Andrew Lizarraga

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ACADEMICS

University of California, Los Angeles (UCLA)
Ph.D. Statistics — Sep 2022 – Jun 2026

University of California, Santa Barbara (UCSB)
B.S. Mathematics — Sep 2014 – Jun 2018

LANGUAGES — Python, C, C++, CUDA, Pytorch, Huggingface

DOMAINS — AI 4 Science: Medical Imaging, Astrophysics, Robotics

AWARDS

National Science Foundation - Graduate Research Fellowship	Sep 2023 – Jun 2026
UCLA Gene Block Merit Award	Sep 2022 – Jun 2023
UCLA Graduate Summer Research Fellowship	Jun 2022 – Sep 2022

TEACHING

UCLA STATS 100A: Introduction to Probability	Jun 2025 – Sep 2025
UCLA STATS 100A: Introduction to Probability	Jun 2024 – Sep 2024

WORK

UCLA, Department of Statistics and Data Science — Sep 2022 – Present
Research Assistant — *Advisors: Prof. Ying Nian Wu, Prof. Shantanu H. Joshi*

- **Diffusion Models and Generative AI**
  - Designed and implemented large-scale conditional diffusion models used jointly by UCLA Statistics, Physics, and Astronomy; uncovered strong quantitative relationships between galaxy morphology and temporal evolution.
  - Built a diffusion-prior–based inverse problem framework with fast posterior refinement via short-run MCMC; delivered state-of-the-art reconstruction accuracy with significant compute savings.
  - Developed end-to-end PyTorch pipelines (data loading, distributed training, inference, and evaluation) for high-dimensional scientific image datasets.

- **Representation Learning**
  - Evaluated limitations of existing generative models (AE, VAE, VQ-VAE, WAE) on high-dimensional medical imaging tasks; identified failure modes in latent structure preservation.
  - Proposed and implemented *Diff-VQ-VAE*, a diffusion-regularized VQ-VAE architecture improving robustness, latent consistency, and performance on noisy clinical data.
  - Engineered efficient tokenization, quantization, and latent-space constraints applicable to medical, astronomical, and robotics datasets.

- **Decision-Making, Planning, and RL**
  - Created the *Latent Plan Transformer*, an unsupervised sequence model that infers latent goals and executes long-horizon policies without task-specific supervision.
  - Built the *Latent Adaptive Planner*, combining reinforcement learning and dynamic programming with Transformer-scale architectures for real-time robotics and manipulation tasks.
  - Delivered reproducible training frameworks using PyTorch, CUDA, and distributed data pipelines for robotics simulation and policy evaluation.

SELECTED PUBLICATIONS

- **Andrew Lizarraga**, Eric Hanchen Jiang Jacob Nowack, Morgan Himes, Jonathan Soriano, Yun Qi Li, Ying Nian Wu, Bernie Boscoe, Tuan Do. *Modeling Galaxy Morphology Evolution Through Cosmic Time via Redshift Conditioned Diffusion Models | (In Review) - Astrophysical Journal*
- **Andrew Lizarraga**, Eric Hanchen Jiang, Jacob Nowack, Yun Qi Li, Ying Nian Wu, Bernie Boscoe, Tuan Do. *Learning the Evolution of Physical Structure of Galaxies via Diffusion Models | Neurips-MLP4S 2024*
- Eric Hanchen Jiang, Yasi Zhang, Zhi Zhang, Yixin Wan, **Andrew Lizarraga**, Shufan Li, Ying Nian Wu *Unlocking the Potential of Text-to-Image Diffusion with PAC-Bayesian Theory | (In Review) ICLR 2026*
- Donghun Noh, Deqian Kong, Minglu Zhao, **Andrew Lizarraga**, Jianwen Xie, Ying Nian Wu, Dennis Hong. *Latent Adaptive Planner for Dynamic Manipulation* | CoRL 2025
- Morgan Himes, Samiksha Krishnamurthy, **Andrew Lizarraga**, Srinath Saikrishnan, Vikram Seenivasan, Jonathan Soriano, Ying Nian Wu, Tuan Do *Multi-Modal Masked Autoencoders for Learning Image-Spectrum Associations for Galaxy Evolution and Cosmology | Neurips-MLP4S 2025*
- Jinxing Li, Jacob Bortnik, Qiushuo Wang, Yingnian Wu, **Andrew Lizarraga**, Mirana Angel, Beibei Wang, Qianzhuang Wen, Jeffrey Jiang *Modeling ring current proton distribution using MLP, CNN, LSTM, and transformer networks* | Frontiers in Astronomy and Space Sciences
- **Andrew Lizarraga**, Edouardo Honig, Ying Nian Wu. *From Stochastic Parrots to Digital Intelligence* | WIRES Computational Statistics 2025
- Edouardo Honig, **Andrew Lizarraga**, Zijun Frank Zhang, Ying Nian Wu. *Better Prompt Compression Without Multi-Layer Perceptrons | Neurips-AFM 2025*
- Deqian Kong, Dehong Xu, Minglu Zhao, Bo Pang, Jianwen Xie, **Andrew Lizarraga**, Yuhao Huang, Sirui Xie, Ying Nian Wu. *Latent Plan Transformer: Planning as Latent Variable Inference | NeurIPS 2024*
- **Andrew Lizarraga**, David Lee, Antoni Kubicki, Ashish Sahib, Elvis Nunez, Katherine Narr, Shantanu H. Joshi. *Alignment of Tractography Streamlines Using Deformation Transfer via Parallel Transport | MICCAI - CDMRI 2021*
- Vikram Seenivasan, Srinath Saikrishnan, **Andrew Lizarraga**, Jonathan Soriano, Bernie Boscoe, Tuan Do *Combining datasets with different ground truths using Low-Rank Adaptation to generalize image-based CNN models for photometric redshift prediction | Neurips-MLP4S 2025*
- Elvis Nunez, **Andrew Lizarraga**, Shantanu H. Joshi. *SrvfNet: A Generative Network for Unsupervised Multiple Diffeomorphic Functional Alignment | CVPR - DiffCVML 2021*
- Jie Ren, Xinhao Zheng, Jiyu Liu, **Andrew Lizarraga**, Ying Nian Wu, Liang Lin, Quanshi Zhang. *Monitoring Primitive Interactions During the Training of DNNs | AAAI 2025*
- **Andrew Lizarraga**, Brandon Taraku, Edouardo Honig, Ying Nian Wu, Shantanu H. Joshi. *Differentiable VQ-VAE's for Robust White Matter Streamline Encodings | IEEE - ISBI 2024*
- **Andrew Lizarraga**, Katherine L. Narr, Kirsten A. Donald, Shantanu H. Joshi. *StreamNet: A WAE for White Matter Streamline Analysis | PMLR - GeoMedIA 2022*