

Ishaan Mehta

Toronto, Ontario

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Summary

- Final year PhD Candidate with 8+ years of experience building autonomous systems across aerial, automotive, and ground platforms. Specialized in the intersection of multi-agent coordination, planning, and neural perception.
- Currently leading a project at the Vector Institute to develop agentic simulation pipelines for safety-critical traffic scenarios—directly addressing the challenge of scaling autonomous vehicle evaluation through generative AI.
- Strong track record of 11 research contributions (including works under review at IEEE RA-L and Journal of Field Robotics), focused on replacing traditional heuristics with learnable, optimization-based frameworks for complex task sequencing and SLAM.
- Established record of interdisciplinary collaboration with academic, industry, and government partners, contributing to projects in robotics, intelligent transportation, logistics, and environmental monitoring.
- Technical fluency in Python and C++, with a commitment to modular code design and reproducible research, and a history of mentoring over 20 researchers and students to achieve high-impact outcomes.

Technical Expertise

Programming and Systems: Proficient in Python and C++; CUDA; Shell scripting; Git; CMake; Docker; Linux environment; modular code design and reproducible research workflows.

Artificial Intelligence and Machine Learning: Deep Learning (PyTorch, TensorFlow); Reinforcement Learning; Generative Modeling; Computer Vision; Representation Learning; Large Language Models (LLMs); Vision-Language Models (VLM).

Autonomous Vehicle Research: Perception; Prediction; Motion Planning; Controls; Localization and Mapping; Multi-sensor Fusion (LiDAR, Camera, IMU, RGB-D); Neural Simulation.

Robotics and Simulation: ROS1 and ROS2; Isaac Sim; MuJoCo; PyBullet; Gazebo; Open3D; OpenCV; Experience with robot manipulators and mobile platforms.

Mathematics and Optimization: Linear Algebra; Multivariable Calculus; Probability and Statistics; Numerical Optimization; Gurobi; Distributed Training; scalable AI training pipelines.

Development and MLOps: Weights and Biases; MLflow; Databricks; AWS (EC2 and S3); GCP; High-performance computing (HPC) clusters.

Scientific Computing and Visualization: NumPy; Pandas; Matplotlib; Seaborn; Plotly; Technical writing and peer review for top-tier conferences and journals.

Experience

Geomate

Research Scientist - Simulation (Part-time)

Waterloo, Canada

May 2026 – Sept 2026

- Spearheading the development of critical scenario validation pipeline for autonomous driving using VLMs, diffusion models and behaviour policies for rigorous and repeatable and quantifiable safety testing of autonomous vehicles.

Vector Institute

Machine Learning Associate

Toronto, Canada

Jan 2026 – May 2026

- Spearheaded the development of an agentic simulation pipeline to automate the generation of safety-critical traffic scenarios, enabling more rigorous stress-testing of autonomous driving systems in collaboration with Geomate.

Toronto Metropolitan University

PhD Candidate, RCVL Lab

Toronto, Canada

May 2022 – August 2026 (Expected)

- Engineered RTSP-Net, a deep reinforcement learning model for robotic task sequencing, reducing path lengths by 26% and increasing execution speed by 33x in complex, cluttered environments.
- Co-led the development of SplatUnity, a decentralized multi-agent SLAM framework using 3D Gaussian Splatting, which surpassed benchmarks in trajectory accuracy and rendering quality for large-scale mapping.
- Designed PA-Net, a reinforcement learning framework for multi-objective routing, which achieved 4.5x faster inference and a 2.3% improvement in Pareto front quality over existing state-of-the-art baselines.
- Optimized robotic disinfection operations by implementing a multi-robot task allocation framework, improving service quality by 46% and reducing computation time by 60%.
- Established MiNa, an open-source scanning electron microscopy dataset, to standardize benchmarking for microplastic classification and foster collaborative environmental monitoring research.
- Designed and delivered laboratory modules for Mechatronic Systems Design, served as a teaching assistant for multiple courses (2022–2025), collectively supporting over 300 students in hands-on learning, practical programming skills, and research development.
- Supervised and mentored over 10 undergraduate, Master's, and PhD students on robotics research projects, enhancing their experimental design, methodology, and publication success.
- Contributed to the robotics community by reviewing 10+ manuscripts for top-tier venues including *IEEE RAL*, *IROS*, and *ICRA*, ensuring the high-quality dissemination of autonomous system research.

University of Toronto

M.Eng. Candidate, UTIAS

Toronto, Canada

Sept 2018 – May 2020

- Optimized low-level control algorithms for the AuToronto self-driving car team, enhancing vehicle stability and trajectory tracking accuracy during real-time autonomous operation.
- Validated a gradient-based exposure control algorithm for autonomous vehicles, which improved object detection performance under volatile and challenging lighting conditions.
- Mastered core concepts in motion planning, control, and perception through advanced research projects, building a deep technical foundation for autonomous robotics deployment.

Toronto Metropolitan University

Research Assistant, RCVL Lab

Toronto, Canada

June 2020 – April 2022

- Directed a 5-member research team to prototype a UV-based mobile manipulator, reducing hardware costs and energy consumption by 30% through efficient design.
- Secured critical research funding through the Department of National Defense (IDEaS) program by demonstrating the viability and safety of autonomous disinfection prototypes.
- Evaluated market readiness for robotic systems by conducting 50+ stakeholder interviews via the Lab2Market program, translating technical research into a validated business strategy.
- Synthesized global research trends in a comprehensive review of UV disinfection robots for *Robotics and Autonomous Systems*, identifying key deployment gaps in the service robotics industry.

University of Toronto

Research Intern, TRAIL Lab

Toronto, Canada

Jan 2019 – Aug 2019

- Deployed a real-time (30 FPS) vision-based tracking system for quadrotors, enabling successful autonomous landings on moving platforms during NSERC Canadian Robotics Network field trials.

Indian Institute of Technology Delhi

Research Intern, PAR Lab

New Delhi, India

Jan 2016 – Aug 2016

- Developed robot control modules for the RoboAnalyzer platform, improving the realism of simulators used for military driver training and robotics education.
- Implemented jerk-reduction algorithms in a parallel robot simulator, enhancing the fidelity and training effectiveness of motion-based simulation systems.

Awards and Honours

- **Queen Elizabeth II Graduate Scholarship**, Toronto Metropolitan University — CAD 15,000/year (2023–2025)
- **Doctoral Research Award**, Toronto Metropolitan University — CAD 30,000/year (2022–2026)
- **MIME Department Award**, Toronto Metropolitan University — CAD 2,500 (2024)
- **Merit Scholarship**, Thapar University — INR 150,000 (2015–2016)
- **4th Place**, Autodesk International Space Challenge (2016)

Education

Toronto Metropolitan University

Doctor of Philosophy, GPA – 4.17/4.3

Planning and Perception in Robotics

Toronto, Canada

May 2022 – Active

University of Toronto Institute for Aerospace Studies

Masters of Engineering (MEng), GPA – 3.84/4

Emphasis on Autonomous Robotics

Toronto, Canada

Sept. 2018 – June 2020

Thapar Institute of Engineering and Technology

Bachelor's of Engineering in Mechatronics, GPA – 8.4/10

Patiala, India

Aug 2013 – May 2017

Publications

- **Ishaan Mehta**, Sharareh Taghipour, and Sajad Saeedi, "RTSP-Net: Reinforcement Learning-Based Robotic Task Sequencing for Robotic Manipulators in Obstacle-Rich Environments," under review at *IEEE Robotics and Automation Letters (RA-L)*, 2026.
- **Ishaan Mehta**, Junseo Kim, Sharareh Taghipour, and Sajad Saeedi, "M3RS: Multi-Agent, Multi-Objective, and Multi-Mode Routing and Scheduling," under review at *Journal of Field Robotics (JFR)*.
- Mahboubeh Asadi, **Ishaan Mehta**, Kourosh Zareinia, Wenbin Li, and Sajad Saeedi, "SplatUnity: A Collaborative Online SLAM and Learning Framework with 3D Gaussian Splatting and Inter-Agent Pose Alignment," under review at *IEEE Robotics and Automation Letters (RA-L)*.
- **Ishaan Mehta**, Sharareh Taghipour, and Sajad Saeedi, "Pareto Frontier Approximation Network (PA-Net) for Solving the Bi-Objective Traveling Salesman Problem," in *Proceedings of the IEEE 18th International Conference on Automation Science and Engineering (CASE)*, 2022.
- **Ishaan Mehta**, Hao-Ya Hsueh, Sharareh Taghipour, Wenbin Li, and Sajad Saeedi, "UV Disinfection Robots: A Review," accepted in *Robotics and Autonomous Systems*.
- Complete list available [here](#).