Jacob Helwig

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Education

Texas A&M University, Ph.D. Computer Science **August 2021-May 2026**
- Advised by Dr. Shuiwang Ji
- Work on AI4Science focused on adapting vision models and image generation frameworks for solving PDEs

The University of Texas at Austin, BS Mathematics **August 2016-May 2021**
- Certificates in Elements of Computing, Scientific Computing, and Applied Statistical Modeling

Work Experience

LinkedIn, CoreAI Intern **Summer 2024, Summer 2025**
- **Summer 2025**: Pretrained transformers for sequential recommendation. Key challenges include correct weight and optimizer state updates with sparse gradients as a result of high percentage of unused embeddings due to large item cardinality/vocab size ($\mathcal{O}$(1B)). Solved using torchrec.
- **Summer 2024**: Developed full pipeline for large-scale training of causal transformers for sequential recommendation. Key challenges include memory management due to large cardinality/vocab size ($\mathcal{O}$(100M)) leading to large model head and logits vector. Solved using Triton kernel fusion of model head with cross-entropy loss from Liger.

Los Alamos National Laboratory, Applied ML Fellow **Summer 2023**
- Project: Solving the Elastic Wave Equation Using Deep Learning

Publications and Talks

[**Preprint**]	**A Two-Phase Deep Learning Framework for Adaptive Time-Stepping in High-Speed Flow Modeling** First author, paper, code
[**NeurIPS 2024**]	**A Geometry-Aware Message Passing Neural Network for Modeling Aerodynamics over Airfoils** (talk at the NeurIPS 2024 ML4CFD Competition) Best student solution, paper, code
[**ICML 2024**]	**Equivariance via Minimal Frame Averaging for More Symmetries and Efficiency** Spotlight, paper
[**FnT ML**]	**Artificial Intelligence for Science in Quantum, Atomistic, and Continuum Systems** Co-first author, paper
[**ICLR 2024**]	**SineNet: Learning Temporal Dynamics in Time-Dependent PDEs** Co-first author, paper, code
[**LoG 2023**]	**High-fidelity Fluid Flow Reconstruction** Paper
[**ICML 2023**]	**Group Equivariant Fourier Neural Operators for Partial Differential Equations** Co-first author, paper/talk, code
[**ACM TOMS**]	**A Covariate-Dependent Approach to Gaussian Graphical Modeling in R** First author, paper, R package
[**Preprint**]	**An Approximate Bayesian Approach to Covariate-dependent Graphical Modeling** Paper

Honors

Ruth J. & Howard F. Newton Memorial Graduate Student Teaching Award In Statistics, 2022 Recipient
- "Jacob was selected to receive the Newton Teaching Award based on his outstanding evaluations by the instructors he was Teaching Assistant for during the Fall 2021 and Spring 2022 semesters." (award details)

UT Austin University Honors, Fall 2019, Spring 2020, Fall 2020, & Spring 2021
- "To be included, a student must earn at least 45 grade points [and] a grade point average of at least 3.50"

Skills

Programming Languages
- Advanced: Python, R
- Basic: Bash, Slurm, C++, SQL

Software
- PyTorch, Git, LaTeX