

Anthony Liang

CONTACT INFORMATION	Website: aliang8.github.io Email: anthony.liang@usc.edu	Github: github.com/aliang8 Phone: 718-395-0622
EDUCATION	University of Southern California <i>Ph.D. in Computer Science</i>	Aug 2021 - May 2026 GPA: 4.0/4.0
	University of Michigan, Ann Arbor - Rackham Graduate School <i>Masters of Science in Robotics</i>	Sept 2020 - May 2021 GPA: 4.0/4.0
	University of Michigan, Ann Arbor <i>Bachelor of Science in Engineering, Minor in Mathematics</i>	Sept 2017 - May 2020 GPA: 3.562/4.000
	Stuyvesant High School , New York City, New York <i>Diploma with Advanced Designation in Mathematics and Science</i>	Sept 2013 - June 2017
RESEARCH INTERESTS	<ol style="list-style-type: none">Embodied AI + Lifelong learning: developing simulated agents that can continually acquire new skills in an unsupervised manner and transfer knowledge to unseen tasks and domainsLanguage-guided Robotics: building robots that can understand and communicate with humans via natural language dialogue, using language to provide robots with prior / common sense knowledge about the worldMultimodal Learning: learning robust representations from large offline datasets that integrates signals from multiple modalities (language, images, audio, haptics, etc)	
RELEVANT COURSEWORK	Special Topics in NLP • Robot Kinematics and Dynamics, Adversarial ML, Unsupervised Visual Learning, Robot Systems Lab, Advanced Topics in Computer Vision • Natural Language Processing • Math for Robotics • Reinforcement Learning (Audit) • Deep Learning for Vision • Autonomous Robotics Laboratory • Mobile Robotics • Self Driving Cars: Perception and Control • Probability Theory • TechLab at MCity • Operating Systems • Information Retrieval • Numerical Methods	
CONFERENCE PAPERS	Wilka Carvalho, Anthony Liang , Kimin Lee, Sungryull Sohn, Honglak Lee, Richard L. Lewis, Satinder Singh. “ <i>Reinforcement Learning for Sparse-Reward Object-Interaction Tasks in a First-person Simulated 3D Environment.</i> ” NeurIPS Deep RL 2020 Workshop, IJCAI 2021 (13.9% acceptance rate)	
WORKSHOP PROCEEDINGS	Wilka Carvalho, Anthony Liang , Kimin Lee, Ryan Krueger, Richard L. Lewis, Satinder Singh, Honglak Lee. “ <i>Efficiently Learning to Perform Household Task with Object-oriented Exploration.</i> ” NeurIPS Black In AI 2019 Workshop (Oral Presentation)	
	Wilka Carvalho, Anthony Liang , Kimin Lee, Sungryull Sohn, Richard L. Lewis, Satinder Singh, Honglak Lee. “ <i>ROMA: A Relational, Object-Model Learning Agent for Sample-Efficient Reinforcement Learning.</i> ” ICML Object-Oriented Learning 2020 Workshop (Oral Presentation)	
RESEARCH EXPERIENCE	University of Southern California - GLAMOR Lab Advisor: Jesse Thomason Project: Learning semantically meaningful skills using natural language supervision	Aug 2021 - Present
	<ul style="list-style-type: none">Leveraging natural language descriptions of behavior as a form of weak supervision to learn semantically meaningful skills that can be composed for downstream task learning in the BabyAI and ALFRED benchmarks	

Carnegie Mellon University - Intelligent Robotics LabAdvisor: **Changliu Liu**

Project: Optimal Control and Reinforcement Learning

May 2020 - May 2021
Remote due to COVID-19

- Developed a hierarchical RL algorithm for the safe and efficient control of autonomous vehicles (AV) operating in dynamic environments
- Proposed a novel algorithm combining optimal control and reinforcement learning to learn an optimal policy for any dynamic system. Demonstrated the efficacy of this approach on a simple AV environment built from scratch

University of Michigan - Deep Learning LabAdvisor: **Honglak Lee**

Project: Sample-Efficient Reinforcement Learning for Sequential Decision-Making Tasks

Jan 2019 - May 2021

- Developed a relational reinforcement learning agent that uses self-attention and learns an object-centric forward model to efficiently perform object-interaction tasks in AI2THOR
- Built a large-scale dataset of object images and demonstrated that our learned representation encodes useful ground-truth information and facilitates efficient sequential-decision making

University of Michigan Hospital: Radiology DepartmentAdvisors: **Ravi Samala, Heang-Ping Chan**

Project: Transfer Learning for Breast Cancer Diagnosis

Sept 2017 - May 2018

- Developed a computer-aided system for classifying malignant and benign masses in digital breast tomosynthesis (DBT) using a multi-stage transfer learning approach
- Tested multi-stage transfer learning by first fine-tuning with mammography data and then with the DBT data, improved AUROC metric by about 6% over baselines

INDUSTRY
EXPERIENCE**Amazon Science***Applied Scientist Intern*Mentor: **Thiago Mosquero**May 2021 - Aug 2021
Remote due to COVID-19

- Developed an approach for automatically generating the ground truth dataset for training a brand scoring model that directly incorporates customer signals
- Demonstrated that our approach is able to discover hidden gem brands suffering from the cold-start problem and conducted thorough analysis of various brand and customer level metrics

Invisible.ai*AI Research Intern*Mentor: **Eric Danziger**May 2020 - Aug 2020
Remote due to COVID-19

- Implemented a real-time human pose detection and tracking algorithm for video data
- Deployed model onto cameras used at manufacturing facilities for social distancing monitoring

Google Ads Quality*Software Engineering Intern*Mentor: **Nina Li**May 2019 - Aug 2019
Mountain View, California

- Improved the retrieval stage of Google's deep recommendation model by using a fast nearest neighbor matching algorithm
- Built a service that provides query suggestions and demonstrated that the new model drastically decreased retrieval time
- Built an API service with the Chrome and Brain teams for intelligently clustering a user's mobile browser tabs

Luminar Technologies	May 2018 - Aug 2018
<i>AI Engineering Intern</i>	<i>Palo Alto, California</i>
Mentor: Prateek Sachdeva, Eric Danziger	

- Designed and implemented an automated training data collection and prelabeling pipeline
- Worked with deep learning models for 2D and 3D object detection and lane/road segmentation
- Implemented a sensor calibration and fusion tool to visualize low density pointclouds

Socratic (acquired by Google)	May 2017 - Aug 2017
<i>Software Engineering Intern</i>	<i>New York, New York</i>
Mentors: Shreyans Bhansali , Lili Dworkin	

- Developed an open-sourced math problem solver library using object character recognition and abstract syntax tree (AST) parsing
- Moderated an open-sourced community of over 20 active contributors on Github

PROJECTS	MRover Robotic Arm - Autonomous Robotics Major Design Experience	April 2019
	<ul style="list-style-type: none"> • Implemented a software library and web interface for a six DOF robotic arm on a space rover including forward and inverse kinematics, path planning, motion control, self and world collision avoidance, and perception for object detection 	

TEACHING EXPERIENCE	Summer STEM Institute Research Mentor	Summer 2021
	University of Michigan - Ann Arbor	
	EECS 442: Computer Vision	Winter 2021
	EECS 498: Algorithmic Robotics	Fall 2020
	EECS 504: Graduate Computer Vision (Graduate level)	Winter 2020
	EECS 280: Introduction to Programming and Data Structures	Fall 2018 - Fall 2019

HONORS & AWARDS	NSF Graduate Research Fellowship Honorable Mention	2020
	Frederick J. Leonberger Scholar (\$23,000/year)	2017 - Present
	National Association for Letter Carriers Scholarship (1/4)	2017 - Present
	University Honors	2017 - Present
	Dean's List	2017 - Present

EXTRA- CURRICULAR ACTIVITIES	Michigan Student Artificial Intelligence Lab (Education Admin and Blog Founder)	2018 - Present
	Michigan Autonomous Aerial Vehicles (Member)	2017 - 2018

SKILLS	Languages: Python, C++, Javascript
	Frameworks / Tools: PyTorch, Tensorflow, NumPy, OpenCV, Scikit-learn, Matplotlib, ROS, PCL, OpenRAVE, Git, ReactJS, AWS, Hadoop