# TREVOR ABLETT

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## EDUCATION

**Ph.D** (in progress), University of Toronto, Toronto, Ontario 2017 - Present
Institute for Aerospace Studies, Space and Terrestrial Autonomous Robotics Systems Lab

*Topic:* Addressing Distribution Shift in Robotic Imitation Learning
*Supervisor:* Dr. Jonathan Kelly.

Overall GPA: 4.0/4.0

**M.A.Sc.** (Transferred to PhD), University of Toronto, Toronto, Ontario 2016 - 2017
Institute for Aerospace Studies, Space and Terrestrial Autonomous Robotics Systems Lab

*Topic:* Active Calibration of a Mobile Manipulator
*Supervisor:* Dr. Jonathan Kelly.

Overall GPA: 4.0/4.0

**B.Eng., Mechatronics**, McMaster University, Hamilton, Ontario 2011 - 2015
Faculty of Engineering, Dept. of Computing and Science

Summa cum laude, Overall GPA: 3.9/4.0

**B.A., Psychology**, McMaster University, Hamilton, Ontario 2009 - 2015
Faculty of Social Sciences, Dept. of Psychology, Neuroscience and Behaviour

Summa cum laude, Overall GPA: 3.9/4.0

## PUBLICATIONS

### Papers

[1] **T. Ablett**, B. Chan, J. H. Wang, and J. Kelly, "Efficient Imitation Without Demonstrations via Value-Penalized Auxiliary Control from Examples," in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA'25) [submitted]*, 2025, https://papers.starslab.ca/vpace/.

[2] **T. Ablett**, O. Limoyo, A. Sigal, A. Jilani, J. Kelly, K. Siddiqi, F. Hogan, and G. Dudek, "Multimodal and Force-Matched Imitation Learning with a See-Through Visuotactile Sensor," *IEEE Transactions on Robotics (T-RO): Special Section on Tactile Robotics*, December 2024, https://papers.starslab.ca/sts-il/.

[3] **T. Ablett**, B. Chan, J. H. Wang, and J. Kelly, "Fast Reinforcement Learning without Rewards or Demonstrations via Auxiliary Task Examples," in *Conference on Robot Learning (CoRL'24) Workshop on Mastering Robot Manipulation in a World of Abundant Data*, Nov. 2024, https://papers.starslab.ca/vpace/.

[4] O. Limoyo, A. Konar, **T. Ablett**, J. Kelly, F. R. Hogan, and G. Dudek, "Working Backwards: Learning to Place by Picking," in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'24)*, Oct. 2024.

[5] **T. Ablett**, B. Chan, and J. Kelly, "Learning from Guided Play: Improving Exploration for Adversarial Imitation Learning with Simple Auxiliary Tasks," *IEEE Robotics and Automation Letters*, vol. 8, no. 3, pp. 1263–1270, March 2023, https://papers.starslab.ca/lfgp/.

[6] O. Limoyo, **T. Ablett**, and J. Kelly, "Learning Sequential Latent Variable Models from Multimodal Time Series Data," in *Proceedings of the 17th International Conference on Intelligent Autonomous Systems (IAS)*, Zagreb, Croatia, Jun. 13–17 2022, **Finalist for the Best Paper Award**.

[7] **T. Ablett***, B. Chan*, and J. Kelly, "Learning from Guided Play: A Scheduled Hierarchical Approach for Improving Exploration in Adversarial Imitation Learning," in *Proceedings of the Neural Information Processing Systems (NeurIPS'21) Deep Reinforcement Learning Workshop*, Dec. 13 2021, https://papers.starslab.ca/lfgp/.

[8] **T. Ablett**, Y. Zhai, and J. Kelly, "Seeing All the Angles: Learning Multiview Manipulation Policies for Contact-Rich Tasks from Demonstrations," in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'21)*, Prague, Czech Republic, Sept. 2021, https://papers.starslab.ca/multiview-manipulation/.

[9] F. Maric, O. Limoyo, L. Petrovic, **T. Ablett**, I. Petrovic, and J. Kelly, "Fast Manipulability Maximization Using Continuous-Time Trajectory Optimization," in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'19)*, Macau, China, Nov. 4–8 2019.

[10] O. Limoyo, **T. L. Ablett**, F. Marić, L. Volpatti, and J. Kelly, "Self-Calibration of Mobile Manipulator Kinematic and Sensor Extrinsic Parameters Through Contact-Based Interaction," in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA'18)*, Brisbane, Queensland, Australia, May 2018.

### Technical Reports

[11] **T. Ablett**, F. Marić, and J. Kelly, "Fighting Failures with FIRE: Failure Identification to Reduce Expert Burden in Intervention-Based Learning," *arXiv:2007.00245*, 2020.

### Patents

[12] F. R. Hogan, **T. Ablett**, X. Liu, G. L. Dudek, and A. Feriani, "Continuous Tactile Feedback for Electronic Devices," *World International Property Organization (WIPO)*, no. WO2024219912A1, 2024.

[13] A. Konar, O. Limoyo, F. Hogan, G. L. Dudek, and **T. Ablett**, "Apparatus and Method for Controlling Robotic Manipulators," *World International Property Organization (WIPO)*, no. WO2024191238A1, 2024.

[14] J. Kelly, O. Limoyo, and **T. Ablett**, "Method of Calibrating a Mobile Manipulator," *World International Property Organization (WIPO)*, no. WO2019165561A1, 2019.

[15] R. Peters, C. V. Tran, **T. L. Ablett**, L. J. Lepore, and M. J. Sergenese, "Vision-based System for Navigating a Robot Through an Indoor Space," *World International Property Organization (WIPO)*, no. WO2017066870A1, 2017.

## AWARDS

**Queen Elizabeth II Graduate Scholarship in Science and Technology (QEII-GSST)** September 2020 - August 2021
*University of Toronto* *Toronto, ON*

· $5000 per semester, $15000 total.

**Ontario Graduate Scholarship (OGS)** September 2019 - August 2020
*University of Toronto* *Toronto, ON*

· $5000 per semester, $15000 total.

**Kenneth M. Molson Fellowship** October 2019
*University of Toronto* *Toronto, ON*

· $2500.

**Ontario Graduate Scholarship (OGS)** September 2018 - August 2019
*University of Toronto* *Toronto, ON*

· $5000 per semester, $15000 total.

**Douglas Patton Hogg Memorial Award** December 2018
*University of Toronto* *Toronto, ON*

· $2531.

**Ontario Graduate Scholarship (OGS)** September 2017 - April 2018
*University of Toronto* *Toronto, ON*

· $5000 per semester, $10000 total.

**University (Senate) Scholarship** September 2013 - August 2014
*McMaster University* *Hamilton, ON*

· $800.

**McMaster Honour Award, Level 3** September 2009 - August 2011
*McMaster University* *Hamilton, ON*

· $2000 per year, $4000 total.

## TEACHING EXPERIENCE

**University of Toronto** Winter 2018-Spring 2022
*Teaching Assistant* *Toronto, ON*

Course Title: AER521 - Mobile Robotics

· Robotics course with both undergraduate and graduate level students
· Developed, administered, and graded MATLAB/ROS robotics laboratories

**Coursera.org and University of Toronto** October 2018 - April 2019
*Subject Matter Expert* *Toronto, ON*

Course Title: Self-Driving Car Specialization

· Developing code, assignments and other supplementary material for a course on state estimation of self-driving cars.
· Assignments are on sensor fusion using filtering techniques, point cloud matching, and 3D geometry.

**University of Toronto** Winter 2018
*Teaching Assistant* *Toronto, ON*

Course Title: APS106 - Fundamentals of Computer Programming

· First year programming course using Python
· Administered weekly programming laboratories to students and aided in ongoing development of course

**University of Toronto** Fall 2016
*Teaching Assistant* *Toronto, ON*

Course Title: ROB501 - Computer Vision for Robotics

· Course with both undergraduate and graduate level students
· Administered MATLAB and computer vision tutorials
· Aided in development and marking of MATLAB based computer vision assignments

**McMaster University** Winter 2015
*Teaching Assistant* *Hamilton, ON*

Course Title: Software Engineering 2DA4 - Digital Systems and Interfacing
· Administered labs using Verilog HDL and Altera based FPGAs

**McMaster University** Fall 2014
*Teaching Assistant* *Hamilton, ON*

Course Title: Software Engineering 3I03 - Communications Skills
· Created presentation materials for tutorials on giving software engineering presentations
· Ran weekly mandatory tutorials for 30 students

## WORK EXPERIENCE

**Samsung Research America** September 2022 - November 2023
*Research Intern – Applied Reinforcement Learning* *Montreal, QC, Canada*

· Development and implementation of new deep reinforcement and imitation learning algorithms to learn control policies to solve real-world robotics problems
· Development, improvement, and maintenance of software libraries for various learning, robotic, and sensing applications

**Callisto Mechanical** April 2015 - June 2016
*Controls Engineer in Training* *Niagara-on-the-Lake, ON*

· Management and execution of research based projects in vision, robotics, and controls
· Named on pending patent for a vision-based Automated Guided Vehicle
· Development of software based controls, HMIs, and SCADA for OEM machines to be used in process automation
· Worked with various software and hardware tools, including Java and C++ based embedded systems, PLCs, and HMIs
· Attended numerous sites for commissioning of various machines and software systems

**Self Employed – University Level Private Tutor** September 2013 - April 2015
*Introductory Level Programming* *Hamilton, ON*

· Charged a small fee for private tutoring sessions in an introductory level programming class where assignments were completed using Python.

**Callisto Integration** May 2014 - August 2014
*Controls Engineer in Training* *Hamilton, ON*

· Lead designer of HMI for a Solar Farm
· PLC programming and debugging of existing systems

**Venture Engineering and Science Camp** May 2013 - April 2014
*Computer/Technology/Robotics Instructor* *Hamilton, ON*

· Designed various electronics, computer, and robotics projects for elementary school aged children

## VOLUNTEER EXPERIENCE

**Bay Area Science and Engineering Fair (BASEF)** January 2017 - April 2017
*Team Mentor* *Burlington, ON*

· Provided weekly assistance and advice to an elementary school science fair team

**Industry Education Council of Hamilton** January 2015 - June 2015
*Code Club - Instructor* *Hamilton, ON*

· Ran a lunchtime club for elementary school students to learn programming through simple projects

## MEDIA APPEARANCES

**Ridgeback Helping to Solve Challenging Mobile Manipulation Tasks** Nov 18, 2020
*Clearpath Robotics*

Clearpath Robotics wrote a blog post showcasing our lab and our mobile manipulation platform, including a video generated as part of a project of mine in which I used end-to-end policies to complete difficult tasks regardless of viewpoint. [Blog post] [Video only]

**Ontario Centres of Excellence (OCE) Showcase – Demo** Aired May 17, 2017
*China Central Television*

CCTV-13, the Chinese national news channel, included a short segment in their daily broadcast with video of me teleoperating our mobile manipulator platform. [Online news brief (Chinese)]

## TECHNICAL STRENGTHS

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|---|---|
| **Programming Languages** | Python, C++, C, Java, MATLAB, LaTeX, Verilog, Ladder Logic |
| **Frameworks/Libraries** | numpy, scipy, tensorflow, pytorch, ROS, OpenCV, scikit-learn |
| **Hardware** | Arduino, Raspberry Pi, PIC microcontroller, various actuators and sensors |
| **Tools** | Linux (CLI), Windows, MS Office, Git, SVN |