

SHADEN ALSHAMMARI

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✉ shaden@mit.edu [github](https://github.com/shadealsha) [google scholar](https://scholar.google.com/citations?user=shaden)

Education

Massachusetts Institute of Technology (MIT)	Cambridge, MA
PhD. in Electrical Engineering and Computer Science Advisor: Prof. Antonio Torralba and Prof. William T. Freeman	Sep. 2025 – Jun. 2028
M.Eng. in Computer Science and Engineering Thesis: A Unifying Framework for Representation Learning Advisor: Prof. William T. Freeman - GPA: 5.0/5.0	Sep. 2023 – Jun. 2025
B.S. in Computer Science and Engineering & Mathematics GPA: 5.0/5.0	Sep. 2019 – Jun. 2023

Technical Skills

Domains Self-Supervised Learning, Imbalanced Learning, Vision Language Models, Networks

Languages Python, Julia, MATLAB, Java, JavaScript, C.

Frameworks PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, CUDA, Microsoft Azure, AWS.

Publications

- [1] [A Unifying Framework for Representation Learning \(ICLR, 2025\)](#)
Shaden Alshammari, Mark Hamilton, Axel Feldmann, John R. Hershey, William T. Freeman.
- [2] [Long-Tailed Recognition via Weight Balancing \(CVPR, 2022; +200 citations\)](#)
Shaden Alshammari, Yu-Xiong Wang, Deva Ramanan, Shu Kong.
- [3] [Vision-Language Models Do Not Understand Negation \(CVPR 2025\)](#)
Kumail Alhamoud, **Shaden Alshammari**, Yonglong Tian, Guo Li, Philip Torr, Yoon Kim, Marzyeh Ghasemi.
- [4] [Using Contact Microphones for Robot Manipulation \(WiML Workshop at NeurIPS, 2022\)](#)
Shaden Alshammari, Victoria Dean, Tess Hellebrekers, Pedro Morgado, Abhinav Gupta.
- [5] [Continual Long-Tailed Recognition: Merge Tail Classes Today, Separate them Tomorrow \(preprint, 2022\)](#)
Yanan Li, **Shaden Alshammari**, Bin Liu, Shu Kong.

Experience

MIT Computer Science & Artificial Intelligence Laboratory (CSAIL) <i>Research Assistant with Prof. William T. Freeman</i>	Sep. 2023 – present Cambridge, MA
<ul style="list-style-type: none">Introduced a comprehensive framework that extends and generalizes popular contrastive learning, supervised learning, dimensionality reduction, and clustering methods.Achieved state-of-the-art performance on key unsupervised clustering on ImageNet 1K and self-supervised feature learning on CIFAT100 and STL-10 with out of domain adaptation.	
Robotics Institute - Carnegie Mellon University (CMU) <i>Research Intern with Dr. Victoria Dean and Prof. Abhinav Gupta [abstract, poster]</i>	Jun. 2022 – Aug. 2022 Pittsburgh, PA
<ul style="list-style-type: none">Adapted contact audio as an alternative tactile modality for complex manipulation tasks that are challenging from vision alone and analyzed feature representations for the audio-visual data and implemented robot manipulation algorithms on itDeployed the developed model on Franka arm, Robotiq gripper, and Piezo microphones.	
MIT Sloan School of Management <i>Research Assistant w. Prof. Abdullah Almaatouq</i>	Mar. 2022 - May 2022 Cambridge, MA
<ul style="list-style-type: none">Built a statistical pipeline that visually summarizes and highlights the properties of data from a large survey.Constructed a model that is robust to new data and new variables which predicts some variables about an individual given other variables using machine learning and dimensionality reduction algorithms.	
CMU Argo AI Center for Autonomous Vehicle Research <i>Research Intern with Prof. Deva Ramanan and Prof. Shu Kong - [GitHub, poster, paper]</i>	Jun. 2021 – Mar. 2022 virtual

- Developed an effective approach to mitigate data bias in long-tailed distribution images using weight balancing.
- Achieved competitive results on iNaturalist 2018, ImageNet-LT and CIFAR100-LT, and it can be easily attached to existing LTR methods to achieve higher accuracy.

Harvard-MIT Health Sciences and Technology

Jan. 2021– May 2021

Undergraduate Researcher with Dr. Li-wei Lehman

virtual

- Modeled delayed linear dynamical systems (dLDS) using gradient descent which achieved lower error compared to analytical approximations for dLDS.

Additional Projects

A Survey of Variational Methods for Estimations in Graphical Models [\[paper\]](#) Spring 2023

- Conducted a survey on variational methods for approximating partition functions in graphical models, exploring techniques for both lower and upper bounds on the partition function such as Mean-Field, Bethe approximation, and tree-reweighted methods.

A Survey on Node Ranking Algorithms [\[paper\]](#) Spring 2022

- A survey on different node ranking algorithms for graphs, their numerical estimation methods, and applications in search engines, social media networks, and recommendation systems.

Facial Images Colorization [\[paper\]](#) Spring 2021

- Built a fully automatic model to convert grayscale facial image to a colored one using Conditional Generative Adversarial Nets (cGANs) and adapted the colorization model to extract image representation and use it for face segmentation task (self-supervised model) which achieved 90% accuracy.

Fixed Points of Random Permutations [\[paper\]](#) Spring 2021

- Found a closed form formula for the number of permutations that fixes a certain number of points using generating functions and studied the corresponding moments value and proved that they are constant.

Teaching Experience

MIT Department of Mathematics

Sep. 2023 – present

Instructor-Graduate for Linear Algebra and Optimization (18.C06)

Cambridge, MA

- Teach two weekly one-hour recitation sessions for a class of 38 students and host review sessions.
- Develop course material, weekly recitation handouts, and problem sets for over 180 students.
- Received an overall teaching quality rating of 6.9/7.0 and was nominated for the Teaching Awards by students.

MIT Department of Electrical Engineering and Computer Science (EECS)

Jan. 2024 – May 2024

Teaching Assistant for Introduction to Machine Learning (6.036)

Cambridge, MA

- Worked with a team of seven professors and lecturers to organize technical materials on various ML topics.
- Conducted weekly recitations and lab sessions, and hosted office hours to support student learning.

Mawhiba & KAUST

Dec. 2018 – Present

Math Olympiad Trainer

Thuwal, Saudi Arabia

- Instruct top math Olympiad nominees in combinatorics, geometry, algebra, and number theory as part of the national training program for over 1000 hours during school breaks.

Leadership Experience

The 2nd Open World Vision Workshop at CVPR'22

Jun. 2022

Onsite Coordinator

New Orleans, LA

European Girls' Mathematical Olympiad (EGMO)

2019-2023

Deputy Leader

Kiev, Ukraine & virtually

International Mathematical Olympiad (IMO)

2019 - 2023

Observer

Bath, United Kingdom & Chiba, Japan

Awards and Honors

Bronze Medal at the International Mathematical Olympiad (IMO)	2017	International
Gold Medal at the European Girls Mathematical Olympiad (EGMO)	2017	International
Gold Medal at the Balkan Mathematical Olympiad (BMO)	2016	International
Honorable mentions from the American Mathematical Society presented at Intel ISEF	2016	International