Dingling Yao

Final-year ELLIS PhD candidate and Google PhD Fellow working on **counterfactual reasoning for sciences**.

Email: yaodingling806@gmail.com **Website**: dinglingyao.github.io
GitHub: github.com/dinglingyao **Scholar**: Scholar profile

Education

ELLIS PhD in Computer Science — 2022 – May 2027 (expected)

ISTA / Max Planck Institute for Intelligent Systems (MPI-IS) — *Austria & Germany*

Working thesis: *Representation Learning and Causal Inference for Scientific Reasoning*.
Advisor: Prof. Francesco Locatello **Co-advisor**: Prof. Georg Martius
Collaboration with Prof. Caroline Muller (ISTA, climate science) on causal and counterfactual questions in climate dynamics, 2024–present.

M.Sc. in Machine Learning — 2020 – 2022

University of Tübingen — *Tübingen, Germany*

Graduated *Sehr gut (very good)*.

B.Sc. in Computer Science — 2016 – 2020

University of Tübingen — *Tübingen, Germany*

Graduated *Sehr gut (very good)*.

Research Experience

California Institute of Technology (Caltech) — Apr 2026 – Present

Visiting Researcher, Anima AI + Science Lab — *Pasadena, CA, USA*

Hosted by Prof. Anima Anandkumar; research on counterfactual predictions in scientific emulators without controlled experiments, with applications to climate modeling (arXiv:2610.02252).

Amazon Web Services — Oct 2022 – Mar 2023

Research Intern — *Tübingen, Germany*

Investigated causal representation-learning methods for intrinsic robot exploration and high-dimensional sensorimotor data.

Bosch Center for Artificial Intelligence — May 2020 – Jun 2021

Part-time ML Researcher — *Renningen, Germany*

Developed probabilistic models for experimental design and adaptive data collection.

Teaching & Mentoring

Research Mentoring

Jiale Chen (ISTA); Kahaan Gandhi (Caltech)

Co-supervised Jiale Chen on *Scalable Mechanistic Neural Networks* (ICLR 2025); mentored Kahaan Gandhi on counterfactual prediction for scientific emulators.

Teaching Assistant

Applied Deep Learning (ISTA); undergraduate mathematics (University of Tübingen)

Awards & Fellowships

Google PhD Fellowship — 2025 – 2027

Machine Learning and ML Foundations

EuroHPC Development Access Award — 2026

Competitive Europe-wide GPU/HPC compute allocation

ICLR 2024 Spotlight (Top 5%) — 2024

First-author paper — *Vienna, Austria*

Rising Stars in Data Science Workshop, University of Chicago — 2026

Semifinalist — *Chicago, USA*

Amazon–MPI Fellowship — 2022 – 2023

Amazon–MPI Science Hub

Talks & Presentations

Answering climate what-if questions from observations — **Sep 2026**
International Institute for Applied Systems Analysis — *Laxenburg, Austria*

Reason Beyond Observation: From Scientific Measurements to Counterfactual Worlds — **Sep 2026**
U.S. talk series — *USA*
UC San Diego & **UC Santa Barbara** — California
Broad Institute of MIT and Harvard — Cambridge, MA
Columbia University & **New York University** — New York, NY

Causal Representation Learning for Scientific Discovery — **Apr 2025**
Institute of Computing Technology, Chinese Academy of Sciences — *Remote*

Multi-view Causal Representation Learning with Partial Observability — **Mar 2024**
SIAM Conference on Uncertainty Quantification (UQ24) — *Trieste, Italy*

Invited presentation on causal representation learning — **Feb 2024**
Bellairs Workshop on Causality — *Barbados*

Oral presentation on causal representation learning — **Dec 2023**
Causal Representation Learning Workshop at NeurIPS 2023 — *New Orleans, USA*

Leadership

CauScien Workshop at NeurIPS 2025 — **2025**
Lead Organizer — *NeurIPS*
Led the inaugural workshop on causality and science, with more than 300 participants.

ELLIS × UniReps Speaker Series — **2025 – Present**
Organizer — *ELLIS / UniReps*
Co-organizing a speaker series on unifying representations, with more than 100 participants.

Academic Service

Reviewer
NeurIPS, ICML, ICLR, KDD AI for Science Track, TMLR, Journal of Computational Physics, IEEE TNNLS
Reviewed work spanning machine learning, AI for science, and computational physics.

Technical Skills

Methods: representation learning, causal inference, generative and probabilistic modeling, scientific machine learning.

Scientific computing: hands-on experience with ERA5/CMIP climate data, atmospheric modeling with SpeedyWeather.jl, large-scale GPU/HPC training, and Lean for formal verification.

List of Publications

[1] **D. Yao**, A. Polesello, A. Pervez, C. Muller, and F. Locatello. "The Perception–Physics Paradox: Probing Scientific Alignment with TC-Bench". In: *International Conference on Machine Learning **(ICML 2026)***. 2026. URL: https://openreview.net/forum?id=wqs3uxBFRo.

[2] J. Chen, **D. Yao**, A. Pervez, D. Alistarh, and F. Locatello. "Scalable Mechanistic Neural Networks". In: *International Conference on Learning Representations **(ICLR 2025)***. 2025. URL: https://arxiv.org/abs/2410.06074.

[3] **D. Yao**, D. Rancati, R. Cadei, M. Fumero, and F. Locatello. "Unifying Causal Representation Learning with the Invariance Principle". In: *International Conference on Learning Representations **(ICLR 2025)***. 2025. URL: https://arxiv.org/abs/2409.02772.

[4] **D. Yao**, F. Tronarp, and N. Bosch. "Propagating Model Uncertainty through Filtering-based Probabilistic Numerical ODE Solvers". In: *International Conference on Probabilistic Numerics 2025 **(ProbNum 2025, oral)***. 2025. URL: https://www.arxiv.org/abs/2503.04684.

[5] **D. Yao***, S. Huang*, R. Cadei, K. Zhang, and F. Locatello. "The Third Pillar of Causal Analysis? A Measurement Perspective on Causal Representations". In: *Advances in Neural Information Processing Systems **(NeurIPS 2025)***. 2025. URL: https://arxiv.org/abs/2505.17708.

[6] D. Xu, **D. Yao**, S. Lachapelle, P. Taslakian, J. von Kügelgen, F. Locatello, and S. Magliacane. "A sparsity principle for partially observable causal representation learning". In: *International Conference on Machine Learning **(ICML 2024)***. 2024. URL: https://openreview.net/pdf?id=MKGrRVODWR.

[7] **D. Yao**, C. Muller, and F. Locatello. "Marrying Causal Representation Learning with Dynamical Systems for Science". In: *Advances in Neural Information Processing Systems **(NeurIPS 2024)***. 2024. URL: https://arxiv.org/abs/2405.13888.

[8] **D. Yao**, D. Xu, S. Lachapelle, S. Magliacane, P. Taslakian, G. Martius, J. von Kügelgen, and F. Locatello. "Multi-view causal representation learning with partial observability". In: *International Conference on Learning Representations **(ICLR 2024, spotlight, top 5%)***. 2024. URL: https://openreview.net/forum?id=OGtnhKQJms.

[9] H. S. A. Yu, **D. Yao**, C. Zimmer, M. Toussaint, and D. Nguyen-Tuong. "Active learning in Gaussian process state space model". In: *Machine Learning and Knowledge Discovery in Databases. Research Track: European Conference, **ECML PKDD 2021**, Bilbao, Spain, September 13–17, 2021, Proceedings, Part III 21*. Springer. 2021, pp. 346–361. URL: https://arxiv.org/abs/2108.00819.

*Equal contribution.