

PERSONAL
INFORMATION

Name : Michael Joseph Munje
Citizenship : United States
Residence : Austin TX, United States
Hometown : Los Angeles CA, United States
✉ michaelmunje@gmail.com
🏠 michaelmunje.com
in [linkedin.com/in/michaelmunje](https://www.linkedin.com/in/michaelmunje)
🐙 github.com/michaelmunje/



RESEARCH
STATEMENT

I am interested in human-centric autonomous agents and robots that can solve complex sequential decision-making tasks. As such, my work draws in elements from **machine learning** (ML), **reinforcement learning** (RL), **computer vision**, and **robotics**. Some areas of focus include imitation learning, leveraging prior knowledge, and improving collaboration between humans and robots. My long-term research goal is to enable human-centric robot autonomy in everyday human life.

EDUCATION

The University of Texas at Austin *Expected May 2027*
Ph.D. in Computer Science
Selected Coursework : Robot Learning, Learning for Controls and Dynamics

Georgia Institute of Technology *Dec. 2022*
M.S. in Computer Science, Machine Learning Specialization
Selected Coursework : Deep Reinforcement Learning, Classic Reinforcement Learning, Imitation Learning, Machine Learning, Deep Learning, Artificial Intelligence, Robot Intelligence : Planning, Computer Vision, Web Search & Mining, Natural Language Processing.

California State University Northridge *May 2019*
B.S. in Computer Science, Minor in Mathematics
Selected Coursework : Machine Learning, Regression Analysis, Statistics, Linear Algebra, Probability, Calculus I-III, Numerical Analysis, Graduate Algorithms, Data Mining, Discrete Math.

INDUSTRY
EXPERIENCE

Research Intern *May 2023 - August 2023*
IBM Research
Improved a quantization framework to increase inference speed and decrease memory requirements for large-language models. Implemented evaluation suite for autoregressive language models. Conducted analysis through extensive experiments on diverse decoder language model quantization schemes.

Data Science Intern *June 2022 - August 2022*
Riverside Research
Development of reinforcement learning library used for various human-machine teaming tasks. Contributed to planning algorithms for the Sawyer robotic arm to build block towers.

Data Science Intern *Aug. 2021 - Nov. 2021*
Riverside Research
Developed end-to-end object detection and pose estimation pipeline, reproduced results from reinforcement learning paper related to theory of mind.

Software Engineer Intern *June 2021 - Aug. 2021*
Microsoft
Trained machine learning models and optimized parameters used in ad rank function in counterfactual platform ; analyzed the results by flighting A/B tests globally.

RESEARCH
EXPERIENCE

Software Engineer Intern

June 2020 - Aug. 2020

Microsoft

Implemented black-box optimization algorithms used to find optimal hyperparameters for combinatorial structures used within a counterfactual platform used to simulate global ad auctions. My work had a direct impact of reducing computation time by 30% while increasing performance by 10% for a computationally expensive algorithm that is widely used globally.

Data Science Intern

Oct. 2019 - June 2020

NASA Jet Propulsion Laboratory

Deployed fresh craters detection pipeline across 99% of Mars with candidate extraction algorithm. Utilized weak supervision and trained classifiers to filter orbital imagery.

Software Engineer Intern

June 2019 - Aug 2019

Northrop Grumman

Developed machine learning and data science tools and added core functionalities to software systems.

Research Assistant

Aug. 2022 - April 2023

Georgia Institute of Technology

Advisor : Prof. Matthew Gombolay

Project title : Interactive Policy Modification for Human-AI Coordination

Description : Develop experiment platform for interactively modifying the policy for interpretable reinforcement learning agents with the goal being improved Human-AI coordination. Reproduce prior work in self-play and population-based agents using the PPO algorithm. Submitted for publication.

Research Assistant

June 2020 - Dec. 2020

California State University Northridge

Advisor : Prof. Kyle Dewey

Project title : Towards a Systems Programming Language Designed for Hierarchical State Machines

Description : Contributed to experimental programming language similar to C/C++ called Proteus, designed for NASA Jet Propulsion Laboratory flight engineers that uses hierarchical state machines for streamlining software verification. This work directly led to a conference publication.

Research Assistant

Feb. 2020 - May 2020

California State University Northridge

Advisor : Prof. Adriano Zamboni

Project title : Motion planning for an unmanned vehicle in the presence of accelerating obstacles

Description : Devised statistical-based methods for estimating the trajectories of autonomous vehicles in a simulation. I contributed to the codebase as well as the proofs for the maximum-likelihood estimators. This work helped contribute to a journal publication.

Research Assistant

Aug 2018 - May 2019

California State University Northridge

Advisor : Dr. Kah Chun Lau

Project title : Predicting the Molecular Properties of Ionic Liquids using Machine Learning

Description : Contributed to the initial codebase for a machine learning pipeline that predicting various molecular properties of ionic liquids such as viscosity and melting point. This work directly led to a journal publication, to which I am credited for the codebase.

REU Participant

June 2018 - Aug. 2018

Tufts University

Advisors : Prof. Csaba D. Toth, Dr. Diane L. Souvaine

Project title : Reconfiguration of connected graph partitions

Description : Devised algorithms for gerrymandering detection. One of my novel contributions included proving that the shortest such sequence of k-district maps is an NP-hard problem. This work directly led to a journal publication.

Research Assistant *Dec. 2017 - June. 2018*
California State University Northridge
Advisor : Dr. Nhut Ho
Project title : Investigating the Effects of UAV Autonomy in Search & Rescue Environments
Description : Developed the codebase for a human-machine teaming experiment investigating the role of drone autonomy and its relation to human trust.

TEACHING
EXPERIENCE

Lecturer *April 2022 - June 2022*
California State University Northridge
Computer vision course for the Data Science Program.

Teaching Assistant *Summer 2019 - June 2021*
California State University Northridge
Data Science Program, NSF Award # 1842386

Teaching Assistant *Aug. 2018 - Dec. 2019*
California State University Northridge
AIMS² program : Calculus I-III, Physics I-II, Intro to Algorithms, Intro to Data Structures, Advanced Data Structures, Automata Theory, Algorithm Design & Analysis

Teaching Assistant *June 2018 - Nov. 2018*
California State University Northridge
Intro to Algorithms, Algorithm Design & Analysis

PUBLICATIONS

Journal Papers

Using machine learning to reduce observational biases when detecting new impacts on Mars Wagstaff, K.L., Daubar, I.J., Doran, G., **Munje, M.J.**, Bickel, V.T., Gao, A., Pate, J. and Wexler, D., 2022. *Icarus*, 386, p.115146.

Reconfiguration of connected graph partitions Akitaya, H.A., Jones, M.D., Korman, M., Korten, O., Meierfrankenfeld, C., **Munje, M.J.**, Souvaine, D.L., Thramann, M. and Toth, C.D., 2019. *Journal of Graph Theory*.

Conference Papers

Towards a systems programming language designed for hierarchical state machines. McClelland, B., Tellier, D., Millman, M., Go, K.B., Balayan, A., **Munje, M.J.**, Dewey, K., Ho, N., Havelund, K. and Ingham, M., 2021, July. In *2021 IEEE 8th International Conference on Space Mission Challenges for Information Technology (SMC-IT)* (pp. 23-30). IEEE.

Providing predictions of adversary movements in a gridworld environment to a human-machine team improves teaming performance. Coady, J.A., Dysart, P., Schumann, A., Koehler, S.A., **Munje, M.J.**, Casebeer, W.D. and Huberdeau, D.M., 2023, June. In *Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications V* (Vol. 12538, pp. 159-172). SPIE.

Workshop Papers

TEAM3 Challenge: Tasks for Multi-Human and Multi-Robot Collaboration with Voice and Gestures. **Munje, M.J.**, Teran, L.K., Thymes, B. and Salisbury, J.P., 2023, March. In *Companion of the 2023 ACM/IEEE International Conference on Human-Robot Interaction* (pp. 91-96).

Abstracts

Large-scale automated detection of fresh impacts on Mars using machine learning with CTX observations. **Munje, M.J.**, Daubar, I.J., Doran, G., Wagstaff, K.L. and Mandrake, L., 2020, August. In 11th Planetary Crater Consortium Meeting (Vol. 11, No. 2251, p. 2065).

Fundamental Study of Ionic Liquids Melting Point Structure-Property Using Machine-Learning Method. Acar, Z., **Munje, M.**, Nguyen, P. and Lau, K.C., 2021. In *APS March Meeting Abstracts* (Vol. 2021, pp. H71-181).

AWARDS	GEM Ph.D. Fellowship	2023
	GEM M.S. Fellowship	2021
	California Pre-Doctoral Program	2020
	Sally Casanova Scholarship	2020
	Bolan Family Endowed Scholarship	2020
	John and Jo Guarrera Endowed Scholarship	2020
	Barry E. Nelson Memorial Endowed Scholarship	2019
	Associated Students Scholarship	2018
	Pearl Simmons Scholarship Endowment	2018
	Southern California Edison Scholarship	2018
SKILLS	Programming Languages : Python, C/C++, C, R, SQL#	
	Reinforcement Learning Libraries : stable-baselines3, ACME, Garage, RLlib	
	Scientific Computing Libraries : Scikit-Learn, Pandas, NumPy	
	Deep Learning Libraries : PyTorch, TensorFlow, Captum, Tensorboard	
	Computer Vision Libraries : OpenCV, torchvision, scikit-image, Pillow	
	Visualization Libraries : Matplotlib, seaborn	
	Other Tools : Bash, MuJoCo, ROS, Open MPI, Docker	
	Office softwares : L ^A T _E X, Microsoft Office	
Operating systems : Linux, Windows		
Languages : English (native), Spanish (elementary)		
PROFESSIONAL ACTIVITIES	International Conference on Human-Robot Interaction (HRI) <i>Reviewer</i>	2022
	International Conference on Machine Learning (ICML) <i>Volunteer</i>	2020
	International Conference on Learning Representations (ICLR) <i>Volunteer</i>	2020
	Conference on Neural Information Processing Systems (NeurIPS) <i>Volunteer</i>	2020
MEDIA COVERAGE	NASA Is Training an AI to Detect Fresh Craters on Mars , In <i>Wired Magazine</i>	
	AI Is Helping Scientists Discover Fresh Craters on Mars , In <i>NASA Feature Article</i>	