Umesh Kumar Singla

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EDUCATION

2020 - 2022	**University of California San Diego** M.S., Computer Science (GPA: 3.96/4.0) Thesis: Exploration in Complex Naturalistic Behavior Advisor: Dr. Marcelo Mattar
2014 - 2018	**IIIT Hyderabad** B.Tech., Computer Science & Engineering (GPA: 8.50/10.0)

EXPERIENCE

2023 - Present	**Princeton Neuroscience Institute (PNI),** Princeton University Research Assistant | Advisors: Dr. Mala Murthy and Dr. Jonathan Pillow ● Develop statistical models to decode latent states governing behavior and neural activity of female *Drosophila* in a social context.
2020 - 2022	**Department of Cognitive Science,** UCSD Graduate Student Researcher | Advisor: Dr. Marcelo Mattar ● Using reinforcement learning to study exploration, planning and decision making with animal behavior recordings in sequential and bandit tasks.
2017 - 2018	**Brain, Cognition and Computation Lab,** IIIT Hyderabad Undergraduate Researcher | Advisors: Dr. Raju S Bapi and Dr. Vinoo Alluri ● Replicated a study on impaired resting-state functional connectivity in substance users. ● Conducted a serial reaction time experiment to study implicit learning in humans.

PUBLICATIONS

2024	**Umesh Singla**, Marcelo Mattar. Temporal abstraction in animal exploration in complex environment. *Cognitive Computational Neuroscience Conference (CCN) (poster).*
2024	**Umesh Singla**, Marcelo Mattar. Temporal persistence explains mice exploration in a labyrinth. *In Proceedings of the 46th Annual Meeting of the Cognitive Science Society. (invited talk).*
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.*

Conference Abstracts

2023	Shruthi Ravindranath, **Umesh Singla**, Junyu Li, Talmo Pereira, Jonathan Pillow, Mala Murthy. Multiscale Generative Modeling Framework For Mapping a Social Interaction. *Neuroethology: Behavior, Evolution and Neurobiology (GRC) (poster)*
2018	**Umesh Singla**, Pramod Kaushik, Eduardo A. Garza-Villarreal and Vinoo Alluri. Replicating impaired resting state functional connectivity in chronic cocaine users. *5th Annual Conference of Cognitive Science. IIT Guwahati, India (poster).*

| 2017 | **Umesh Singla**, Anuj K. Shukla and Bapi S Raju. Implicit sequence learning in auditory domain. *IIIT Hyderabad Undergraduate R&D Showcase (poster).* |

Invited Talks

| 2023 | Learning and Planning in RL. *The NorthCap University, New Delhi, India.* |

INDUSTRY

2018 - 2020	Software Engineer, **Joveo, Inc.** *Hyderabad, India*
	• Design, code, troubleshoot, and support scalable big data pipelines for the data science team. Technologies used were AWS, Spark, Airflow, and Map-Reduce.
Jun - Aug 2017	Software Intern, MacPorts, **Google Summer of Code 2017** *Remote*
	• Implemented the migrate 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.
May - Jun 2017	Research Engineering Intern, **Samsung Research** *Bangalore, India*
	• Analyze time-series data from CPU usage and network logs for anomaly detection.
	• Study fault localization methods to detect faulty operations in cloud systems at runtime.

SKILLS

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

TEACHING ASSISTANT

UCSD

Fall 2021	CSE 250A: Probabilistic Reasoning and Decision-Making
Spring 2022	DSC 190: Intro to Machine Learning
Winter 2021, 22	DSC 102: Systems for Scalable Analytics
Summer 2022	CSE 8A: Intro to Programming in Python
Summer 2021	CSE 141: Intro to Computer Architecture
Spring 2021	CSE 142L: Computer Architecture Lab

IIIT Hyderabad

Spring 2018	ICS 251: Computer Networks
Spring 2017	IEC 103: Basic Electronic Circuits
Fall 2016	IEC 102: Electrical Science 1

VOLUNTEERING

2022	Jacobs Undergraduate Mentoring Program graduate mentor, UCSD
2021	oSTEM Qtorship mentor, UCSD
2018, 2019	Google Summer of Code (GSoC) org admin and co-mentor for MacPorts.

| 2014 - 2015 | Dean's List, IIIT Hyderabad |
| 2014 | INSPIRE Scholar, Department of Science and Technology, Govt of India |

RELEVANT COURSEWORK

Princeton

Statistical Modeling and Analysis of Neural Data

UCSD

Probabilistic Reasoning and Decision-Making; Search and Optimization; Deep Generative Models
Recommender Systems; Structured Prediction for NLP

IIIT Hyderabad

Statistical Methods in AI; Intro to Neuronal Dynamics; Information Retrieval
Intro to Cognitive Science; Game Design; Language, Mind and Society
Discrete Mathematics; Linear Algebra; Probability and Statistics
Complexity and Algorithms; Theory of Computation; Software Design
Distributed Systems; Database Systems; Computer Networks

REFERENCES

Dr. Marcelo G. Mattar, New York University (**marcelo.mattar@nyu.edu**)
Dr. Jonathan W. Pillow, Princeton University (**pillow@princeton.edu**)
Dr. Mala Murthy, Princeton University (**mmurthy@princeton.edu**)

August 6, 2024