AISHNI PARAB

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EDUCATION

University of California, Los Angeles   Jun 2027 (expected)
PhD Statistics (Advanced to Candidacy, C. Phil)   Sep 2022 -   Present
M.Sc. Computer Science   Sep 2020 - Jun 2022

University of California, Santa Cruz   Sep 2014 - Mar 2018
B.Sc. Computer Science

GRANTS, SCHOLARSHIPS & AWARDS

·   ONR Grant, Human-inspired Computational Models of Vision-Language Interactions for Agents (2023 - 2024) [[call](#)]
·   Google DeepMind Scholarship (2020 - 2022) [[UCLA News](#)]
·   University of California, Santa Cruz, Undergraduate Dean's Award (2014 - 2018)

RELEVANT SKILLS

·   Languages: Python, R, JavaScript, PHP, Postgres, SQL, C++, Probabilistic Programs (Gen, Pyro, WebPPL)
·   Libraries: TensorFlow, PyTorch, Jax, PyTorch.Geometric, SciKit Learn, OpenCV, Pandas, Numpy, ThreeJS
·   Coursework: Statistical Modeling and Learning, Matrix Algebra & Optimization, Machine Learning, Probabilistic Decision Making, Visual Communication, Cognitive Artificial Intelligence, Neural Networks and Deep Learning, Automated Reasoning, Data Mining, Algorithms and Complexity, Operating Systems, Artificial Life for Graphics & Vision, Probability Theory, Probability Theory, R programming, Research Design and Analysis, Generative Models, Types and Programming Languages

EXPERIENCE

Mathematics of Intelligences, Institute of Pure and Applied Mathematics, UCLA   Sep 2024 - Dec 2024
Core Participant
·   Engaged in research discussions, seminars, and collaborative projects on *Search, Architecture, and Evaluation of Large Language Models; Concept Learning in Humans and Machines; and Group Theory and Representation Learning.*
·   Contributed to a white paper and presented preliminary research findings

Applied Scientist Intern, Microsoft   Jun 2024 - Present
PRogram Synthesis by Example (PROSE) Research Team
·   Building neuro-symbolic models for reasoning about spreadsheet data in image and tabular form
·   Writing and optimizing code for research prototypes and experiments
·   Running large-scale experiments and data analysis to evaluate performance of state-of-the-art Multi-Modal models
·   Training and fine-tuning Multi-Modal models for solving Image to Code tasks
·   Authoring technical papers

Mentee, NeuroSymbolic AI Research   May 2023 - Present
Mentor: Sumit Gulwani, Microsoft Research [[webpage](#)]

Graduate Research Assistant, Visual Intelligence Lab, UCLA   Mar 2021 - Dec 2024
Principal Investigator: Tao Gao
·   **Researching and building models for joint vision-language learning using NeuroSymbolic methods (towards PhD dissertation)**
·   Lead writing an ONR grant proposal for "Human-inspired Computational Models of Vision-Language Interactions for Agents" under faculty guidance (Tao Gao, Josh Tenenbaum) and received funding for 2023-2026 [[call](#)]
·   Advising undergraduates, leading lab meetings on modeling work in Deep Learning and NeuroSymbolic Learning
·   Investigated the role of structured program representations in concept learning (M.S. thesis available upon request)

· Implemented inverse planning algorithm for goal understanding using forward search and backward Bayesian Inference for a kitchen domain task (3D visual [VirtualHome](#) environment)

Mentee, Google DeepMind Scholar   Aug 2020 - Dec 2023

Mentor: Peter Battaglia, Google DeepMind [[webpage](#)]

Software Engineer, MIT Media Lab, Tangible Media Group, Cambridge, MA   Dec 2019 - Aug 2020

Principal Investigator: Hiroshi Ishii

· Applied deep learning techniques to 3D knitwear images to automatically generate knitting machine instructions
· Designed 3D knitwear on CAD tools and fabricated on a Shima Seiki WholeGarment MACH2XS machine
· Designed web-based Google Street View tool for user's to experience local art and sense ambient olfactory and sound stimuli in Lagos, Nigeria (for Google Arts & Culture in collaboration with photographer Stephen Tayo) [[video](#)]
· Designed web-based CAD tool to design & simulate behavior of a pressure actuated artificial muscle fiber [[code](#)][[paper](#)]

Software Engineer, MIT Human-Centered Artificial Intelligence, Cambridge, MA   Aug 2018 - Dec 2019

Advisor: Lex Fridman

· Developed deep learning and computer vision algorithms for a real-time driver monitoring system to measure cognitive load using pupil and blink data [[paper](#)]
· Developed web-based annotation tools with database backend to streamline large-scale data collection, annotation and validation of raw video and image data of human faces, pupil and blinks [[code](#)]
· Developed a simulation tool in Python to analyze human driving behavior in parking scenarios using GPS data
· Developed a system to assign road-type labels to large-scale raw GPS data of driving routes
· Produced insights through exploratory data analysis of driver emotions in Veoneer self-driving scenario

Research Assistant, Re-Embodied Cognition Lab, UC Santa Cruz, CA   Feb 2017 - Mar 2018

Principal Investigator: Leila Takayama

· Developed a Python-based text-to-speech interface for Beam telepresence robots to aid wizard-of-oz experiments [[code](#)]
· Assisted in designing human-robot interaction experiments to measure human loneliness and social connectedness

Software Engineering Intern, Folium LLC, Mountain View, CA   Jun 2017 - Aug 2018

Advisor: Jeff Capone

· Developed a machine learning model to detect biological sex of users from wearable EKG data

Research Assistant, Computer Vision Lab, UC Santa Cruz, CA   Jun 2016 - Dec 2016

Advisor: Roberto Manduchi

· Developed a gaze-contingent on-screen magnifier in C++ using Tobii Pro to allow touch-free interaction with screen

Research Assistant, NASA Undergraduate Student Instrument Project, UC Santa Cruz, CA   Jun 2016 - Jun 2017

Principal Investigator: David Smith [LAFTR Team in [NASA news](#)]

· Developed an understanding of lightning thunderstorms causing gamma ray emissions in the atmosphere
· Led a team of undergraduate researchers to manage, present to NASA, and build a plastic scintillator based detector to observe terrestrial gamma-ray flashes from thunderstorms
· Simulated passage of thunderstorm particles through gamma ray detector

TEACHING ASSISTANTSHIPS

University of California Los Angeles

Statistics 101A Introduction to Probability	Jan 2025 - Mar 2025
Statistics 100A Introduction to Probability	Apr 2024 - Jun 2024
Statistics 10 Introduction to Statistical Reasoning	Sep 2023 - Dec 2023
Communication 188C AI & Society	Mar 2022 - Jun 2022
Communication 122 Visual Communication	Sep 2021 - Dec 2022
Computer Science 31 Introduction to Computer Science	Jun 2021 - Aug 2021/Jan 2022 - Mar 2022
Los Angeles Computing Circle, Instructor	Jul 2021

Massachusetts Institute of Technology

6.S094 Deep Learning for Self-Driving Cars, Teaching Assistant

Feb 2022 - Apr 2022

JOURNAL ARTICLES

- Stacy, Stephanie, Siyi Gong, **Aishni Parab**, Minglu Zhao, Kaiwen Jiang, and Tao Gao. "A Bayesian theory of mind approach to modeling cooperation and communication." *Wiley Interdisciplinary Reviews: Computational Statistics*: e1631. [PDF]

PEER REVIEWED CONFERENCE PROCEEDINGS

- Ding, Li, Jack Terwilliger, **Aishni Parab**, Meng Wang, Lex Fridman, Bruce Mehler, and Bryan Reimer. "CLERA: A Unified Model for Joint Cognitive Load and Eye Region Analysis in the Wild." *ACM Transactions on Computer-Human Interaction* (2023). [PDF]
- Stacy, Stephanie, **Aishni Parab**, Max Kleiman-Weiner, and Tao Gao. "Overloaded communication as paternalistic helping." In *Proceedings of the Annual Meeting of the Cognitive Science Society*, vol. 44, no. 44. 2022. [PDF]

POSTER PRESENTATIONS

- Barghi Sr, Majid Reza, Nicholas Delaney, Amirhossein Forouzani, Eric Wells, **Aishni Parab**, David Smith, Forest Martinez, Gregory S. Bowers, and John Sample. "Plastic Scintillator Based Detector for Observations of Terrestrial Gamma-ray Flashes." In *AGU Fall Meeting Abstracts*, vol. 2017, pp. AE33B-2555. 2017. [abstract]

INVITED TALKS

- **Parab, Aishni.** "Extracting Structured Data from Multi-Modal Input." *Workshop III: Naturalistic Approaches to Artificial Intelligence*, Mathematics of Intelligences Long Program, Institute for Pure and Applied Mathematics (IPAM), November 2024. Invited Talk. [abstract]. [youtube]

ACTIVITIES

University of California Los Angeles

August 2020 - Present

- IPAM Mathematics of Intelligences Core Member
- Neurosymbolic AI Reading Group
- Women in Math Group
- Statistics & Computer Science Graduate Student Association
- ACM AI & International Collegiate Programming Contest (ICPC)
- Los Angeles Computing Circle