

# MANASI SHARMA

## Graduate Student in Computer Science (AI/ML Track) at Stanford University

Interests in AI, Machine Learning, Reinforcement Learning, Deep Learning, Computer Vision

Experience in Autonomous Vehicles, Perception & 3D Vision, Robot Learning, Large Language Models

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## EDUCATION

### Stanford University, School of Engineering

Sep '21 - Jun '23

M.S. in Computer Science (AI/ML Track), Current GPA: **3.96/4.00**

Distinction-in-Research in progress: 'Large Language Models for Corrections in Robot Learning' under Prof. Dorsa Sadigh

### Columbia University, Columbia College

Aug '17 - Jun '21

B.A. Computer Science with concentration in Physics, GPA: **3.81/4.00**

**Key Courses:** Decision Making under Uncertainty, Interactive Robotics, Trustworthy ML, Natural Language Processing, ML with Graphs, Deep Learning for Computer Vision, Data Str. & Algorithms, Prob. & Statistics, Lin. Algebra, Robot Autonomy

## WORK EXPERIENCE

### Renault-Nissan-Mitsubishi - Alliance Innovation Lab

Jun '22 - Sep '22

Research Intern, Autonomous Systems

- Engineered an end-to-end LiDAR 3D point-cloud classification system in Python & C++ for Nissan Autonomous Vehicles, which achieved >95% accuracy, ~2% FPR and 85% reduction in runtime on classifying real-world cars, pedestrians, cyclists, etc. *The system is planned for deployment in Nissan Autonomous Vehicles beginning Winter '22.*

### Stanford University, School of Engineering

Mar '22 - Dec '22

Teaching Assistant for [CS231N](#) (Deep Learning for Comp. Vision, Prof. Fei-Fei Li) and [CS230](#) (Deep Learning, Prof. Andrew Ng)

- Managed weekly 'Discussion Sections' of 75+ students for two of the most popular CS courses at Stanford (>500 students); held office hours, constructed & graded HWs. Received >95% excellent reviews ('Very/Extremely Effective').

### Columbia University, Department of Mathematics

Sep '19 - Jun '21

Undergraduate Teaching Assistant for Calculus III (across 4 semesters)

## RESEARCH EXPERIENCE

### Stanford University, Stanford Vision Laboratory & ILIAD Robotics Lab

Sep '21 - Present

Research Intern (Prof. Fei-Fei Li, Prof. Jiajun Wu, Prof. Dorsa Sadigh)

- Led the development of the Knowledgebase for [iGibson](#) and [BEHAVIOR-1K](#), an ImageNet-scale robotic simulation benchmark. Accepted for CoRL '22 and nominated for 'Best Paper' award.
- Mobilized ~20 crowd-workers to categorize ~5000 "how-to" articles and used zero-shot Natural Language Processing techniques with GPT-3 to generate >97% quality activity definitions in a predicate logic-based language.
- Heading a new project on 'Gaze & Language-assisted Instruction Corrections for Imitation Learning'

### Columbia University, Data Science Institute

Sep '19 - Jun '21

Research Intern, Dept. of CS & Astronomy (Prof. Daniel Hsu and Prof. Zoltan Haiman)

- Discovered that 89% of the output of a popular neural network used in Astronomy was counterintuitively attributable to negative image regions (voids, black holes, etc.). Published results in APS Physical Review '20. Targeted explainability & trustworthiness of neural networks in the traditional field of Astronomy using Saliency Maps.

### California Institute of Technology, Division of Physics, Mathematics and Astronomy

Jun '19 - Aug '19

Visiting Undergraduate Research Program (VURP) Intern, Palomar Gattini-IR Group (Prof. Mansi Kasliwal)

- Pioneered the development of a flagship image classification system for Caltech's Gattini-IR Telescope using TensorFlow which achieved ~97.5% accuracy on thousands of cosmic transient sources. Published results in PASP '20. Deployed the model in the Telescope's data processing pipeline (still active), replacing the manual classification process.

## TECHNICAL SKILLS

- Programming Languages: Proficient: Python, C++/C, ROS, CUDA, Java, JavaScript, LaTeX; Familiar: Julia, SQL, SQLite
- Frameworks: TensorFlow, Keras, PyTorch, Scikit-Learn, NLTK, PyBullet, MeshLab, NetworkX, PyG, OpenCV
- Tools: Colab/GCP, Jupyter Notebooks, Visual Studio, Git, MySQL (Familiar), Figma

## PUBLICATIONS

- C. Li, C. Gokmen..., **M. Sharma**..., "BEHAVIOR-1K: A Benchmark for Embodied AI with 1,000 Everyday Activities and Realistic Simulation" in *Conference on Robot Learning (CoRL)*. Nominated for 'Best Paper'. *June '22*
- J. Matilla, **M. Sharma**, D. Hsu, Z. Haiman, "Interpreting deep learning models for weak lensing" in *Physical Review D*, 102(12). <https://doi.org/10.1103/physrevd.102.123506> *Dec '20*
- K. De, M.J. Hankins..., **M. Sharma**..., "Palomar Gattini-IR: Survey Overview, Data Processing System, on-Sky Performance and First Results." *Publications of the Astronomical Society of the Pacific*, vol. 132. <https://doi.org/10.1088/1538-3873/ab6069> *Feb '20*

## GRADUATE COURSE PROJECTS

- **Crowd Aware Intent-based Reinforcement Learning** - CS333 (Algorithms for Interactive Robotics)  
Reduced collision rate in crowd navigation by 50% by leveraging human latent intent reinforcement learning ([link](#)).
- **Predicting Drug Interactions with Graph Neural Networks** - CS224W (Machine Learning with Graphs)  
Used the Graph Isomorphism Network to exceed 11<sup>th</sup> place on ogbl-ddli leaderboard ([link](#), selected for course [website](#)).
- **Debiasing Models for Out-of-domain Generalization** - CS224N (NLP for Deep Learning)  
Exceeded BERT's performance on out-of-domain question-answering data by 2.5% by using debiasing models ([link](#)).
- **Optimizing Wind Turbine Placement Subject to Turbine Wakes** - CS238 (Decision Making Under Uncertainty)  
Applied Q-Learning to windfarms to generate sensible layouts that maximize power, subject to wake constraints ([link](#)).
- **LIMES: LIME for Image Segmentation** - CS329T (Trustworthy Machine Learning)  
Devised a LIME algorithm variant for facial segmentation that achieves explainability like gradient-based methods.
- **Monte-Carlo Tree Search Player** - CS227B (General Game Playing)  
Designed a player to play any game, using MCTS, multi-threading, grounding, etc.; placed 8<sup>th</sup> in the class ([link](#)).

## LEADERSHIP ROLES

- Graduate Community Chair, Women in Computer Science, Stanford University *Jun '22 - Present*
- Founder & Project Leader, [COVID-19 Public Hub](#) website highlighting Columbia research *Apr '20 - Jun '21*
- Corporate Chair, Women in Computer Science, Columbia University *Apr '20 - Jun '21*
- Class 3 Curriculum Developer (AI section), Girls Who Code, Columbia University *Feb '20 - Aug '20*
- Executive Board UG Student Coordinator, Columbia Society for Women in Physics *Sep '18 - Sep '19*
- Captain, 'Columbia Raas' Dance Team (member since Sep 2017), Columbia University *Apr '20 - Jun '21*

## HONORS

- 1 of 18 accepted to the [GFSD](#) (Graduate Fellowships for STEM Diversity) Program *Mar '22*
- 1 of 50 accepted into Google's CS Research Mentorship Program ([CSRMP](#)), Class of 2022A *Feb '22*
- Selected for the final round of the GEM Fellowship *Jan '22*
- Dean's List (in 6 out of 7 graded semesters, awarded to top 20%), Columbia University *Fall '17 - Fall '20*
- Columbia Undergraduate Research Fellowship (URF), Columbia College Summer Funding Program *May '20*
- Visiting Undergraduate Research Program (VURP) Award, California Institute of Technology *May '19*
- 1 of 25 awarded Laidlaw Undergraduate Research & Leadership Scholarship, Columbia Univ. *'18 - '19*
- Andy Grove Scholarship for Intel Employees' Children, Intel Foundation *Fall '19*

## OTHER

- Languages: Hindi (fluent), Spanish (intermediate)