at ETH Zurich and EPF Lausanne, in both *mathematics* and *physics*, including

- Numerical Methods for Hyperbolic PDEs (ETHZ; 2019); Mathematical Methods for Physicists (EPFL; 2017, 2018); Advanced Physics (EPFL; 2017); Computational Physics (EPFL; 2015, 2016); Numerical Mathematics (ETHZ; 2013); Differential Geometry (ETHZ; 2012)

SCIENTIFIC PRESENTATIONS

- Talk in the [Applied Math Seminar](#), UC Berkeley (2022),
- Minisymposium on “Provable Guarantees for Learning Dynamical Systems” [SIAM MD22](#), San Diego CA (2022),
- Minisymposium on “Operator Learning in PDEs, Inverse Problems, and UQ” [SIAM UQ22](#) (hybrid), Atlanta GA (2022),
- Minisymposium on “Recent Advances on Analysis and Numerics of Multidimensional Compressible Flows”, [SIAM PD22](#) (virtual), (2022),
- [Swiss Numerics Day 2021](#), EPF Lausanne, Switzerland (2021),
- Seminar on “Physics-Informed Learning Machines for Multiscale and Multiphysics Problems” ([PhILMs](#)), *virtual*, invited by G.E. Karniadakis, Brown University (2021),
- Minisymposium on *Incompressible Fluid Mechanics*, [SIAM PD19](#) in La Quinta, CA (2019),
- Workshop on [Interfaces and Instabilities in Fluid Dynamics](#) at the Hausdorff Research Institute in Mathematics in Bonn, Germany (2019),
- Invited speaker: [Theory of Fusion Plasmas](#), Varenna-Lausanne intl. workshop (2018),
- *XV Intl. Conference on Hyperbolic Problems (Hyp2014)*, in Rio de Janeiro, Brazil (2014).

RECOGNITION AND AWARDS

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|-------------------|---|
| 05/2022 | ETH Medal (ETH Zurich)
Awarded for outstanding doctoral thesis |
| 01/2022 – 12/2024 | GAMM Junior Fellow
Elected by the International Association of Applied Mathematics and Mechanics (GAMM) for outstanding work in doctoral thesis (10 junior fellows per year) |
| 01/2015 | ETH Medal (ETH Zurich)
Awarded for outstanding master’s thesis |
| 09/2013 – 01/2015 | Excellence Scholarship and Opportunity Programme (ETH Zurich)
A special scholarship to cover the full study and living costs for the duration of master’s degree, as well as specific supervision. |
| 12/2013 | Polya prize (ETH Zurich)
Awarded for best bachelor’s degree in mathematics and physics. |

PROFESSIONAL SERVICE

- Journal referee for [Calcolo](#), [Journal of Scientific Computing](#), [IMA Journal of Numerical Analysis](#), [SIAM Journal on Scientific Computing](#), [Vietnam Journal of Mathematics](#), [Neural Networks](#), [Connection Science](#), [Inverse Problems](#) and [Communications in Computational Physics](#).
- Organizer: Minisymposium “Theoretical foundations and algorithmic innovation in operator learning” [ICIAM 2023](#).

PROGRAMMING EXPERIENCE

Extended Experience: C++, FORTRAN-90/03 (with MPI-parallelization), MATLAB, PYTHON
 Basic Knowledge: CUDA, OPENACC, HTML

LANGUAGES

ENGLISH:	Fluent (C2)	FRENCH:	Advanced (C1)
GERMAN:	Mother tongue	KOREAN:	Intermediate (B1)