

Ishaan Mehta

Toronto, Ontario

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Summary

- Final-year PhD candidate with 8+ years of experience developing autonomous robotic systems, including drones, self-driving cars, ground robots, and manipulators, with strong expertise in planning, perception, and multi-robot systems.
- Over 6 years of experience applying deep learning to computer vision, robotic planning, and optimization, resulting in 11+ publications (including under review) in top journals and conferences.
- Demonstrated collaborative research experience, working with 20+ academics across interdisciplinary robotics and AI projects, leading teams and mentoring students.
- Skilled in bridging technical research with real-world impact, including prototype development, experimental validation, and commercialization initiatives.

Technical Skills

Programming Languages: Python, C++, MATLAB, Shell

Robotics & Simulation: ROS1, ROS2, OpenCV, Open3D, Gazebo, PyBullet, Isaac Sim, MuJoCo, CMake, Docker, Simulink

Deep Learning: PyTorch, TensorFlow, Keras

Optimization: CPLEX, Gurobi

Hardware: Experience with manipulators, drones, mobile robots, sensors (IMUs, cameras, LiDARs), microcontrollers, and actuators

Development Tools: Shell scripting, Git, Visual Studio, PyCharm

Documentation: L^AT_EX, Microsoft Office, Google Workspace

Experience

Toronto Metropolitan University

PhD Candidate, RCVL Lab

Toronto, Canada

May 2022 – May 2026 (Expected)

- Developed **PA-Net**, a reinforcement learning framework for the bi-objective Traveling Salesman Problem (TSP), which determines the optimal visiting order for multiple locations under two competing criteria. Achieved a 2.3% improvement in Pareto front quality and 4.5× faster inference over baselines, enabling faster and more efficient multi-objective routing.
- Proposed and implemented a multi-robot task allocation and scheduling framework that optimizes quality of service for robotic disinfection of public spaces. Improved overall disinfection quality by up to 46% and reduced computation time by 60%, enabling faster, more coordinated robotic operations. ([Project Page](#))
- Designed and trained **RTSP-Net**, a deep reinforcement learning model for robotic task sequencing in cluttered environments—determining the optimal order and configuration for performing multiple tasks. Achieved up to 32% shorter paths, 2–29% faster execution, and 40% faster solution generation, significantly enhancing efficiency in complex spaces. ([Project Page](#))
- Co-developed **ConSplat**, a distributed dense SLAM (Simultaneous Localization and Mapping) system that builds realistic 3D maps of unknown environments by integrating Gaussian Splatting with consensus optimization. Improved RGB reconstruction quality by 2–7 dB (PSNR) and reduced tracking error, enabling high-fidelity, collaborative mapping for multi-robot systems. ([Project Page](#))
- Co-led the development of SplatUnity, a decentralized multi-agent SLAM framework based on 3D Gaussian Splatting, outperforming baselines in trajectory accuracy and rendering quality, and advancing large-scale multi-robot mapping. ([Project Page](#))
- Initiated and co-led MiNa, an open-source scanning electron microscopy dataset for micro/nanoplastic detection and classification, supporting standardized benchmarking of state-of-the-art models and fostering environmental robotics 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 research community by co-hosting a presentation session at *IEEE CASE 2022* and reviewing manuscripts for journals including *IEEE RAL* and *RAS*, as well as conferences such as *CASE 2022*, *IROS 2023 & 2025*, and *ICRA 2024 & 2026*, ensuring high-quality dissemination of research.

Toronto Metropolitan University

Research Assistant, RCVL Lab

Toronto, Canada

June 2020 – April 2022

- Helped secure research funding through the Department of National Defense's *Innovation for Defence Excellence and Security (IDEaS)* program to advance UV-disinfection robots, supporting prototype development and validation.
- Led a 5-member research team to design and prototype a cost-efficient UV-based disinfection mobile manipulator, reducing energy consumption and hardware costs by over 30%, and presented the results at ISMR 2022. ([Project Page](#))
- Authored a comprehensive review on UV disinfection robots, published in *Robotics and Autonomous Systems*, synthesizing global research trends and identifying design and deployment gaps for healthcare and service robotics. ([Paper](#))
- Selected from a national pool of applicants for the *Lab2Market* program—Canada's national research commercialization accelerator—to assess the market readiness of robotic disinfection systems through 50+ stakeholder interviews and business validation activities.

University of Toronto

Research Intern, TRAIL Lab

Toronto, Canada

Jan 2019 – Aug 2019

- Developed and implemented a real-time (30 FPS) vision-based tracking system for gimbaled cameras on quadrotors, enabling accurate detection and pursuit of moving targets. This system supported autonomous drone landings on dynamic platforms and was successfully demonstrated during the NSERC Canadian Robotics Network field trials (Aug 2019), validating the system in real-world outdoor conditions.

University of Toronto

M.Eng. Candidate, UTIAS

Toronto, Canada

Sept 2018 – May 2020

- Conducted research through course projects in motion planning, control, and perception for autonomous robotics enabling enhanced understanding and hands-on experience in autonomous robotics.
- Designed and validated a gradient-based exposure control algorithm for self-driving vehicles, enhancing image quality under varying lighting conditions and improving object detection performance.
- Developed and fine-tuned low-level control algorithms for the **AuToronto** self-driving car team, improving vehicle stability, trajectory tracking accuracy, and real-time responsiveness during autonomous operation.

Indian Institute of Technology Delhi

Research Intern, PAR Lab

New Delhi, India

Jan 2016 – Aug 2016

- Developed robot control modules for the **RoboAnalyzer** simulation platform, enabling more effective robotics education and hands-on training. ([Paper](#))
- Designed algorithms to reduce motion jerks in a parallel robot simulator, improving realism and training effectiveness for military driver simulation. ([Paper](#))

Awards and Honours

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

Service Activities

- Organized and led free breathwork and stress-management workshops during the COVID-19 pandemic, supporting the mental well-being of 50+ community members.
- Collaborated with the **SKY Campus Happiness** initiative to deliver guided breathwork sessions, helping 20+ students manage stress and improve focus during academic activities.

Education

Toronto Metropolitan University

Doctor of Philosophy, GPA – 4.17/4.3

Planning and Perception in Robotics

Toronto, CA

May 2022 – Active

University of Toronto Institute for Aerospace Studies

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

Emphasis on Autonomous Robotics

Toronto, CA

Sept. 2018 – June 2020

Thapar Institute of Engineering and Technology

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

Patiala, IN

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 the *International Conference on Robotics and Automation (ICRA)*, 2026.
- **Ishaan Mehta**, Junseo Kim, Sharareh Taghipour, and Sajad Saeedi, "M3RS: Multi-agent, Multi-objective, and Multi-mode Routing and Scheduling," under review at the *Journal of Field Robotics (JFR)*.
- Mahboubeh Asadi, **Ishaan Mehta**, Kourosh Zareinia, Wenbin Li, and Sajad Saeedi, "ConSplat: Consensus Optimization for Distributed Gaussian Splatting SLAM," under review at the *International Conference on Robotics and Automation (ICRA)*, 2026.
- 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 (RAL)*.
- Hadi Rezvani, Navid Zarrabi, **Ishaan Mehta**, Christopher Kolios, Hussein Ali Jaafar, Cheng-Hao Kao, Sajad Saeedi, and Nariman

- Yousefi, "Morphological Detection and Classification of Microplastics and Nanoplastics Emerged from Consumer Products by Deep Learning," under review at *Science of the Total Environment*.
- **Ishaan Mehta**, Hao-Ya Hsueh, Sharareh Taghipour, Wenbin Li, and Sajad Saeedi, "UV Disinfection Robots: A Review," accepted in *Robotics and Autonomous Systems*.
 - **Ishaan Mehta**, Hao-Ya Hsueh, Nikolaos Kourtzanidis, Mateusz Brylka, and Sajad Saeedi, "Far-UVC Disinfection with Robotic Mobile Manipulator," in *Proceedings of the International Symposium on Medical Robotics (ISMR)*, 2022.
 - **Ishaan Mehta**, Sharareh Taghipour, and Sajad Saeedi, "Pareto Frontier Approximation Network (PA-Net) to Solve Bi-objective TSP," in *Proceedings of the IEEE 18th International Conference on Automation Science and Engineering (CASE)*, 2022.
 - **Ishaan Mehta**, Mingliang Tang, and Timothy D. Barfoot, "Gradient-Based Exposure Compensation Applied to a Self-Driving Car," in *Proceedings of the Conference on Computer and Robot Vision (CRV)*, 2020.
 - **Ishaan Mehta**, Keshav Bimbraw, R.G. Chittawadigi, and S.K. Saha, "A Teach Pendant to Control Virtual Robots in Robo-Analyzer," in *Proceedings of the International Conference on Recent Advances in Humanities and Applications (RAHA)*, 2016.
 - Keshav Bimbraw, **Ishaan Mehta**, Vinoth Venkatesan, Udhith Joshi, G.S. Sabherwal, and S.K. Saha, "Performance Improvements of a 6-DOF Motion Platform," in *Proceedings of the International Conference on Recent Advances in Humanities and Applications (RAHA)*, 2016.