

ERIC ZHAN

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EDUCATION

California Institute of Technology 2016 - 2021

Ph.D. Computing & Mathematical Sciences, GPA: 3.8

Thesis: New Algorithms for Programmatic Deep Learning with Applications to Behavior Modeling

Cornell University 2012 - 2016

B.A. Computer Science and Mathematics, *summa cum laude*, GPA: 4.0

WORK & RESEARCH EXPERIENCE

Latitude AI - Senior Software Engineer Feb 2023 - Present

- Engineer on the Learned Autonomy Behavior team, focused on developing data-driven models and establishing scalable machine learning infrastructure for prediction, forecasting, and motion planning.
- Delivered end-to-end machine learning solutions to improve autonomous vehicle performance, encompassing problem formulation, dataset curation, model design, training, and deployment. Key contributions include models for track quality assessment, waypoint prediction, and tactical decision-making.
- Developed a comprehensive ontology of driver behaviors and implemented autolabeling tools to automate the annotation and categorization of driving logs. Expanded labeled datasets by approximately 10x and reduced dataset creation time from hours to minutes, benefiting 7 teams company-wide.
- Led the design and implementation of a unified scene representation, consolidating redundant workflows across 3 teams and enabling more efficient development of shared tooling.

Argo AI (now Latitude AI) - Senior Software Engineer Jan 2022 - Feb 2023

- Developed and deployed a machine learning model to predict non-yielding probabilities of actors in autonomous vehicle scenarios, reducing reliance on human intervention. Responsibilities included: constructing and curating datasets, designing and training deep learning models in PyTorch, developing evaluation metrics, and integrating the model into a multithreaded, latency-critical system for real-time performance.
- Designed and implemented a lightweight framework for rapid prototyping and evaluation of black-box motion planners, including tools for dataset generation, serialization, schema definition, simulation, and performance metrics. The system enabled efficient experimentation and accelerated development cycles.

Caltech - Machine Learning Researcher (Advisor: Yisong Yue) Sep 2016 - Nov 2021

- Conducted research in behavior modeling and sequential decision making, focusing on developing new methods for imitation learning inspired by generative models, weak supervision, and program learning.
- Thesis explores two themes: using domain-specific programs as sources of weak labels and using programs as a flexible function class with interpretable structure for neurosymbolic program learning.
- Published research papers at top conferences for machine learning (ICML, ICLR, NeurIPS, CVPR).

Facebook - Machine Learning Engineer Intern Summer 2021

- Received highest internship re-offer package.
- Explored several approaches for identifying credible threats of violence (CTV) by leveraging social graphs with millions of nodes (users, posts, groups) and edges (friendship, group membership).
- Trained graph neural networks using both supervised and unsupervised learning methods, the latter of which resulted in a 5x improvement in recall on the held-out “golden set” of CTV examples.

SKILLS

Programming: Python, SQL, C++, Java

Tools: PyTorch, TensorFlow, Keras, LaTeX, Jupyter, Colab, EC2

PUBLICATIONS

Eric Zhan. New Algorithms for Programmatic Deep Learning with Applications to Behavior Modeling. Dissertation (Ph.D.), California Institute of Technology, 2022. <https://thesis.library.caltech.edu/14436/>.

Eric Zhan*, Jennifer Sun*, Ann Kennedy, Yisong Yue, Swarat Chaudhuri. Unsupervised Learning of Neurosymbolic Encoders. *TMLR 2022*.

Jennifer Sun, Ann Kennedy, **Eric Zhan**, Yisong Yue, Pietro Perona. Task Programming: Learning Data Efficient Behavior Representations. *CVPR 2021 (Best Student Paper Award)*.

Eric Zhan, Jagjeet Singh, Yisong Yue, Andrew Hartnett. The Argoverse Trajectory Retrieval Benchmark. *In submission*.

Oliver Stephenson, Tobias Köehne, **Eric Zhan**, Brent Cahill, Sang-Ho Yun, Zachary Ross, Mark Simons. Deep Learning-based Damage Mapping with InSAR Coherence Time Series. *IEEE Transactions on Geoscience and Remote Sensing 2021*.

Ameesh Shah*, **Eric Zhan***, Jennifer Sun, Abhinav Verma, Yisong Yue, Swarat Chaudhuri. Learning Differentiable Programs with Admissible Neural Heuristics. *NeurIPS 2020*.

Eric Zhan, Albert Tseng, Yisong Yue, Adith Swaminathan, Matthew Hausknecht. Learning Calibratable Policies using Programmatic Style-Consistency. *ICML 2020*.

Yukai Liu, Rose Yu, Stephan Zheng, **Eric Zhan**, Yisong Yue. NAOMI: Non-Autoregressive Multiresolution Sequence Imputation. *NeurIPS 2019*.

Eric Zhan, Stephan Zheng, Yisong Yue, Long Sha, Patrick Lucey. Generating Multi-Agent Trajectories using Programmatic Weak Supervision. *ICLR 2019*.

Eric Zhan, Stephan Zheng, Yisong Yue. MAGnet: Generating Long-Term Multi-Agent Trajectories. *Bayesian Deep Learning workshop, NeurIPS 2017*.

*equal contribution

SOFTWARE ENGINEERING EXPERIENCE

Argo AI - Research Intern Summer 2020

- Designed deep models and learning objectives to learn compact representations of complex traffic scenes, and leveraged learned representations to enable efficient search and retrieval of similar traffic scenes.
- Developed new tool for scene retrieval, improving dataset quality and feedback signals for model evaluation.

Microsoft - Research Intern Summer 2018

- Investigated reinforcement learning (RL) and imitation learning (IL) methods for calibrating agents to specific playstyles for playing Atari games.
- Implemented and benchmarked various state-of-the-art RL & IL algorithms in Project Athens codebase.

LinkedIn - Software Engineering Intern Summer 2015

- Engaged in product decisions to improve the social connections that users can build through LinkedIn.
- Implemented new messaging features for LinkedIn's desktop and mobile web applications.

HONORS & AWARDS

Cornell Computer Science Honors Program <i>summa cum laude</i> .	2016
Cornell Pauline and Irving Tanner Dean Scholar.	2012
Honorable Mention at 42nd International Physics Olympiad.	2011