

Edwin Zhang

Ph.D. Student
Harvard University

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Education

- **Harvard University**
Ph.D., Computer Science, RL for Social Good, 2023 - Present
Advisor: Milind Tambe
- **University of California, Santa Barbara**
M.S., Computer Science, 2022 - 2023
Advisor: William Wang
- **University of California, Santa Barbara**
B.S., Computer Science, 2019 - 2022
Graduated top of class at age 19
Advisor: William Wang
High Honors, Regents Scholar (Top 2.5% of school)
GPA: 3.96
- **Westview High School**
Graduated top of class at age 16, 2018 - 2019

Research Interests

Real-world AI deployment; Principles of intelligence; Reinforcement learning; Responsible ML; AI safety; AI for Policy

Experience

- **Harvard University, MA** 09/2023 – Present.
Graduate Student Researcher
 - Creating new foundation models for social good through proposing and implementing a new Language-Conditioned Restless Multi-Armed Bandits (RMABs) framework.
 - Working on improving world's largest maternal health care program, positively affecting over 10 million mothers in India (Kilkari and mMitra).
- **Massachusetts Institute of Technology-IBM Watson AI**, Cambridge, MA 12/2022 – 05/2023.
Visiting Researcher, Mentors: Chuang Gan and Yikang Shen
 - Started work on an ongoing hierarchical RL project with Chuang Gan with potential for solving extremely long-horizon control problems such as minecraft diamond crafting.
 - Won 3rd place out of 19 in NeurIPS Integrated Language and Understanding Challenge, receiving a \$1500 cash prize.

- **Meta**, Seattle, WA 07/2022 – 09/2022.
Research Intern, Mentor: Amy Zhang
 - Proposed, analyzed, and deployed new group page configuration reducing misinformation by 4%, improving the experience of 3 million daily active users
 - Created new facebook post ranking model with 17% gain on offline engagement area under curve (AUC) metrics
 - Started work on Language Control Diffusion.
- **Plato Systems**, Palo Alto, CA 06/2021 – 06/2022.
Computer Vision and Software Engineering Intern, Mentor: Mashour Solh
 - Developed multiple view calibration pipeline through planar homographies and OpenCV.
 - Created set up process and capture script for NVIDIA Jetson platform with multiple third party imaging providers.
- **Allthenticate**, Santa Barbara, CA 06/2020 – 06/2021.
Lead Full Stack Engineer/First Hire, Mentor: Chad Spensky
 - Led development on cloud platform in early stage startup, collaborating directly with the CEO to architect and implement proprietary API.
 - Taught advanced Vue JS by taking complete responsibility at each step of the development phase – delivered a full web application while teaching and leading two other interns working on the same project.
 - Built and deployed python backend with over 27000 lines to use Elastic Beanstalk, implementing dockerized development process to speed up iteration cycles by 25%.
- **Yaitea**, CA 08/2018 – 09/2019.
Founder and Lead Tutor
 - Assessed a need for tutoring code and critical thinking to children, as programming skills arose in demand and traditional tutoring services struggled to keep up.
 - Collaborated with several students and parents to create lasting relationships.

Publications and Preprints

In Submission

1. *Yunfan Zhao, *Nikhil Behari, Edward Hughes, **Edwin Zhang**, Dheeraj Nagaraj, Karl Tuyls, Aparna Taneja and Milind Tambe. "Towards Zero Shot Learning in Restless Multi-armed Bandits." *In Submission to AAMAS 2024*.
2. **Edwin Zhang**, Yujie Lu, William Wang, and Amy Zhang. "Language Control Diffusion: Efficiently Scaling through Space, Time, and Tasks." *In submission to ICLR 2024*.
 - Proposed and created language conditioned diffusion RL models, enabling generalization in control through large language models.
 - Led several meticulous experiments comparing baselines and ran large scale training with SLURM on distributed FAIR cluster.

Published

1. **Edwin Zhang**. "Towards Generalist Agents through Scaling Offline Reinforcement Learning." *Proquest, University of California*, 29 Aug. 2023, escholarship.org/uc/item/69j3d2w2.
2. *Li, Jiachen, ***Edwin Zhang**, Ming Yin, Qinxun Bai, Yu-Xiang Wang, and William Yang Wang. "Offline reinforcement learning with closed-form policy improvement operators." In *International Conference on Machine Learning 2023*, pp. 20485-20528. PMLR, 2023.
 - Designed rigorous alternative method for solving policy improvement in closed form through Taylor Approximation.
 - Led technical implementation and experiment running, creating a multiprocess RL research framework with over 15000 lines of Python designed for quick iteration and highly performant training.
3. Kiseleva, Julia, Alexey Skrynnik, Artem Zholus, Shrestha Mohanty, Negar Arabzadeh, Marc-Alexandre Côté, ... **Edwin Zhang** ... Mohammad Aliannejadi et al. "Interactive Grounded Language Understanding in a Collaborative Environment: Retrospective on Iglu 2022 Competition." In *NeurIPS 2022 Competition Track*, pp. 204-216. PMLR, 2022.
4. **Zhang, Edwin**, Yujie Lu, William Wang, and Amy Zhang. "LAD: Language Augmented Diffusion for Reinforcement Learning." In *Neural Information Processing Systems 2022, Language and Reinforcement Learning Workshop*.

Awards and Honors

- Harvard AI Safety Technical Fellowship, 2023
- Harvard Effective Altruism Precipice Fellowship, 2023
- Second out of 10 in Amazon Alexa Simbot Challenge (\$100,000 cash prize), 2023
- Third out of 19 in Integrated Language and Understanding (IGLU) Challenge at NeurIPS (\$1500 cash prize), 2022
- First out of 16 in React Category at SBhacks, 2022
- UCSB Distinction in the Major: Research Track, 2022
- UCSB High Honors (Top 8.5% of school), 2022
- First out of 78 in Startup Category at SDhacks, 2021
- Best use of Google Cloud out of 71 at SBhacks, 2021
- First overall out of 6 at Santa Barbara Startup Weekend, 2020
- First out of 70 in Database Category at SBhacks, 2020
- Second out of 85 in AI classification competition at UCSB, 2020
- Google Cloud Cybersecurity Grant Winner (\$1000), 2020
- Regents Scholar UCSB (\$24000), 2019
- Google Cloud Startup Grant Winner (\$3000), 2019
- AP Scholar with Distinction, 2019

Invited Talks

1. Harvard SEAS AI for Social Good Seminar, 10/26/23. Language Control Diffusion: Efficiently Scaling to Generalist Agents through Space, Time, and Tasks.
2. Harvard Law School Tax Law Seminar, 10/25/23. Review and Analysis of the AI Economist: Improving Equality and Productivity with AI-Driven Tax Policies. (Review of work done by Stephan Zhang et al.)
3. UCSB Master's Thesis Defense, 5/31/23. Towards Generalist Agents through Scaling Offline Reinforcement Learning. Slides. Video.
4. MIT Brain and Cognitive Sciences, 12/13/22. Integrating Language into Reinforcement Learning through Diffusion.
5. NeurIPS Integrated Grounded Language and Understanding Competition, 12/06/22. Hierarchical RL through Diffusion Models.
6. UCSB Computer Science Research Poster Session, 6/03/22. Offline RL with CFPI.
7. UCSB Natural Language Processing Lab, 4/08/22. Soft Actor-Critic: Off-Policy Maximum Entropy Deep Reinforcement Learning with a Stochastic Actor Review.

Teaching Experience

- UC Santa Barbara, Spring 2023
Teaching Assistant, *Machine Learning: Upper-division*, 80 students.
- UC Santa Barbara, Winter 2020
Learning Assistant, *Introduction to Computer Science: Lower-division*, 201 students.

Last updated: November 16, 2023