

# Samuel LANTHALER

## PERSONAL DATA

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

CITIZENSHIP: Switzerland  
EMAIL: [slanth@caltech.edu](mailto:slanth@caltech.edu)

## EMPLOYMENT

SINCE 08/2022 | **Postdoc** in Mathematics at California Institute of Technology, 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. \(M<sup>3</sup>AS\)](#), **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

## SCIENTIFIC PRESENTATIONS

- 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](#)), via Zoom, 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).

## TEACHING EXPERIENCE

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- **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)

## RECOGNITION AND AWARDS

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| 05/2022           | <a href="#">ETH Medal</a> (ETH Zurich)<br>Awarded for outstanding doctoral thesis   |
| 01/2022 – 12/2024 | <a href="#">GAMM Junior Fellow</a><br>Elected by the International Association of Applied Mathematics and Mechanics ( <a href="#">GAMM</a> ) for outstanding work in doctoral thesis (10 junior fellows per year)     |
| 01/2015           | <a href="#">ETH Medal</a> (ETH Zurich)<br>Awarded for outstanding master’s thesis   |
| 09/2013 – 01/2015 | <a href="#">Excellence Scholarship and Opportunity Programme</a> (ETH Zurich)<br>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           | <a href="#">Polya prize</a> (ETH Zurich)<br>Awarded for best bachelor’s degree in mathematics and physics.  |

## PROFESSIONAL SERVICE

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- Journal referee for [Calcolo](#), [Journal of Scientific Computing](#), [IMA Journal of Numerical Analysis](#), [SIAM Journal on Scientific Computing](#), [Connection Science](#) and [Communications in Computational Physics](#).

## PROGRAMMING EXPERIENCE

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

## LANGUAGES

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