KATHLEEN LEWIS

@ katielewism@gmail.com https://katiemlewis.github.io/ @KatieLewisMIT www.linkedin.com/in/katiemarielewis

RESEARCH EXPERIENCE

Research Assistant

Sept. 2017 - August 2023 MIT CSAIL

- **PhD Dissertation**: Developing Domain-Specific Generative Models (advised by John Guttag and Frédo Durand)
- **Vision-Language Models**: Developed the GIST method to generate fine-grained image-specific text descriptions using LLMs and contrastive learning. GIST achieves SOTA performance on fine-grained image classification for four diverse datasets.
- **Machine Learning for Art**: Collaborated with artist, Agnieszka Kurant, on two commissioned generative AI art pieces for MIT.
- **Machine Learning for Fashion**: Developed SizeGAN, the first method for generating images of garments and models in a new target size to tackle the size under-representation problem.
- **Machine Learning for Medical Imaging**: Developed learning-based method to align sparse, clinical MRI brain scans with higher accuracy on 92% of subjects and 100x faster on the CPU than the most accurate baseline

Research Intern

June 2020 - August 2021 Google

- Two internships with Ira Kemelmacher-Shlizerman's team
- Developed photorealistic virtual try-on method, TryOnGAN, and published SIGGRAPH 2021 paper
- Led research project for generating images of garments in unseen sizes to increase size diversity. Google funded my PhD for the 2021-2022 academic year to continue this research.

Research Assistant

College of Engineering Senior Design Project

August 2016 - May 2017 Boston University

- Designed and developed automated door-opening robotic system for wheelchair users
- Implemented computer vision system to automatically detect door handle type and location

Research Assistant

Computer Architecture and Automated Design Lab

January 2016 - May 2017 Boston University

- Improved runtime of existing Molecular Dynamics code by:
  - Multithreading and implementing existing code on the GPU
  - Designing algorithms to improve locality and cache hit rates

Software Engineer Intern

MITRE Corporation

May 2015 - August 2015 Boston, MA

- Developed web app for Air Force to view and edit map routes from database

EDUCATION

PhD in Computer Science

Massachusetts Institute of Technology, 2023

M.S. in Computer Science

Massachusetts Institute of Technology, 2019

B.S. in Computer Engineering

Boston University, 2017

PUBLICATIONS

- **Lewis, K.M.***, Mu, E.*, Dalca, A.V. & Guttag, J. (2023). GIST: Generating Image-Specific Text for Fine-grained Object Classification. https://arxiv.org/abs/2307.11315.
- **Lewis, K.M.***, Shanmugam, D.* M., Ortiz, J. J. G.*, Kurant, A., & Guttag, J. At the Intersection of Conceptual Art and Deep Learning: The End of Signature. Workshop on Broadening Research Collaborations @ NeurIPS 2022
- **Lewis, K. M.**, & Guttag, J. (2022). SizeGAN: Improving Size Representation in Clothing Catalogs. arXiv preprint arXiv:2211.02892.
- **Lewis, K.M.**, Varadharajan, S., & Kemelmacher-Shlizerman, I. TryOnGAN: Body-Aware Try-On via Layered Interpolation. ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH 2021)
- Zhao, A., Balakrishnan, G., **Lewis, K.M.**, Durand, F., Guttag, J., & Dalca, A.V.. Painting Many Pasts: Synthesizing Time Lapse Videos of Paintings.(arXiv:2001.01026). CVPR 2020
- **Lewis, K.M.**, Rost, N. S., Guttag, J., & Dalca, A. V. (2020, April). Fast Learning-based Registration of Sparse 3D Clinical Images. In Proceedings of the ACM Conference on Health, Inference, and Learning (pp. 90-98).
- Suresh, H., **Lewis, K. M.**, Guttag, J., & Satyanarayan, A. (2022, March). Intuitively Assessing ML Model Reliability Through Example-based Explanations and Editing Model Inputs. In 27th International Conference on Intelligent User Interfaces (pp. 767-781).
- Spotlight Presentation (**6% acceptance rate**) and Poster at Machine Learning for Healthcare (ML4H) @ NeurIPS 2018
- Poster presented at Women in Machine Learning (WiML) @ NeurIPS 2018
- Poster presented at Women in Computer Vision (WiCV) @ CVPR 2019
- Ahmed Sanaullah, **Kathleen Lewis**, Martin Herbordt, GPU-Accelerated Charge Mapping. IEEE High Performance Extreme Computing Conference, HPEC 2016.
- Poster presented at Performance-Aware Programming with Application Accelerators, University of Hong Kong

Research Assistant

Cross-Disciplinary Integration of Design Automation Research

August 2014 - Dec. 2015 Boston University

- Developed web app, Phagebook, for Synthetic Biology project design
- Poster presented at Synberc, MIT
- Poster presented at International Workshop on Bio-Design Automation, University of Washington

HONORS & AWARDS

- Frederic and Barbara Cronin Fellowship
- Women in ML (WiML) Travel Scholarship
- Machine Learning for Healthcare (ML4H) Travel Scholarship
- Boston University Trustee Scholarship (Four years full tuition)
- Joseph Healey Distinguished Fellowship
- Clare Booth Luce (Research Award)
- Honor Societies: Tau Beta Pi, IEEE-HKN

ACADEMIC SERVICE

- SIGGRAPH 2022 Reviewer
- NeurIPS 2021 Reviewer
- MIT AI+D PhD Application 2021 Reviewer
- NeurIPS 2020 Reviewer
- ACM CHIL 2020 Reviewer

LEADERSHIP

- Writer and Editor for MIT Graduate Student Blog (MIT, 2020)
- Machine Learning across MIT Committee (MIT, 2019)
- Student Governor, IEEE-HKN Board of Governors (Nationwide position, Jan - Dec 2018)
- Teaching Assistant, 6.00 Intro: Comp Sci & Programming (MIT, Fall 2018)
- President, IEEE Student Chapter/IEEE-HKN (Boston University, April 2016 - May 2017)
- Teaching Assistant, Performance-Aware Programming with Application Accelerators (University of Hong Kong, July 2016)
- Tour Guide, College of Engineering (Boston University, January 2014 - May 2017)
- Teaching Assistant, EK127 Introduction to Computation (Boston University, January - December 2014)

SKILLS

Python, Keras, Tensorflow, PyTorch, C, C++, MATLAB, CUDA, Javascript, HTML