Ishaan Mehta

Toronto, Ontario

Phone: +1 (647) 803 3022 · **LinkedIn**: ishaanmht · **GitHub**: ishaanmht · **Email**: mehtaishaan4@gmail.com · **Website**: ishaanmht.github.io

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, S3 and SageMaker); Azure; 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

Vector Institute **Toronto, Canada**
Machine Learning Associate *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 **Toronto, Canada**
PhD Candidate, RCVL Lab *May 2022 – August 2026 (Expected)*

- Engineered RTSP-Net, a deep reinforcement learning model for robotic task sequencing, reducing path lengths by 32% and increasing execution speed by 29% 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 — **Toronto, Canada**
M.Eng. Candidate, UTIAS — *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 — **Toronto, Canada**
Research Assistant, RCVL Lab — *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 — **Toronto, Canada**
Research Intern, TRAIL Lab — *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 — **New Delhi, India**
Research Intern, PAR Lab — *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 — **Toronto, Canada**
Doctor of Philosophy, GPA – 4.17/4.3 — *May 2022 – Active*
Planning and Perception in Robotics

University of Toronto Institute for Aerospace Studies — **Toronto, Canada**
Masters of Engineering (MEng), GPA – 3.84/4 — *Sept. 2018 – June 2020*
Emphasis on Autonomous Robotics

Thapar Institute of Engineering and Technology — **Patiala, India**
Bachelor's of Engineering in Mechatronics, GPA – 8.4/10 — *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.