

Enmao Diao

Ambitious, Creative, Curious, Honest, Passionate
Distributed Machine Learning, Efficient Machine Learning
Signal Processing, Artificial Intelligence

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EDUCATION

- **Duke University** | *Ph.D. in Electrical Engineering* 05/2018 – 09/2023
- **Harvard University** | *M.S. in Engineering Sciences* 08/2016 – 05/2018
- **Georgia Institute of Technology** | *B.S. in Computer Science (highest honor)* 08/2013 – 05/2016
- **Georgia Institute of Technology** | *B.S. in Electrical Engineering (highest honor)* 08/2012 – 05/2016

EXPERIENCE

- **Postdoctoral Researcher**
Duke University 09/2023 – 01/2024
 - Developed Efficient and Collaborative Methods for Distributed Machine Learning and Artificial General Intelligence
 - Advised by Prof. Vahid Tarokh and Prof. Jie Ding
- **Research Assistant**
Duke University 05/2018 – 09/2023
 - Studied Distributed Machine Learning and developed Federated Learning and Assisted Learning frameworks
 - Studied Efficient Machine Learning and developed Deep Learning methods for data and model compression
 - Advised by Prof. Vahid Tarokh and Prof. Jie Ding
- *Harvard University* 08/2016 – 05/2018
 - Developed theoretical foundations of the limit of machine learning from a statistical efficiency perspective
 - Developed an efficient algorithm to compute the degree of freedom for general nonlinear models to reduce the computation of cross-validation by several orders of magnitudes
 - Advised by Prof. Vahid Tarokh and Prof. Jie Ding
- *Georgia Institute of Technology* 05/2014 – 05/2016
 - Developed melody extraction algorithm for monophonic pitch transcription in mobile applications
 - Developed Cellular Neural Network on FPGA with Verilog
 - Advised by Dr. Udit Gupta, Prof. Elliot Moore and Prof. Hyesoon Kim
- **Applied Scientist**
Amazon 01/2022 – 09/2022
 - Studied Semi-Supervised and Personalized Federated Learning and developed its applications for Alexa devices
 - Developed PyTorch based pipeline for internal research development
 - Collaborated with other scientists to study various topics on Federated Learning including fairness, asynchrony, side information, and model compression
 - Advised by Prof. Jie Ding and Dr. Tao Zhang

- **Project Manager**

Duke Data+ Program

05/2019 – 08/2019

- Led a team of full-time undergraduate students working on summer research projects that developed algorithms for speech emotion recognition and emotional speech generation

- **Teaching Assistant**

Duke University

08/2019 – 05/2020

- Instructed students in learning and implementing deep learning and audio signal processing algorithms

Georgia Institute of Technology

05/2015 – 08/2015

- Instructed students in learning FPGA, oscilloscope, and implementing a processor with VHDL

PUBLICATION

- S. Moushegian, S. Wu, **E. Diao**, J. Ding, T. Banerjee, V. Tarokh, **Robust Score-Based Quickest Change Detection**, *IEEE Transactions on Information Theory*
- Q. Le, **E. Diao**, Z. Wang, X. Wang, J. Ding, L. Yang, A. Anwar, **Probe Pruning: Accelerating LLMs through Dynamic Pruning via Model-Probing**, *ICLR 2025*
- X. Wang, Q. Le, A. Ahmed, **E. Diao**, Y. Zhou, N. Baracaldo, J. Ding, A. Anwar, **MAP: Multi-Human-Value Alignment Palette**, *ICLR 2025 (Oral)*
- X. Wang, **E. Diao**, Q. Le, J. Ding, A. Anwar, **AID: Adaptive Integration of Detectors for Safe AI with Language Models**, *NAACL 2025*
- Q. Le, **E. Diao**, X. Wang, V. Tarokh, J. Ding, A. Anwar, **DynamicFL: Federated Learning with Dynamic Communication Resource Allocation**, *IEEE BigData 2024 (Best Student Paper)*
- Y. Zhe, **E. Diao**, **ESC: Efficient Speech Coding with Cross-Scale Residual Vector Quantized Transformers**, *EMNLP 2024*
- Y. Zhang, **E. Diao**, D. Huston, T. Xia, **A PixelCNN Based Method for Rough Surface Clutter Reduction in GPR B-scan Images**, *IEEE Radar Conference*
- Y. Zhang, **E. Diao**, D. Huston, T. Xia, **A Data Efficient Deep Learning Method for Rough Surface Clutter Reduction in GPR Images**, *IEEE Transactions on Geoscience and Remote Sensing*
- **E. Diao**, T. Banerjee, V. Tarokh, **Large Deviation Analysis of Score-based Hypothesis Testing**, *IEEE Access*
- **E. Diao**, Q. Le, S. Wu, X. Wang, A. Anwar, J. Ding, V. Tarokh, **ColA: Collaborative Adaptation with Gradient Learning**, *arXiv*
- S. Wu, **E. Diao**, T. Banerjee, J. Ding, V. Tarokh, **Quickest Change Detection for Unnormalized Statistical Models**, *IEEE Transactions on Information Theory*
- K. Varma, **E. Diao**, T. Roosta, J. Ding, T. Zhang, **Once-for-All Federated Learning: Learning From and Deploying to Heterogeneous Clients**, *KDD 2023 Workshop*
- S. Wu, **E. Diao**, T. Banerjee, J. Ding, V. Tarokh, **Robust Quickest Change Detection for Unnormalized Models**, *UAI 2023*
- **E. Diao**, T. Eric, J. Ding, Z. Tao, **Semi-Supervised Federated Learning for Keyword Spotting**, *ICME 2023*
- **E. Diao**, G. Wang, J. Zhang, Y. Yang, J. Ding, V. Tarokh, **Pruning Deep Neural Networks from a Sparsity Perspective**, *ICLR 2023*
- S. Wu, **E. Diao**, T. Banerjee, J. Ding, V. Tarokh, **Score-based Change Point Detection for Unnormalized Models**, *AISTATS 2022*
- Q. Le, **E. Diao**, X. Wang, A. Anwar, V. Tarokh, J. Ding, **Personalized Federated Recommender Systems with Private and Partially Federated AutoEncoders**, *Asilomar 2022*
- L. Collins, **E. Diao**, T. Roosta, J. Ding, T. Zhang, **PerFedSI: A Framework for Personalized Federated Learning with Side Information**, *NeurIPS 2022 Workshop*

- **E. Diao, J. Ding, V. Tarokh, SemiFL: Communication Efficient Semi-Supervised Federated Learning with Unlabeled Clients**, *NeurIPS 2022*
- **E. Diao, J. Ding, V. Tarokh, GAL: Gradient Assisted Learning for Decentralized Multi-Organization Collaborations**, *NeurIPS 2022*
- **S. Wu, E. Diao, K. Elkhailil, J. Ding, V. Tarokh, Score-based Hypothesis Testing for Unnormalized Models**, *IEEE Access*
- **E. Diao, V. Tarokh, J. Ding, Decentralized Multi-Target Cross-Domain Recommendation for Multi-Organization Collaborations**, *arXiv*
- **E. Diao, J. Ding, V. Tarokh, Multimodal Controller for Generative Models**, *CVMI 2022*
- **M. Mohammadreza, E. Diao, V. Tarokh, B. Andrew, Emulating Spatio-Temporal Realizations of Three-Dimensional Isotropic Turbulence via Deep Sequence Learning Models**, *AAAI 2022 Workshop*
- **M. Mohammadreza, E. Diao, V. Tarokh, B. Andrew, Dimension Reduced Turbulent Flow Data From Deep Vector Quantizers**, *Journal of Turbulence*
- **M. Mohammadreza, E. Diao, V. Tarokh, B. Andrew, A Physics-Informed Vector Quantized Autoencoder for Data Compression of Turbulent Flow**, *DCC 2021*
- **E. Diao, J. Ding, V. Tarokh, HeteroFL: Computation and Communication Efficient Federated Learning for Heterogeneous Clients**, *ICLR 2021*
- **J. Ding, E. Diao, V. Tarokh, On Statistical Efficiency in Learning**, *IEEE Transactions on Information Theory*
- **J. Wang, M. Xue, R. Culhane, E. Diao, J. Ding, V. Tarokh, Speech Emotion Recognition with Dual-Sequence LSTM Architecture**, *ICASSP 2020*
- **E. Diao, J. Ding, V. Tarokh, DRASIC: Distributed Recurrent Autoencoder for Scalable Image Compression**, *DCC 2020*
- **S. Wu, E. Diao, J. Ding, V. Tarokh, Deep Clustering of Compressed Variational Embeddings**, *DCC 2020*
- **E. Diao, J. Ding, V. Tarokh, Restricted Recurrent Neural Networks**, *IEEE BigData 2019*
- **J. Ding, E. Diao, V. Tarokh, A Penalized Method for the Predictive Limit of Learning**, *ICASSP 2018*

AWARD

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|---|---------|
| • Student Travel Award IEEE BigData 2019 | 12/2019 |
| • ECE Senior Scholar Award Georgia Institute of Technology | 04/2016 |
| • President Undergraduate Research Award Georgia Institute of Technology | 07/2015 |