

EDUCATION

Carnegie Mellon University (CMU)

2026 – 2028

Master of Science, Robotics

Advisors: Dr. Ji Zhang and Dr. Jonathan Francis

Relevant Courses: *Robot Learning, Convex Optimization, Software Engineering*

Toronto Metropolitan University (TMU)

2020 – 2025

Bachelor of Engineering, Aerospace Engineering, with Distinction

CGPA: 4.20/4.33 | Program Rank: 2/75 | Faculty Rank: 5/738

Relevant Courses: *Space Robotics, Machine Learning, Control Systems, Aerospace Sensors, Digital Systems, Avionics Design*

PUBLICATIONS

JOURNAL PAPERS

- [1] **S. Shaikh**, N. Amiri, and F. Janabi-Sharifi, “Machine Learning in Aerial Manipulation: A Survey,” **In submission**. Target journal: *Robotics and Autonomous Systems*, Feb. 6, 2026.

CONFERENCE PRESENTATIONS

- [1] **S. Shaikh** and J. Enright, “Space Debris Monitoring Using Star Trackers,” presented at *CASI ASTRO 2024*, Toronto, ON, Canada, Aug. 27–29, 2024.

RESEARCH EXPERIENCES

Graduate Research Assistant, Humanoid Loco-Manipulation | *Whole-body control, mlab, Isaac Lab*

Pittsburgh, PA

Z-Lab, CMU Robotics Institute & Robot Learning Lab, Bosch Center for AI and CMU

2026-08 – Present

- Deployed NVIDIA’s SONIC whole-body controller in MuJoCo as the base for a humanoid skill library
- Building non-prehensile whole-body skills for heavy payloads, e.g., lifting a box by hugging it to the torso
- Developing compliant-interaction skills for contact-rich tasks, e.g., opening a car door and sitting in the seat

Research Assistant, ML for Aerial Manipulation | *Literature review, perception, control, planning*

Toronto, ON

Robotics, Mechatronics, and Automation Laboratory (RMAL), TMU | Advisor: Dr. Farrokh Janabi-Sharifi

2025-05 – 2026-05

- Wrote a first-author survey on ML in aerial manipulation, in submission to *Robotics and Autonomous Systems*
- Analyzed perception, control, and motion planning literature to identify open research challenges and future directions

Research Assistant, Space Debris Tracking | *Multi-object tracking (MOT), state estimation, MATLAB*

Toronto, ON

Space Avionics and Instrumentation Laboratory (SAIL), TMU | Advisor: Dr. John Enright

2024-05 – 2024-09

- Conducted a trade-off study on accuracy vs. computational load of MOT algorithms to track space debris and other Resident Space Objects (RSOs) using Rocket Lab and SAIL’s on-orbit ST-16 star trackers
- Implemented a lightweight MOT algorithm in MATLAB using Kalman filters (KFs) and Hungarian assignment
- Reached $\approx 70\%$ accuracy on 3 datasets by experimentally tuning KF process noise covariances, deriving measurement noise covariances from ST-16 hardware limits, and initializing states from orbital velocity estimates
- Derived the “RSO score” confidence metric to classify tracks as RSOs based on KF and velocity data, and presented results at CASI ASTRO 2024

HONORS AND AWARDS

GRANTS AND SCHOLARSHIPS – All values listed in CAD

- Dean’s Research Fund-Undergraduate Research Experience Award (\$11.4k) – research grant, 2024 | *TMU Faculty of Engineering and Architectural Science (FEAS)*
- Carl Smythe Award (\$1k) – academic excellence and community involvement, 2024 | *TMU FEAS*
- Magellan Aerospace Richard A. Neil Memorial Scholarship (\$3.2k) – academic excellence, 2023 | *Magellan Aerospace*
- Renewable Entrance Scholarship (\$2-4k, varying annually) – GPA-based, 2020-2025 | *TMU FEAS*

LEADERSHIP AWARDS

- Dennis Mock Student Leadership Award, Program and Faculty-wide (2 awards) – outstanding voluntary extracurricular contributions, 2025 | *TMU Office of the Vice-Provost, Students*
- Innovation Award (presented to TMU CanSat) – excellence in engineering leadership and design, 2025 | *TMU FEAS*
- Ventura Nobis Consilio (“Design for the Future”) Award – community impact and involvement, 2024 | *TMU FEAS*

SKILLS

Software: Python, C/C++, ROS 2, mlab, Isaac Lab, MATLAB, Simulink, Visual Basic, Java, CATIA V5, $\text{\LaTeX}$

Libraries: PyTorch, LeRobot, Ultralytics, OpenCV, Keras, NumPy, Pandas, Matplotlib, Pillow, Tkinter, pySerial

Robot Platforms: Unitree G1, RoboParty RP1, wheeled humanoid (stealth), SO-101 arm

INDUSTRY EXPERIENCES

Space Robotics Intern <i>Project management, requirements tracing, VR simulation, budgeting, MS Office</i>	Brampton, ON
<i>MDA Space</i>	2023-05 – 2024-05
<ul style="list-style-type: none">– Managed part procurement, design freezes, and prototype development for the Canadarm3 space robotics program, tracking deliverables for the Canadian Space Agency– Created a virtual-reality simulator for employees to observe Canadarm2 free-flyer capture on the International Space Station– Budgeted and tracked hours for 9 work packages in Microsoft Project and Excel, reducing deficit growth by 10%– Met PDR exit requirements via document updates, technology readiness risk assessments, and requirements tracing	
In-Service Stress Analysis Tool Update Intern <i>Stress analysis, Visual Basic</i>	Oakville, ON
<i>Collins Aerospace</i>	2022-05 – 2022-09
<ul style="list-style-type: none">– Reconfigured a Visual Basic stress analysis tool from SEAS200 to NASTRAN while maintaining beam model accuracy– Compiled a load envelope from landing requirements and stress reports– Verified and implemented load equations for aircraft towing cases– Built an automated Word document generation tool, increasing the production speed of Stress-Design Reports by 52%	

TECHNICAL TEAMS & PROJECTS

LeRobot SO-101 Robot Arm <i>Robot learning, vision-language-action (VLA) models, 3D printing, Python</i>	2026-05
<ul style="list-style-type: none">– 3D printed and assembled the open-source SO-101 robot arm and its teleoperation leader arm– Fine-tuned and deployed SmolVLA, a small open-source VLA model on the arm using Hugging Face’s LeRobot framework– Trained a reinforcement learning policy in MuJoCo for object lifting with the arm	
Software Lead <i>Embedded programming, sensors, Python, C/C++, soldering, 3D printing</i>	Toronto, ON
<i>TMU CanSat</i>	2024-08 – 2025-06
<ul style="list-style-type: none">– Spearheaded Python and C/C++ flight and ground software for real-time telemetry of sensor data (temperature, altitude, GPS, etc.) and 2-DoF camera gimbal control– Developed sensor and gimbal motor control prototypes on Arduino Uno and Teensy 4.1 microcontrollers– Soldered sensor pins and 3D printed gimbal components to speed up breadboard prototyping and hardware testing	
Autonomous Helicopter Drilling System <i>Control systems design, computer vision, Simulink, C</i>	2025-01 – 2025-04
<ul style="list-style-type: none">– Derived a linearized dynamic model and control laws from first principles for an underactuated 3-DoF Quanser helicopter– Implemented cascaded PID controllers in Simulink and on hardware with <10% overshoot over the full range of motion– Improved state estimation by fusing IMU and encoder data with a KF, making landings smoother and safer– Localized drilling targets from an external camera feed using color thresholding and blob detection– Produced drill control code in C, integrating limit switch and infrared sensor feedback for precise operation	
Automated PCB Component Detection System <i>Object detection, transfer learning, Python, OpenCV, PyTorch</i>	2024-10
<ul style="list-style-type: none">– Developed a Python and OpenCV computer vision pipeline using image masking and edge detection to automate component placement verification on printed circuit boards (PCBs)– Trained and tuned a YOLOv11 model (Ultralytics, PyTorch) to detect small components, reaching 81.7% mAP@50	

ACADEMIC SERVICE AND STUDENT LEADERSHIP

Course Development, Robotic Manipulation <i>Kinematics, industrial manipulators</i>	Toronto, ON
<i>TMU Department of Mechanical, Industrial, and Mechatronics Engineering</i>	2025-09 – 2025-12
<ul style="list-style-type: none">– Assisted in developing the mandatory lab component of MTE602: Introduction to Robotics, an introductory robotic manipulation course for TMU’s new mechatronics program, starting January 2026– Designed experiments introducing fundamental robotics skills, including forward/inverse kinematics, pick-and-place tasks, and programming TMU’s fleet of industrial manipulators	
Tutorial Host, Aerospace Courses	Toronto, ON
<i>Metropolitan Undergraduate Engineering Society</i>	2024-04 – 2025-04
<ul style="list-style-type: none">– Hosted pre-exam review sessions for AER 416: Flight Mechanics and AER 699: Avionics and Sensors over two finals seasons– Led problem-solving sessions, answered student questions, and summarized course content	
Chair of Orientation	Toronto, ON
<i>TMU Engineering Spirit and Orientation Committee</i>	2023-12 – 2024-12
<ul style="list-style-type: none">– Managed 7 executive portfolios in the planning and execution of Orientation Week, TMU FEAS’s largest annual event– Organized all materials to run 5 full days of events for over 1,500 students within a \$75,000 budget– Interviewed, hired, and trained over 130 Orientation Leaders	
VP Operations	Toronto, ON
<i>TMU Aerospace Course Union</i>	2022-05 – 2023-05
<ul style="list-style-type: none">– Commissioned and led the rebrand of the union as Ryerson rebranded to TMU, aligning its identity with the university’s new pillars and fostering pride in the institution’s commitment to Indigenous reconciliation– Oversaw merchandise design and budgeting, generating over \$2,000 in revenue—a record for the union	

CONFERENCES

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2026 | *Volunteer*
- Global Changemakers Engineering Conference (Motorola Solutions) 2024 | *Mentor and Panelist*
- Canadian Engineering Leadership Conference 2023 & Professional Engineers Ontario Student Conference 2022 | *TMU Delegate*