Haixu Wu

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Education

Tsinghua University, Software Engineering, Doctor of Philosophy 2020 - 2025

- Advised by Prof. Mingsheng Long.
- With honor: **Tsinghua Top Grade Scholarship** (*10 per year, the highest honor for Tsinghua graduates*) and **Tsinghua Outstanding Young Researcher** (*10 per year, the highest honor for graduates in research*).

Tsinghua University, Software Engineering, Bachelor of Engineering 2016 - 2020

- With honor: **Outstanding Undergraduate** in Tsinghua University (*Top 10%*), and Beijing (*Top 5%*).

Tsinghua University, Mathematical Science, Bachelor of Science (Second Degree) 2017 - 2020

Experience

MIT CSAIL, Postdoc Researcher 2025 - Now

- Computational Design and Fabrication Group (CDFG).
- Advised by Prof. Wojciech Matusik.

Harvard University, Visiting Student 2019.7 - 2019.9

- Visual Computing Group (VCG).
- Advised by Prof. Hanspeter Pfister.

Research Interests

My research centers on scientific machine learning, aiming to develop *scaling principles for physical systems*–principles that remain largely absent from current foundation models and are essential for unlocking the full potential of AI for physical world. My work spans three main directions and has received over 20,000 citations:

1. Physics-grounded backbones: Autoformer (NeurIPS 2021), Corrformer (NMI 2023), Transolver (ICML 2023).
2. End-to-end physical foundation models: TimesNet (ICLR 2023), Unisolver (ICML 2025), GeoPT (arXiv 2026).
3. Efficient physical AI systems: Flowformer (ICML 2022), Transolver++ (ICML 2025), FlashBias (NeurIPS 2025).

Preprints

[1] GeoPT: Scaling Physics Simulation via Lifted Geometric Pre-Training

Haixu Wu*, Minghao Guo*, Zongyi Li, Zhiyang Dou, Mingsheng Long, Kaiming He, Wojciech Matusik

arXiv preprint, 2026 [PDF][Code][Project Page]

☆ **Best Paper Award ICLR 2026 Foundation Models for Science Workshop**

Selected Journal Articles

[1] Interpretable Weather Forecasting for Worldwide Stations with a Unified Deep Model

Haixu Wu, Hang Zhou, Mingsheng Long#, Jianmin Wang#

Nature Machine Intelligence (Nat. Mach. Intell.), 2023 [PDF][Code]

☆ **Cover Article for June Issue, 2023**

☆ **Youth Outstanding Paper Award Honorable Mention of WAIC 2024**

[2] PredRNN: A Recurrent Neural Network for Spatiotemporal Predictive Learning

Yunbo Wang*, **Haixu Wu***, Jianjin Zhang, Zhifeng Gao, Jianmin Wang, Philip S. Yu, Mingsheng Long#

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022 [PDF][Code]

☆ **ESI Highly Cited Paper, ESI Hot Paper**

Selected Conference Proceedings

[1] FlashBias: Fast Computation of Attention with Bias

Haixu Wu, Minghao Guo, Yuezhou Ma, Yuanxu Sun, Jianmin Wang, Wojciech Matusik, Mingsheng Long#

Neural Information Processing Systems (NeurIPS), 2025 [PDF][Code][Slides]

* Equal Contribution, # Corresponding Author

[2] RoPINN: Region Optimized Physics-Informed Neural Networks
Haixu Wu, Huakun Luo, Yuezhou Ma, Jianmin Wang, Mingsheng Long#
Neural Information Processing Systems (NeurIPS), 2024 [PDF][Code][Slides]

[3] Transolver: A Fast Transformer Solver for PDEs on General Geometries
Haixu Wu, Huakun Luo, Haowen Wang, Jianmin Wang, Mingsheng Long#
International Conference on Machine Learning (ICML), 2024 [PDF][Code][Slides] (**Spotlight Paper**)
☆ **Integrated into NVIDIA Modulus as the Latest Neural PDE Solver**

[4] Solving High-Dimensional PDEs with Latent Spectral Models
Haixu Wu, Tengge Hu, Huakun Luo, Jianmin Wang, Mingsheng Long#
International Conference on Machine Learning (ICML), 2023 [PDF][Code][Slides]

[5] TimesNet: Temporal 2D-Variation Modeling for General Time Series Analysis
Haixu Wu*, Tengge Hu*, Yong Liu*, Hang Zhou, Jianmin Wang, Mingsheng Long#
International Conference on Learning Representations (ICLR), 2023 [PDF][Code][Slides]
☆ **Paper Digest Most Influential Paper in ICLR 2023**

[6] Flowformer: Linearizing Transformers with Conservation Flows
Haixu Wu, Jialong Wu, Jiehui Xu, Jianmin Wang, Mingsheng Long#
International Conference on Machine Learning (ICML), 2022 [PDF][Code][Slides]

[7] Autoformer: Decomposition Transformers with Auto-Correlation for Long-Term Series Forecasting
Haixu Wu, Jiehui Xu, Jianmin Wang, Mingsheng Long#
Neural Information Processing Systems (NeurIPS), 2021 [PDF][Code][Slides]
☆ **Paper Digest Most Influential Paper of NeurIPS 2021**

[8] MotionRNN: A Flexible Model for Video Prediction with Spacetime-Varying Motions
Haixu Wu*, Zhiyu Yao*, Jianmin Wang, Mingsheng Long#
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021 [PDF][Code][Slides]

[9] Unisolver: PDE-Conditional Transformers Are Universal PDE Solvers
Hang Zhou*, Yuezhou Ma*, **Haixu Wu#**, Haowen Wang, Mingsheng Long#
International Conference on Machine Learning (ICML), 2025 [PDF][Code]
☆ **Win the 3rd in NeurIPS FAIR Universe Competition**

[10] Transolver++: An Accurate Neural Solver for PDEs on Million-Scale Geometries
Huakun Luo*, **Haixu Wu***, Hang Zhou, Lanxiang Xing, Yichen Di, Jianmin Wang, Mingsheng Long#
International Conference on Machine Learning (ICML), 2025 [PDF][Code]

[11] SimMTM: A Simple Pre-Training Framework for Masked Time-Series Modeling
Jiaxiang Dong*, **Haixu Wu***, Haoran Zhang, Li Zhang, Jianmin Wang, Mingsheng Long#
Neural Information Processing Systems (NeurIPS), 2023 [PDF][Code] (**Spotlight Paper**)

[12] Anomaly Transformer: Time Series Anomaly Detection with Association Discrepancy
Jiehui Xu*, **Haixu Wu***, Jianmin Wang, Mingsheng Long#
International Conference on Learning Representations (ICLR), 2022 [PDF][Code][Slides] (**Spotlight Paper**)
☆ **Ranked 14th of the Most Cited Papers in ICLR 2022**

[13] PhySense: Sensor Placement Optimization for Accurate Physics Sensing
Yuezhou Ma, **Haixu Wu**, Hang Zhou, Huikun Weng, Jianmin Wang, Mingsheng Long#
Neural Information Processing Systems (NeurIPS), 2025 [PDF][Code][Slides] (**Oral Paper**)

[14] iTransformer: Inverted Transformers Are Effective for Time Series Forecasting
Yong Liu*, Tengge Hu*, Haoran Zhang*, **Haixu Wu**, Shiyu Wang, Lintao Ma, Mingsheng Long#
International Conference on Learning Representations (ICLR), 2024 [PDF][Code] (**Spotlight Paper**)
☆ **Paper Digest Most Influential Papers in ArXiv (Machine Learning)**

Large Models and Applications

Besides pure research, I also devote myself to promoting research to large models and industrial applications.

Neural-Solver-Library for neural PDE solving, first author 2025

- A well-organized library for developing and benchmarking neural PDE solvers.

FengQing, large meteorological model for medium-range forecasting, co-first author 2024

- Trained with more than 150TB of reanalysis data, can provide skillful global forecasts for future 10 days.
- Deployed in China Meteorological Administration, online running till now. See CCTV News.

TimeMixer for green computing of data center, co-first author 2024

- Deployed in Ant Group to predict the internet flow for autoscaling in the data center.

Time-Series-Library for deep time series analysis, first author 2023

- An easy-to-use library with more than 10,000 GitHub stars.
- Ranking Top 1 in all the 27,900 "Time Series Analysis" related repositories on GitHub.

Corrformer for wind forecasting, first author 2022

- Deployed in the 2022 Winter Olympics to provide a skillful minute-by-minute wind forecast. See News.

MotionRNN for precipitation nowcasting, first author 2022

- Deployed in the China Meteorological Administration, online running till now.

Professional Activities

Area Chair, ICML 2026 2026

Area Chair, ICLR 2026 2025

Area Chair, NeurIPS 2025 2025

Workshop Organizer, AI4Science Beijing Meetup 2025 2025.6

Workshop Organizer, Large Time Series Model in International Symposium on Forecasting 2025.6

Reviewer for ICML, NeurIPS, ICLR, IEEE TPAMI, Nature Machine Intelligence 2021 - Now

☆ **ICLR 2024 Outstanding Reviewer** [Link]

☆ **NeurIPS 2023 Top Reviewer** [Link]

Teaching Assistant, Deep Learning, Instructor: Prof. Mingsheng Long 2022 - 2024

Teaching Assistant, Machine Learning, Instructor: Prof. Mingsheng Long 2021 - 2023

Selected Awards

Stanford/Elsevier World's Top 2% Scientists 2025

ByteDance Scholarship *(15 Winners from China and Singapore)* 2024

Top 100 Worldwide Raising Star in Machine Learning, AMiner Database 2024

- Rank 36th in Rising Star Leaderboard of the 2021-2024 machine learning area *(Top 0.2%)*. [Certificate]

Tsinghua Outstanding Young Researcher, Tsinghua University 2023

- *10 students per year*, the highest honor for Tsinghua graduates in research. [Certificate]

Tsinghua Top Grade Scholarship, Tsinghua University 2022

- *10 students per year*, the highest honor for Tsinghua graduates. [Certificate]

Technical Award for 2022 Winter Olympics, China Meteorological Administration 2022

- *1 project per year*, awarded for excellent work in Corrformer deployed in 2022 Winter Olympics. [News]

National Scholarship, Ministry of Education *(Top 1%)* 2022, 2024

Outstanding Undergraduate in Tsinghua University *(Top 10%)*, and Beijing *(Top 5%)* 2020

Social Services

Undergraduate Mentor for School of Software, Tsinghua University 2020.9 - 2024.6

- Responsible for 93 Undergraduate Students of Class 2020 at the School of Software.
- Awarded as an Excellent Undergraduate Counselor in 2022 (*10 students per year*).