Nishant Kheterpal

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Education

University of Michigan 9/2020 - 2026

- *PhD* in Robotics, advised by Jean-Baptiste Jeannin
- *Master of Science* in Robotics awarded 2022; candidacy achieved January 2022
- Research emphasis on formal verification applied to safety-critical systems and education

University of California, Berkeley 8/2015 - 12/2018

- *Bachelors of Science* in Electrical Engineering and Computer Sciences; GPA: 3.85/4.0
- Coursework in artificial intelligence, machine learning, vehicle dynamics, optimization, probability, controls, data science, computer architecture, algorithms, discrete math, linear algebra

Teaching

University of California, San Diego

Summer Instructor - Halıcıoğlu Data Science Institute Summer 2024 (two sessions)

- Instructor of record for two introductory data science courses
- DSC 10: introductory Python programming and basic statistics; enrollment 25 students
- DSC 40A: modeling, loss function optimization, linear algebra, probability; enrollment 20 students
- Responsible for all aspects of course from delivering lectures to exam writing to TA hiring
- Hired and managed a staff of six (DSC 10) and three (DSC 40A) undergraduate TAs
- Ratings: 4.5/5 (DSC 10), 4.6/5 (DSC 40A)

University of Michigan

Graduate Student Instructor - EECS 280 Winter 2024, Fall 2025

- Student instructor for undergraduate level data structures and algorithms course taught in C++
- Staff lead in charge of quiz content development, a new component of the course in Fall 2025
- Taught 30+ students weekly in lab sections applying course material in group activities
- Enrollment: 1000 students+
- Rating: 4.9/5 (W24)

Graduate Student Instructor - Practical Data Science (EECS 398-003) Fall 2024

- Sole graduate student instructor for the pilot offering of a project-oriented data science course focused on real-world applications such as data wrangling, machine learning, and visualization using `pandas`, `numpy`, `scikit-learn`, and SQL
- Responsible for content development including homework, discussion, exam, and FAQ material
- Interviewed 20 undergraduate TA candidates with simulated office hours and open-ended questions
- Enrollment: 125 students
- Rating: 4.3/5

Guest Lecturer - EECS 590, Aero 552 Fall 2023, Winter 2024

- Guest instructor for one lecture on semantics in EECS 590: graduate level programming languages
- Guest instructor for five lectures in Aero 552: covering finite automata, and programming concepts

Graduate Student Instructor - Robotics 599 Fall 2023

- Student instructor graduate level autonomous vehicles class covering planning and control
- Advised and supported semester-long student projects implementing material in simulation
- Applications covered air, ground, and aquatic vehicles
- Enrollment: 40 students
- Rating: 4.9/5

University of California, Berkeley

Data 8 - Undergraduate Student Instructor Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018

- In Fall 2018, served as pedagogy lead TA and supervised a team of 4 instructors developing course materials for 1200+ students
- As lead TA, presented weekly to 40+ instructors regarding course material and educational strategy
- Taught 30+ (60+ as lead) students weekly in one (two as lead) lab sections applying course material
- Primary lab section instructor teaching computational and inferential thinking with real-world data
- Enrollment: 500-1200 students
- Ratings: 4.6/5 (FA18), 4.6/5 (SP18), 4.6/5 (FA17), 3.8/5 (SP17), 6.2/7 (FA16)

Publications

N. Kheterpal, J. T. Slagel, E. Tang, S. Z. Dane, J-B. Jeannin, "Automatic Certification of the Active Corner Method for Collision Avoidance." *Certified Programs and Proofs, 2026.* (In submission)

N. Kheterpal, J-B. Jeannin, "Towards a study of performance for safe neural network training." *Workshop on Formal Methods for ML-Enabled Autonomous Systems, CAV, 2023.*

N. Kheterpal, J-B. Jeannin, "Towards a Formalization of the Active Corner Method for Collision Avoidance in PVS.", *Formal Techniques for Safety-Critical Systems*, *SPLASH*, 2022.

N. Kheterpal, E. Tang, J-B. Jeannin, "Automating Geometric Proofs of Collision Avoidance with Active Corners.", *Formal Methods in Computer-Aided Design, 2022*. (40 accepted / 88 submissions)

N. Kheterpal, E. Vinitsky, C. Wu, A. Kreidieh, K. Jang, K. Parvate, A. Bayen, "Flow: Open Source Reinforcement Learning for Traffic Control." *Workshop on Machine Learning Open-Source Software, NeurIPS,* 2018.

E. Vinitsky, A. Kreidieh, L. Le Flem, **N. Kheterpal**, K. Jang, C. Wu, F. Wu, R. Liaw, E. Liang, A. Bayen, "Benchmarks for Reinforcement Learning in Mixed-Autonomy Traffic." *Conference on Robot Learning*. 2018.

N. Kheterpal, K. Parvate, C. Wu, A. Kreidieh, E. Vinitsky, A. Bayen, "Flow: Deep Reinforcement Learning for Control in SUMO", *SUMO User Conference,* 2018.

C. Wu, K. Parvate, **N. Kheterpal**, L. Dickstein, A. Mehta, E. Vinitsky, A. Bayen, "Framework for Control and Deep Reinforcement Learning in Traffic." *Intelligent Transportation Systems (ITSC), 2017 IEEE 20th International Conference on.* IEEE, 2017.

Service

Journal of Aerospace Information Systems - Reviewer 2/2024

Conference on Computer-Aided Verification (CAV '22) - Shadow PC Member 3/2022

Conference on Computer-Aided Verification (CAV '21) - Shadow PC Member 2/2021

Mentorship

Elanor Tang: Undergraduate and MS mentee, now PhD student at Carnegie Mellon 5/2021-12/2022

Industry Experience

Uber ATG - Research Intern 3/2020 - 8/2020

- Researcher working with Dr. Ersin Yumer and Professor Raquel Urtasun
- Developed ride comfort metrics for autonomous vehicles to improve passenger experience
- Productionized safety metrics using Traffic Conflict Technique alongside research staff

Ike Robotics - Simulation Software Engineer 1/2019 - 1/2020

- Developed simulation platform in Unreal Engine to test and validate software performance for automated trucking
- Built simulated intelligent actors and integrated control & dynamics into simulation
- Implemented distributed cloud simulation in Google Cloud Platform using Docker and Kubernetes

Berkeley Deep Drive - Undergraduate Researcher 1/2017 - 12/2018

- Helped build Flow, an open-source framework enabling deep reinforcement learning for traffic control using vehicle simulator SUMO, RLlib, rllab, and Amazon Web Services
- Designed RL experiments in Flow to train vehicle and infrastructure agents to improve traffic flow in congested traffic scenarios
- Studied gradient accuracy, training time, and reward in deep reinforcement learning methods

General Motors - Electrification Controls Intern 6/2017 - 8/2017

- Validated power consumption models for electric vehicles using experimental data
- Developed and troubleshot Simulink models for electrified powertrain energy consumption

Apple - Emerging Technologies Intern 5/2016 - 8/2016

- Developed interactive Matlab tools to analyze and summarize spatial and temporal datasets
- Streamlined a signal simulation pipeline and created GUIs for rapid signal generation
- Summarized work in final presentation, well-received by 20+ cross-functional team members

University of Michigan Transportation Research Institute - Research Assistant 7/2013 - 8/2015

- Analyzed sensor data using SQL and plotting tool Igor to evaluate active safety performance
- Built Matlab tools to automatically characterize heavy truck suspension behavior from test data

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Honors and Awards

Towner Prize for Outstanding GSIs, UM College of Engineering - Finalist 2026

Graduate Teacher Certificate, University of Michigan 12/2024

NASA Graduate Fellowship 2021-2023

Rackham Travel Grant Recipient 2022

NSF Graduate Research Fellowship Honorable Mention 2021

Berkeley Engineering Honors to Date - Top 20% GPA Fall 2015 - Fall 2018

Bronze Medal Winner - Siemens-UC Berkeley Hackathon 2018

UC Berkeley Outstanding Graduate Student Instructor Award - Top 9% of GSIs Spring 2018

Member, Eta Kappa Nu, Mu (Berkeley) Chapter - Top 25% of EECS Majors Fall 2016

College of Engineering Dean's List - Top 10% GPA Fall 2015, Fall 2016, Spring 2017

Michigan Mathematics Prize Competition - Top 100 2015
