Da Long

837 University Village, Salt Lake City, UT 84108
385-418-7953, u1368737@utah.edu, long-da.github.io

EDUCATION

The University of Utah, Salt Lake City, UT
Ph.D. in Computer Science, GPA: 3.9, Expected: 06/2026, Advisor: Shandian Zhe

The University of Arizona, Tucson, AZ
B.S. in Computer Science, GPA: 4.0, 12/2020
B.S. in Mathematics, GPA: 4.0, 12/2020

WORK EXPERIENCE

Machine Learning Engineer Intern at **DoorDash**, Sunnyvale, CA, *05/2025 - 08/2025*

- Built, trained, and deployed DoorDash's homepage ranking models using transformers, multi-gate mixture-of-experts (MMoE), and semantic representations of merchants and consumers with LLMs to model short- and long-term consumer behaviors for improved personalization and engagement.
- Delivered a substantial lift in gross merchandise value (GMV) and improved order and retention rates, as verified by 4-week A/B tests; architectures were later adopted by other teams.

Research Scientist Intern at **Meta**, Menlo Park, CA, *05/2024 - 08/2024*

- Integrated reinforcement learning (RL) algorithms (DQN, A2C) into Meta's generative recommendation foundation model to optimize long-term user satisfaction and engagement.
- Designed state representations and reward functions, optimizing RL algorithms to improve long-term performance metrics (e.g., NDCG).

Student Researcher at **Lawrence Berkeley Laboratory**, Berkeley, CA, *08/2024 - 12/2024*

- Designed a hierarchical spatio-temporal Fourier transformer for spectral and multi-scale modeling of complex dynamical systems (e.g., climate evolution), followed by a flow matching block for refinement.
- Improved long-horizon stability and accuracy while providing calibrated uncertainty estimates.

Research Assistant at **The University of Utah**, Salt Lake City, UT, *08/2021 - Present*

- Conducted research on probabilistic and generative modeling, developing transformer-, diffusion-, and Gaussian process-based surrogates for complex physical dynamics.
- Designed and developed LLM systems with customized post-training alignment techniques (SFT, RL), synthetic data generation pipelines, and chain-of-thought reasoning for personalized healthcare coaching and recommendations.

SELECTED PROJECTS

Agentic LLM-Based Systems for Personalized Healthcare Coaching and Recommendations

- Developed an LLM-based framework for personalized healthcare recommendations and coaching by post-training open-source LLMs on synthetic and curated real-world coaching conversations, using supervised fine-tuning and customized RL algorithms.
- Aligned the model with real-world healthcare coaching guidelines and validated it through expert assessments.

Arbitrarily-Conditioned Multi-Functional Diffusion for Multi-Physics Emulation

- Developed a flexible diffusion model-based framework for multivariate dynamical systems.
- Within a single unified model, the framework was designed to simulate diverse physical processes and address arbitrary conditional tasks.

Physics-Informed Gaussian Process for Surrogate Modeling

- Developed a physics-informed Gaussian process framework that incorporates physics knowledge (PDEs), while quantifying uncertainties for forecasting and interpolation.

SKILLS

***Technical*:** LLM Post-training, Recommendation Algorithms, Reinforcement Learning, Transformers, Gaussian Processes, Diffusion Models
***Tools & Frameworks*:** PyTorch, Hugging Face, DeepSpeed, Ray, Databricks, Snowflake
***Programming Languages*:** Python (Pandas, Scikit-learn, NumPy), JAX, MATLAB

RESEARCH INTERESTS

LLM Alignment, Probabilistic Modeling, Surrogate Modeling, Reinforcement Learning

PUBLICATIONS

$*$ *indicates equal contribution.*

- **Long D.**, Xu Z., Yang G., Narayan A., & Zhe S., Arbitrarily-Conditioned Multi-Functional Diffusion for Multi-Physics Emulation. In *International Conference on Machine Learning (ICML 2025)*.
- Xu Z.*, **Long D.***, Xu Y., Yang G., Zhe S., & Owhadi H., Toward Efficient Kernel-Based Solvers for Nonlinear PDEs. In *International Conference on Machine Learning (ICML 2025)*.
- **Long D.**, Xu Z., Yuan Q., Yang Y., & Zhe S., Invertible Fourier Neural Operators for Tackling Both Forward and Inverse Problems. In *International Conference on Artificial Intelligence and Statistics (AISTATS 2025)*.
- Chen K., Li Y., **Long D.**, Xu Z., Xing W., Hochhalter J., & Zhe S., Pseudo Physics-Informed Neural Operators. In *Transactions on Machine Learning Research (TMLR 2025)*.
- **Long D.**, Xing W., Krishnapriyan A., Kirby R., Zhe S., & Mahoney M., Equation Discovery with Bayesian Spike-and-Slab Priors and Efficient Kernels. In *International Conference on Artificial Intelligence and Statistics (AISTATS 2024)*.
- Fang S.*, Cooley M.*, **Long D.***, Li S., Kirby R., & Zhe S., Solving High Frequency and Multi-Scale PDEs with Gaussian Processes. In *International Conference on Learning Representations (ICLR 2024)*.
- **Long D.**, Mrvaljevic N., Zhe S., & Hosseini B., A Kernel Approach for PDE Discovery and Operator Learning. In *Physica D: Nonlinear Phenomena*.
- **Long D.**, Wang Z., Krishnapriyan A., Kirby R., Zhe S., & Mahoney M. (2022). AutoIP: A United Framework to Integrate Physics into Gaussian Processes. In *International Conference on Machine Learning (ICML 2022)*.

PAPERS IN SUBMISSION

- **Long D.**, Zhe S., Williams S., Oliker L., & Bai Z., Spatio-temporal Fourier Transformer (StFT) for Long-term Dynamics Prediction.