OLIVIA Y. LEE

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I am a fourth-year undergraduate student at Stanford University, pursuing a B.S. in Symbolic Systems and a coterminal M.S. in Computer Science. My research interests span reinforcement learning, robotics, and computer vision, and I conduct research at IRIS Lab, led by Prof. Chelsea Finn, on these topics.

I am interested in *embodied systems capable of intelligently exploring their environments and harnessing learned knowledge for downstream tasks*. When faced with novel situations, humans don't re-learn skills and object representations from scratch. I am excited by the potential of robotic agents similarly learning representations via pretraining on diverse datasets that facilitate intelligent, autonomous exploration through interaction. Successful exploration and data collection in new environments can then be leveraged to complete downstream tasks specified by humans.

EDUCATION

Stanford University — **Palo Alto, CA**
B.S. Symbolic Systems (Learning), Minor: Mathematics. GPA: 4.123/4.0. — Sep 2020 – Jun 2024
M.S. Computer Science (Artificial Intelligence). GPA: 4.0/4.0 — Jan 2023 – (expected) Dec 2024
Undergraduate Major Advisor: Prof. Nick Haber. M.S. Research Advisor: Prof. Chelsea Finn

Raffles Institution (Junior College) — **Singapore**
Singapore-Cambridge General Certificate of Education A-Level — Jan 2018 – Dec 2019
90/90 Rank Points, 8 Distinctions (Physics, Chemistry, Math, Economics, Higher Math)

PUBLICATIONS

Maximilian Du*, **Olivia Y. Lee***, Suraj Nair, Chelsea Finn. "Play It by Ear: Learning Skills amidst Occlusion through Audio-Visual Imitation Learning". *Robotics: Science and Systems 2022*. arXiv:2205.14850.

Olivia Y. Lee, Tom Vergoossen. "An updated analysis of satellite quantum-key distribution missions". arXiv:1909.13061.

RESEARCH PROJECTS

***Extracting Affordances from Human Videos for Autonomous Robotic Exploration** — **May 2023 – Present**
Affiliated with Stanford Artificial Intelligence Laboratory (IRIS Lab). Advised by Annie Xie, Karl Pertsch, Prof. Chelsea Finn
- Developing approach to extract object and skill affordances from egocentric human video datasets and play data.
- Designing system to leverage learned affordances for autonomous robotic exploration and data collection in novel environments.

Today Years Old: Adapting Language Models to Word Shifts — **Jan 2023 – Mar 2023**
CS 224N: Natural Language Processing with Deep Learning Final Project — Github Repo
- Finetuned GPT-2 and RoBERTa to predict word embeddings for novel lexical items given their definitions, trained via supervised learning on word embeddings of common words, using embeddings from pretrained models as ground-truth embeddings.
- Incorporated predicted word embeddings into pretrained language model, evaluated on masked language modeling tasks.

***Play it by Ear: Learning Skills amidst Occlusion through Audio-Visual Imitation Learning** — **Mar 2021 – Jun 2022**
Affiliated with Stanford Artificial Intelligence Laboratory (IRIS Lab). Advised by Suraj Nair, Prof. Chelsea Finn — Site, Paper
- Conducted multimodal robot learning research leveraging vision, audio, and memory, demonstrating that augmenting visual, audio, and proprioception data improves success rates on partially observed tasks.
- Developed behavior cloning algorithms with MuJoCo, Robosuite, and PyTorch for implementation on Franka-Emika Panda robot.
- Established novel robotic imitation learning data pipeline to collect expert demonstrations using Oculus Quest headset.

A Shot in the Dark: Transfer Learning with Self-Supervision for Sentiment Classification — **Mar 2022 – Jun 2022**
CS 229: Machine Learning Final Project
- Modeled improved zero-shot and few-shot transfer learning with self-supervised models for sentiment classification.
- Engaged in comparative testing of direct tuning, zero-shot, and few-shot capabilities of logistic regression models with validation, long-short-term memory (LSTM) networks with frozen and trainable word2vec embeddings, and DistilBERT.

***Model Predictive Curiosity** — **Mar 2022 – Jun 2022**
PSYCH 240A: Curiosity in Artificial Intelligence Final Project. Advised by Prof. Nick Haber — Poster
- Proposed Model Predictive Curiosity (MPCu), backpropagates on predicted curiosity value to select curiosity-maximizing actions.
- Tested MPCu's capability to optimize for high-curiosity action values and enrich multi-object interactions in Box2D environment.

Building Safety Benchmarking Services for Comprehensive AI Services (CAIS) systems — **Jan 2021 – Jun 2021**
Affiliated with Stanford Existential Risks Initiative Research Program — Paper 1, Paper 2
- Analyzed potential to mitigate AI existential risk through K. Eric Drexler's Comprehensive AI Systems (CAIS) framework.
- Proposed protocol encompassing pre- and post-deployment safety benchmarking services for CAIS systems.

TECHNICAL SKILLS

Languages and Libraries: Python, PyTorch, TensorFlow, NumPy, Matplotlib, Pandas, C++, C, HTML/CSS, JavaScript, React
Tools: MuJoCo, Robosuite, Franka-Emika Panda Robot, Oculus Quest VR Headset, Git, Unix, LaTeX, Terminal
Research Areas: Machine Learning, Reinforcement Learning, Computer Vision, Robotics, Behavior Cloning, Robotics, Natural Language Processing, Graph Representation Learning

HONORS & AWARDS

Tau Beta Pi Scholarship 2023-24 **Jul 2023**
- Recognizes and awards members with funds to support their studies and research, based on academic achievement, extracurricular activities, and promise of substantial contributions to the engineering profession
- Awarded to ~200 members across all chapters nationwide. *About TBP Scholarship*

Tau Beta Pi California Gamma Chapter **Jun 2023**
- Engineering honors society, top 12.5% of juniors in School of Engineering. Nominated Fall 2022, initiated Spring 2023. *About TBP*

Symbolic Systems Research Fellow 2023 **Jan 2021**
- Guaranteed funding for Stanford Computer Science Department's undergraduate summer research program.
- Selected as 1 of ~20 Symbolic Systems Summer Research Internship Program fellows in 2023. *About SymSys Intern*

Stanford Engineering Research Scholars 2022 **Feb 2022**
- Awarded to underrepresented students interested in engineering research to empower graduate engineering departments.
- Selected as 1 of 16 students from colleges across the US to participate in Stanford's Engineering Research program.

CURIS Fellowship 2021 **Jan 2021**
- Guaranteed funding for Stanford Computer Science Department's undergraduate summer research program.
- Selected as 1 of 17 undergraduate CURIS Fellows for the Summer 2021 CURIS Program. *About CURIS Fellows*

GCE A-Level Examination Excellence Award **Aug 2020**
- Awarded to students who achieved the highest possible grades in all subjects offered in the GCE A-Level Examinations.
- 1 of 70 students who achieved 8 distinctions, out of high school's graduating cohort of ~1300 students.

Agency for Science, Technology and Research (A*STAR) Science Award **Apr 2019**
- Awarded to Singaporean students with strong aptitude for mathematics, science, and engineering research.
- Selected as 1 of ~80 students nationwide to receive the award and engaged in a research attachment program with A*STAR.

WORK EXPERIENCE

Stanford School of Engineering, Computer Science Department | *Course Assistant (CA)* **Sep 2023 – Present**
- (Winter 2024) Graduate CA for CS 224N: Natural Language Processing, taught by Prof. Tatsunori Hashimoto and Prof. Diyi Yang
- (Fall 2023) Graduate CA for CS 157: Computational Logic, taught by Prof. Mike Genesereth.
- Graded assignments and projects, held office hours to clarify queries, taught quiz review sessions, set and revised quiz questions.

Stanford Artificial Intelligence Laboratory – IRIS Lab | *Research Engineer* **Mar 2021 – Present**
- Conducting research in reinforcement learning and robotics, studying intelligence through robotic interaction at scale.
- Working on projects supervised by Suraj Nair, Annie Xie, Karl Pertsch, and Prof. Chelsea Finn.

Inspirit AI | *Instructor & Research Mentor* **Jun 2023 – Aug 2023**
- Taught high school students about AI fundamentals: introduction to machine learning and deep learning, linear and logistic regression, natural language processing, computer vision, and neural networks.
- Mentored advanced high school students in independent AI research projects spanning various. fields, e.g., NLP for sentiment analysis of financial news, computer vision and object detection models applied to autonomous driving.

Salesforce | *Full-Stack Software Engineer* **May 2022 – Aug 2022**
- Contributed to Flow Builder, a low-code tool for building, managing, and running automated end-to-end enterprise workflows.
- Enhanced user customization tools in Flow Builder using React, Typescript, and HTML/CSS by shipping production-ready code.
- Collaborated with engineers, product managers, and UI/UX team to iterate on features for September 2022 product release.

CS + Social Good | *Fellowships (Team Lead, Executive Board)* **Jul 2021 – Jun 2022**
- Secured $25,000 in funding, coordinated full-time student summer projects in tech and social impact organizations. *About CS+SG*

Women in Computer Science (WiCS) | *Outreach (Volunteer)* **Sep 2020 – Nov 2020**
- Developed curriculum teaching CS principles to low-income, underrepresented students in Palo Alto School District. *About WiCS*

Center for Quantum Technologies | *Research Intern* **Aug 2018 – Sep 2019**
- First author of analysis discussing applications of satellites to distribute private keys for quantum cryptography. *arXiv:1909.13061*
- Researched quantum computing theory and algorithms, by conducting literature reviews of ~25 papers with postgraduates.

Updated Nov 2023

COURSEWORK

Computer Science

- CS 330: Deep Multi-task and Meta-Learning (Fall 2023)
- CS 326: Topics in Advanced Robotic Manipulation (Fall 2023)
- CS 384: Seminar on Ethical and Social Issues in Natural Language Processing (Spring 2023, A)
- CS 231N: Deep Learning for Computer Vision (Spring 2023, A)
- CS 422: Interactive and Embodied Learning (Winter 2023, A)
- CS 224N: Natural Language Processing with Deep Learning (Winter 2023, A)
- OSPOXFRD 196Q: Graph Representation Learning (Fall 2022, A) (Stanford in Oxford Study Abroad Program)
- CS 157: Computational Logic (Fall 2022, A+)
- CS 229: Machine Learning (Spring 2022, A)
- CS 205L: Continuous Mathematical Methods for Machine Learning (Winter 2022, A+)
- CS 161: Design and Analysis of Algorithms (Winter 2022, A)
- CS 221: Artificial Intelligence: Principles and Techniques (Fall 2021, A)
- CS 110: Principles of Computer Systems (Summer 2021, A+)
- CS 109: Probability for Computer Scientists (Spring 2021, A)
- CS 103: Mathematical Foundations for Computing (Spring 2021, A)
- CS 107: Computer Organization and Systems (Winter 2021, A)
- CS 106B: Programming Abstractions in C++ (Fall 2020, A)
- CS 56N: Great Discoveries and Inventions in Computing (Fall 2020, A+)

Mathematics

- PHIL 152: Computability and Logic (Spring 2023, A+)
- MATH 87Q: Mathematics of Knots, Braids, Links, and Tangles (Spring 2022, A)
- PHIL 151: Metalogic (Winter 2022, A)
- PHIL 150: Mathematical Logic (Fall 2021, A+)
- MATH 52: Integral Calculus of Several Variables (Spring 2021, A+)
- MATH 104: Applied Matrix Theory (Winter 2021, A)
- MATH 51: Linear Algebra, Multivariable Calculus, and Modern Applications (Fall 2020, A)

Philosophy

- PHIL 186: Philosophy of Mind (Spring 2023, A+)
- SYMSYS 202: Theories of Consciousness (Winter 2023, A+)
- OSPOXFRD 199A: Philosophy of Mind (Fall 2022, A) (Stanford in Oxford Study Abroad Program)
- SYMSYS 205: The Philosophy and Science of Perception (Spring 2022, A)
- SYMSYS 207: Conceptual Issues in Cognitive Neuroscience (Fall 2021, A)
- PHIL 80: Mind, Matter, and Meaning (Spring 2021, A)
- PHIL 20N: Philosophy of Artificial Intelligence (Winter 2021, A+)
- SYMSYS 1: Minds and Machines (Winter 2021, A+)
- ESF 7: The Transformation of the Self (Fall 2020, A)

Psychology & Linguistics

- PSYCH 140: Introduction to Psycholinguistics (Winter 2023, A)
- PSYCH 240A: Curiosity in Artificial Intelligence (Spring 2022, A)
- LINGUIST 130A: Introduction to Semantics and Pragmatics (Winter 2022, A+)
- PSYCH 1: Introduction to Psychology (Winter 2022, A+)
- LINGUIST 150: Language and Society (Winter 2021, A)

Other

- PHYSICS 83N: Physics in the 21st Century (Winter 2023, A+)
- OSPOXRD 29: Artificial Intelligence and Society (Fall 2022, A+) (Stanford in Oxford Study Abroad Program)
- ENGLISH 13Q: Imagined Realism (Fall 2021, A)
- HISTORY 44Q: Gendered Innovations in Science, Medicine, Engineering, and Environment (Fall 2021, A)
- CS 21SI: AI for Social Good (Spring 2021, Satisfactory)
- DESINST 210: Human Interaction in the Digital vs. Analog World (Fall 2020, Satisfactory)