

Shizheng Wen 闻仕政

PhD Student in AI & Applied Mathematics, ETH Zürich

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🌐 [shizheng-wen.github.io](https://github.com/shizheng-wen)

🎓 [Google Scholar](#)

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Research Interests

Scientific computing and machine learning, with a focus on fast, scalable, and differentiable solvers for partial differential equations (PDEs): differentiable numerical methods, neural operator architectures for complex geometries, and large-scale PDE foundation models.

Education

ETH Zürich

2025 – Present

Ph.D. in Computational Mathematics and AI

Seminar for Applied Mathematics (SAM), Department of Mathematics; affiliated PhD, ETH AI Center.

Advisor: Prof. Siddhartha Mishra.

ETH Zürich

2022 – 2025

M.Sc. in Computational Science and Engineering [🔗 course categories & personal notes](#)

Department of Mathematics. **Advisor:** Prof. Siddhartha Mishra.

Awarded the **ETH Medal** for an outstanding master's thesis.

Duke University

2019

Visiting Undergraduate

Aeroelasticity Group, Department of Mechanical Engineering and Materials Science.

Advisor: Prof. Earl Dowell.

Nanjing University of Aeronautics and Astronautics (NCAA)

2016 – 2020

B.Eng. in Energy and Power Engineering (with distinction)

School of Energy and Power Engineering. **Advisor:** Prof. Xianglei Liu.

Open-Source Project

- **TensorMesh** – creator. A fast, differentiable, JIT-free, debugging-friendly, GPU-native finite-element library for PyTorch.
- **torch-sla** – creator. A memory-efficient, differentiable sparse linear-algebra / linear-solver library for PyTorch with multiple backends.

Publications

1. **Learning, Solving and Optimizing PDEs with TensorGalerkin: an Efficient High-Performance Galerkin Assembly Algorithm.**
Shizheng Wen*, Mingyuan Chi*, Tianwei Yu, Ben Moseley, Mike Yan Michelis, Pu Ren, Hao Sun, Siddhartha Mishra.
ICML, 2026. [\[arXiv\]](#) [\[code\]](#) [\[project\]](#)
2. **torch-sla: Differentiable Sparse Linear Algebra with Adjoint Solvers and Sparse Tensor Parallelism for PyTorch.**
Mingyuan Chi*, Shizheng Wen*.
Preprint, 2026. [\[arXiv\]](#) [\[code\]](#) [\[project\]](#)
3. **MOSIV: Multi-Object System Identification from Videos.**
Chunjiang Liu, Xiaoyuan Wang, Qingran Lin, Albert Xiao, Haoyu Chen, Shizheng Wen, Hao Zhang, Lu Qi, Ming-Hsuan Yang, Laszlo A. Jeni, Min Xu, Yizhou Zhao.
ICLR, 2026. [\[arXiv\]](#) [\[code\]](#)

4. **Geometry Aware Operator Transformer as an Efficient and Accurate Neural Surrogate for PDEs on Arbitrary Domains.**
Shizheng Wen, Arsh Kumbhat, Levi Lingsch, Sepehr Mousavi, Yizhou Zhao, Praveen Chandrashekar, Siddhartha Mishra.
NeurIPS, 2025. [[arXiv](#)] [[code](#)] [[project](#)]
5. **RIGNO: A Graph-based Framework for Robust and Accurate Operator Learning for PDEs on Arbitrary Domains.**
 Sepehr Mousavi, **Shizheng Wen**, Levi Lingsch, Maximilian Herde, Bogdan Raonić, Siddhartha Mishra.
NeurIPS, 2025. [[arXiv](#)] [[code](#)]
6. **Phase-field Simulation and Machine Learning of Low-field Magneto-elastocaloric Effect in a Multiferroic Composite.**
 Wei Tang, **Shizheng Wen**, Huilong Hou, Qihua Gong, Min Yi, Wanlin Guo.
International Journal of Mechanical Sciences, 2024. [[doi](#)]
7. **Feature Identification in Complex Fluid Flows by Convolutional Neural Networks.**
Shizheng Wen, Michael W. Lee, Kai M. Kruger Bastos, Ian Eldridge-Allegra, Earl H. Dowell.
Theoretical and Applied Mechanics Letters, 2023. [[doi](#)]
8. **A Machine Learning Strategy for Modeling and Optimal Design of Near-field Radiative Heat Transfer.**
Shizheng Wen, Chunzhuo Dang, Xianglei Liu.
Applied Physics Letters, 2022. [[doi](#)]
9. **High-performance Three-body Near-field Thermophotovoltaic Energy Conversion.**
 Chunzhuo Dang, Xianglei Liu, Haifeng Xia, **Shizheng Wen**, Qiao Xu.
Journal of Quantitative Spectroscopy and Radiative Transfer, 2021. [[doi](#)]
10. **Ultrahigh Thermal Rectification Based on Near-field Thermal Radiation between Dissimilar Nanoparticles.**
Shizheng Wen, Xianglei Liu, Sheng Cheng, Zhoubing Wang, Shenghao Zhang, Chunzhuo Dang.
Journal of Quantitative Spectroscopy and Radiative Transfer, 2019. [[doi](#)]

* Equal contribution.

Honors & Awards

- ICML Gold Reviewer 2026
- ETH Medal (top 2.5%) 2026
- National Scholarship (top 1%) 2019
- NUAAs Presidential Fellowship (top 0.1%) 2019

Invited Talks

- *Learning, Solving and Optimizing PDEs with TensorGalerkin: an Efficient High-Performance Galerkin Assembly Algorithm.*
 Simon Fraser University (host: Wuyang Chen). Mar 2026
- *Geometry Aware Operator Transformer as an Efficient and Accurate Neural Surrogate for PDEs on Arbitrary Domains.*
 Tsinghua University (host: Angelica Aviles-Rivero). Mar 2026
- *Accelerating Computational Science: From Differentiable Solvers to Geometry Aware Operator Transformers.*
 Stanford University (host: Charbel Farhat). Dec 2025

Teaching

- **Numerical Methods for Partial Differential Equations** (10 ECTS), 401-0674-00L.
 ETH Zürich, Spring 2026. [[course page](#)]
- **AI in the Sciences and Engineering** (6 ECTS), 401-4656-21L.
 ETH Zürich, Fall 2025. [[course page](#)]