

# Research Output

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## Preprints

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1. “The Nonlocal Neural Operator: Universal Approximation”, [S. Lanthaler](#), Z. Li, A. M. Stuart, (2023), *preprint*, [arXiv:2304.13221](#)
2. “Operator learning with PCA-Net: upper and lower complexity bounds”, [S. Lanthaler](#), (2023), *preprint*, [arXiv:2303.16317](#)

## Publications in peer-reviewed scientific journals

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### Papers with joint authorship/as first author:

3. “On concentration in vortex sheets”, [S. Lanthaler](#), *Partial Differ. Equ. Appl.*, **4**(13) (2023)
4. “Nonlinear Reconstruction for Operator Learning of PDEs with Discontinuities”, [S. Lanthaler](#), R. Molinar, P. Hadorn, S. Mishra, (2022), *ICLR* (2023)
5. “On Bayesian data assimilation for PDEs with ill-posed forward problems”, [S. Lanthaler](#), S. Mishra, F. Weber, (2022), *Inverse Problems*, **38**(8):085012 (2022)
6. “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](#),
7. “On universal approximation and error bounds for Fourier neural operators”, N. Kovachki, [S. Lanthaler](#), S. Mishra, *Journal of Machine Learning Research*, **22**(290), (2021), 1-76
8. “On the approximation of functions by tanh neural networks”, T. De Ryck, [S. Lanthaler](#), S. Mishra, *Neural Networks*, **143**, (2021), 732-750
9. “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
10. “On the conservation of energy in two-dimensional incompressible flows”, [S. Lanthaler](#), S. Mishra, C. Parés-Pulido, *Nonlinearity*, **34**(2), (2021), 1084
11. “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
12. “Guiding-centre theory for kinetic-magnetohydrodynamic modes in strongly flowing plasmas”, [S. Lanthaler](#), J. P. Graves, D. Pfefferlé, W. A. Cooper, *Plasma Phys. Control. Fusion*, **61**, (2019), 074006
13. “Higher order Larmor radius corrections to guiding-centre equations and application to fast ion equilibrium distributions”, [S. Lanthaler](#), D. Pfefferlé, J. P. Graves, W. A. Cooper, *Plasma Phys. Control. Fusion*, **59**, (2017), 044014
14. “Statistical solutions of hyperbolic conservation laws I: Foundations”, U. S. Fjordholm and [S. Lanthaler](#) and S. Mishra, *Arch. Ration. Mech. An.*, **226**(2), (2017), 809–849

15. “Computation of measure-valued solutions for the incompressible Euler equations”, [S. Lanthaler](#), S. Mishra, *Math. Models and Methods Appl. Sci.*, **25**, (2015), 2043-2088

#### Co-authored papers:

16. “Three-dimensional magnetohydrodynamic equilibrium of quiescent H-modes in tokamak systems”, W. A. Cooper, J. P. Graves, B. P. Duval, O. Sauter, J. M. Faustin, A. Kleiner, [S. Lanthaler](#), H. Patten, M. Raghunathan, T.-M. Tran, *Pasma Phys. Control. Fusion*, **58**, (2016) 064002
17. “Modelling of advanced three-ion ICRF heating and fast ion generation scheme for tokamaks and stellarators”, J. M. Faustin, J. P. Graves, W. A. Cooper, [S. Lanthaler](#), L. Villard, D. Pfefferlé, J. Geiger, Ye O. Kazakov, D. Van Eester, *Pasma Phys. Control. Fusion*, **59**, (2017) 084001
18. “The DEMO wall load challenge”, R. Wenninger, R. Albanese, R. Ambrosino, F. Arbeiter, J. Aubert, C. Bachmann, L. Barbato, T. Barrett, M. Beckers, W. Biel, L. Boccaccini, D. Carralero, D. Coster, T. Eich, A. Fasoli, G. Federici, M. Firdaouss, J. Graves, J. Horacek, M. Kovari, [S. Lanthaler](#), V. Loschiavo, C. Lowry, H. Lux, G. Maddaluno, F. Maviglia, R. Mitteau, R. Neu, D. Pfefferlé, K. Schmid, M. Siccino, B. Sieglin, C. Silva, A. Snicker, F. Subba, J. Varje and H. Zohm, *Nuclear Fusion*, **57**, (2017) 046002
19. “Stellarator nonlinearly saturated periodicity-breaking ideal magnetohydrodynamic equilibrium states”, W. A. Cooper, D. López-Bruna, M. A. Ochando, F. Castejón, J. P. Graves, A. Kleiner, [S. Lanthaler](#), H. Patten, M. Raghunathan, J. M. Faustin and the TJ-II Team, *Nuclear Fusion*, **58**, (2018) 124002
20. “Reduced models for parallel magnetic field fluctuations and their impact on pressure gradient driven MHD instabilities in axisymmetric toroidal plasmas”, J. P. Graves, D. Zullino, D. Brunetti, [S. Lanthaler](#), C. Wahlberg, *Pasma Phys. Control. Fusion*, **61**, (2019) 104003

#### Peer-reviewed books/monographs

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- “Kinetic-MHD stability of virtually collisionless plasmas”, [S. Lanthaler](#), *PhD Thesis-No. 10'142*, (2020), EPFL
- “Computation and analysis of statistical solutions of the incompressible Euler equations”, [S. Lanthaler](#), *Diss. ETH No. 27930*, (2022), ETH Zurich

#### Unpublished work

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- “On the first and second variation of area and its applications”, [S. Lanthaler](#), *BSc thesis*, (2013) ETH Zurich
- “Computation of measure-valued solutions of the incompressible Euler equations”, [S. Lanthaler](#), *MSc thesis*, (2015) ETH Zurich