

# Umesh Kumar Singla

A84E PNI  
Princeton, NJ 08540

[usingla@princeton.edu](mailto:usingla@princeton.edu)  
[umeshksingla.github.io](https://github.com/umeshksingla)

## EDUCATION

---

- 2020 - 2022      **University of California, San Diego (UCSD)**  
M.S., Computer Science (GPA: 3.96/4.0)  
Thesis: Exploration in Complex Naturalistic Behavior (defended 06/12/2022)  
Advisor: [Dr Marcelo Mattar](#)
- 2014 - 2018      **IIIT Hyderabad**  
B.S., Computer Science & Engineering (GPA: 8.50/10.0)  
Honors in Cognitive Science  
Advisor: [Dr Bapi S Raju](#)

## EXPERIENCE

---

- 2023 - Present      **Princeton Neuroscience Institute (PNI)**, Princeton University  
Advisors: [Dr Mala Murthy](#) and [Dr Jonathan Pillow](#)  
Position: Full-time Research Specialist
- Develop methods to quantify social behavior in an unsupervised manner. We are modeling courtship behavior in *Drosophila melanogaster* to identify distinct behavioral states that govern the pose dynamics of a fly.
- 2020 - 2022      **Department of Cognitive Science**, UC San Diego  
Advisor: [Dr Marcelo Mattar](#) (now NYU)  
Position: Graduate Student Researcher
- Researched existing exploration algorithms for sequential tasks in Reinforcement Learning literature to test their generalizability and also applicability to animal behavior.
  - Analysis and modeling of rodent behavior from 2AFC and delay discounting tasks in Stan using the frameworks of Reinforcement Learning and Bayesian Hierarchical models.
- 2017 - 2018      **Brain, Cognition and Computation Lab**, IIIT Hyderabad  
Advisor: [Dr Bapi S Raju](#) and [Dr Vinoo Alluri](#)  
Position: Undergraduate Student Researcher
- Spring 2018: Replicated a previous study on cocaine addiction-related alteration in resting-state functional connectivity in a different demographic sample.
  - Fall 2017: Designed and conducted a serial reaction time experiment in Psychtoolbox to study implicit sequence learning in auditory domain in human subjects.

## PUBLICATIONS

---

### In Progress

- 2023      **Umesh Singla**, Marcelo Mattar. Temporal persistence explains exploration of mice in a labyrinth. *In prep.*

### Journal Articles

- 2023      Sharon Noh, **Umesh Singla**, Ilana Bennett, Aaron Bornstein. [Memory precision and age differentially predict the use of decision-making strategies across the lifespan.](#) *Scientific Reports*.
- 2020      Arun Garimella, **Umesh Singla\***, Sourabh Rajguru\*, and Vinoo Alluri. [Marijuana and the hippocampus: A longitudinal study on the effects of marijuana on hippocampal subfields.](#) *Progress in Neuro-Psychopharmacology and Biological Psychiatry*.

## Posters

2023	Shruthi Ravindranath, <b>Umesh Singla</b> , Junyu Li, Talmo Pereira, Jonathan Pillow, Mala Murthy. Multiscale Generative Modeling Framework For Mapping a Social Interaction. <i>Neuroethology: Behavior, Evolution and Neurobiology (GRC)</i> . Mount Snow, Vermont.
2018	<b>Umesh Singla</b> , Pramod Kaushik, Eduardo A. Garza-Villarreal and Vinoo Alluri. Replicating impaired resting state functional connectivity in chronic cocaine users. <i>5th Annual Conference of Cognitive Science (ACCS)</i> . IIT Guwahati, India.
2017	<b>Umesh Singla</b> , Anuj K. Shukla and Bapi S Raju. Implicit sequence learning in auditory domain. <i>IIT Hyderabad Undergraduate R&amp;D Showcase</i> .

## Talks

2023	Learning and Planning in RL. <i>The NorthCap University, New Delhi, India</i> .
------	---

## INDUSTRY

---

2018 - 2020	Machine Learning Engineer, <b>Joveo, Inc.</b> , Hyderabad, India <ul style="list-style-type: none"><li>• Design, code, troubleshoot, and support scalable big data pipelines for the data science team. Technologies used were Spark, Airflow, AWS Athena, and Elastic Map-Reduce.</li><li>• Develop a data-driven media planner to recommend the best platforms, locations, bid, and budget to advertise a job position.</li></ul>
Jun - Aug 2017	Student, MacPorts, <b>Google Summer of Code 2017</b> <i>Remote</i> <ul style="list-style-type: none"><li>• Implemented the <a href="#">migrate</a> command in Tcl and C to automate the end-to-end process of reinstalling macports and packages to ensure a smooth transition after an OS upgrade.</li></ul>
May - Jun 2017	Research Engineering Intern, <b>Samsung Research</b> <i>Bangalore, India</i> <ul style="list-style-type: none"><li>• Analyze time-series data from CPU usage and network logs for anomaly detection.</li><li>• Study fault localization methods to detect faulty operations in cloud systems at run time.</li></ul>

## SKILLS

---

Programming	Python (PyTorch, JAX, PyStan, scikit-learn, Numpy, Pyplot), MATLAB, SQL
Web	HTML, CSS, JavaScript, REST
Systems	Cloud (AWS/GCP), CI/CD, Git, Docker, Linux

## TEACHING ASSISTANT

---

### UCSD

Fall 2021	CSE250A: Probabilistic Reasoning and Decision-Making
Fall 2022	DSC180A: Data Science Senior Capstone Project
Spring 2022	DSC190: Intro to Machine Learning: Representation Learning
Winter 2022	DSC102: Systems for Scalable Analytics
Summer 2022	CSE8A: Intro to Programming in Python
Summer 2021	CSE141: Intro to Computer Architecture
Summer 2021	CSE3: Fluency in Information Technology
Spring 2021	CSE142L: Computer Architecture: Software Perspective

Winter 2021      DSC102: Systems for Scalable Analytics

## IIIT Hyderabad

Spring 2018      ICS251: Computer Networks

Spring 2017      IEC103: Basic Electronic Circuits

Fall 2016      IEC102: Electrical Science 1

## VOLUNTEERING

---

2023 - present      Climate & Inclusion Committee, PNI

Fall 2022      [Jacobs Undergraduate Mentoring Program](#) graduate mentor, UCSD

Fall 2021      [oSTEM Qtorship](#) mentor, UCSD

2018, 2019      Google Summer of Code (GSoC) admin for [MacPorts](#)

## AWARDS

---

2014 - 2015      Dean's List for 2 semesters, IIIT Hyderabad

2014      [INSPIRE](#) Scholar, Department of Science and Technology, Govt of India

## RELEVANT COURSEWORK

---

### UCSD

Probabilistic Learning and Decision-Making; Deep Generative Models

Search and Optimization; Probabilistic Machine Learning

Recommender Systems; Structured Prediction for NLP

### IIIT Hyderabad

**ML:** Statistical Methods in AI; Information Retrieval and Extraction

**CogSci:** Intro to Cognitive Science; Intro to Neuronal Dynamics; Game Design; Language, Mind and Society

**Maths:** Discrete Mathematics; Linear Algebra; Probability and Statistics

**CS:** Complexity and Algorithms; Distributed Systems; Software Design; Formal Methods