

Sepehr Mousavi

Doctoral Researcher · Scientific Machine Learning

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SKILLS

Programming	Python, C++, MATLAB, SQL
HPC	OpenMP, MPI, CUDA
Tools	JAX, PyTorch, Git, Linux, LaTeX, CMake, Doxygen, Sphinx
CAD / CAE	COMSOL, Ansys Fluent

LANGUAGES

English, French, German, Persian

SUMMARY

A computational scientist working at the intersection of applied mathematics, machine learning, and physics. My research focuses on scientific machine learning and operator learning, building neural surrogates that solve partial differential equations accurately and efficiently on arbitrary domains. I'm driven by bridging two worlds, classical numerical methods and learnable, data-driven system design, by translating advances from the broader machine learning landscape into the needs of physics simulation.

EDUCATION

Ph.D. in Operator Learning for Solid Mechanics
2024 – Present

ETH Zürich, Switzerland

- Within the Computational Mechanics group, I am working on artificial intelligence methods for science and engineering, specifically neural operators, with a focus on the applications and challenges that are commonly faced in solid mechanics problems. The project is supervised by Prof. Laura De Lorenzis (D-MAVT) and Prof. Siddhartha Mishra (D-MATH).

M.Sc. Computational Science and Engineering
2021 – 2024

EPFL, Switzerland

GPA 5.63/6.00 (93%)

- Master thesis (at ETH Zürich): *"Solving Multi-Scale Time-Dependent Partial Differential Equations with Graph Neural Networks"*

B.Sc. Mechanical Engineering
2016 – 2021

University of Tehran, Iran

GPA 18.35/20 (92%)

- Final project: *"A simulation tool for early-stage turbocharger matching for internal combustion engines"*

EXPERIENCE

Junior Data Scientist / Intern
Sep 2022 – Feb 2024

RIO Platform, Fondation Asile des Aveugles

Lausanne • 18 months

- Responsible for the development, maintenance and support of the main data-preparation pipeline of the data-science research platform
- Designed and implemented the pipeline, provided ad-hoc data engineering and software solutions, and wrote full documentation

Research Assistant
Feb 2022 – Jun 2022

Unsteady Flow Diagnostics Laboratory, EPFL

Lausanne • 5 months

- Developed an image-analysis pipeline for tracking, labelling and reconstructing the 3D position of markers on a flapping wing from stereo videos

Research Assistant
Feb 2021 – Aug 2021

University of Tehran

Tehran • 7 months

- Contributed to a software product for 1D simulation of an industrial refrigeration cycle
- Developed the flow simulation inside the capillary tube and the compressor, the convergence algorithm and the graphical user interface (GUI)

Bachelor Student / Intern
Jun 2019 – May 2020

Irankhodro Powertrain Company (IPCO)

Tehran • 12 months

- Developed a simulation tool for initial turbocharger matching of internal-combustion engines and validated it against experimental engine data
- Compiled a database of digitised turbocharger characteristic curves

TEACHING

Head Teaching Assistant
Feb 2025 – Present

Introduction to Computing, ETH Zürich

200–300 students

- Managing the teaching assistants
- Designing, arranging, holding, and correcting exams
- Managing the exam supervision and correction team
- Designing and correcting coding exercises and homeworks

Teaching Assistant
Feb 2025 – Present

Experimental Mechanics, ETH Zürich

- Participating in exam and homework corrections

Undergraduate Teaching Assistant
Feb 2018 – Feb 2020

University of Tehran

- **Courses:** Thermodynamics, Strength of Materials, Physical Chemistry
- **Duties:** holding exercise sessions, preparing and grading assignments, and arranging and grading exams and quizzes

PUBLICATIONS

105 citations • h-index 5 • i10-index 5

[1] **Sepehr Mousavi**, S. Mishra, L. De Lorenzis. *Imposing Boundary Conditions on Neural Operators via Learned Function Extensions.* ICML 2026.

[2] S. Wen, A. Kumbhat, L. Lingsch, **Sepehr Mousavi**, Y. Zhao, P. Chandrashekar, S. Mishra. *Geometry-Aware Operator Transformer as an Efficient and Accurate Neural Surrogate for PDEs on Arbitrary Domains.* NeurIPS 2025.

[3] **Sepehr Mousavi**, S. Wen, L. Lingsch, M. Herde, B. Raonić, S. Mishra. *RIGNO: A Graph-based Framework for Robust and Accurate Operator Learning for PDEs on Arbitrary Domains.* NeurIPS 2025.

[4] E. Seiler, L. Delachaux, J. Cattaneo, A. Garjani, T. Martin, A. Duriez, J. Baffou, **Sepehr Mousavi**, I. Meloni, C. Bergin, M. Tomasoni, C. M. Eandi. *Importance of OCT-derived Biomarkers for the Recurrence of Central Serous Chorioretinopathy using Statistics and Predictive Modelling.* Scientific Reports, 14(1), 2024.

[5] **Sepehr Mousavi**, A. Garjani, A. Elwakil, L. P. Brock, A. Dherse, E. Forestier, M. Palaz, E. Seiler, A. Duriez, T. Martin, T. Wolfensberger, R. Schlingemann, I. Meloni, C. Bergin, M. Tomasoni. *Cohort Builder: a Software Pipeline for Generating Patient Cohorts with Predetermined Baseline Characteristics from Medical Records and Raw Ophthalmic Imaging Data.* Studies in Health Technology and Informatics (IOS Press), 316, 2024.

[6] **Sepehr Mousavi**, A. Nejat, S. S. Alaviyoun, M. Nejat. *An Integrated Turbocharger Matching Program for Internal Combustion Engines.* Journal of Applied Fluid Mechanics, 14(4), 2021.

REFERENCES

Laura De Lorenzis
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Ph.D. supervisor

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Ph.D. co-supervisor

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Academic supervisor