

# TREVOR ABLETT

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## RESEARCH EXPERIENCE

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### Staff Research Scientist

*Boston Dynamics*

July 2025 - Present

*Waltham MA, USA*

- Researching and implementing features for training manipulation policies for the Atlas humanoid robot.
- Using a combination of imitation learning, reinforcement learning, simulation, and sim-to-real approaches.

### Graduate Researcher (Ph.D)

*University of Toronto*

Sept. 2017 - June 2025

*Toronto ON, Canada*

- Published numerous papers in top tier robotics and machine learning venues related to addressing distribution shift in robotic learning.
- Researched methods for applying imitation learning and inverse reinforcement learning to robotic manipulation.
- Mentored multiple undergraduate and graduate level students each year.

### Samsung Research America

*Research Intern – Applied Reinforcement Learning*

September 2022 - November 2023

*Montreal, QC, Canada*

- Lead research for publication in robotic learning with tactile sensing, collaborated on many other papers.
- 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.

## EDUCATION

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### Ph.D, University of Toronto, *Toronto, Ontario, Canada*

2017 - 2025

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, Canada*

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, Canada*

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, Canada*

2009 - 2015

Faculty of Social Sciences, Dept. of Psychology, Neuroscience and Behaviour

Summa cum laude, Overall GPA: 3.9/4.0

## PUBLICATIONS

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## 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)*, May 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

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<b>Queen Elizabeth II Graduate Scholarship in Science and Technology (QEII-GSST)</b> <i>University of Toronto</i>	September 2020 - August 2021 <i>Toronto, ON</i>
· \$5000 per semester, \$15000 total.	
<b>Ontario Graduate Scholarship (OGS)</b> <i>University of Toronto</i>	September 2019 - August 2020 <i>Toronto, ON</i>
· \$5000 per semester, \$15000 total.	
<b>Kenneth M. Molson Fellowship</b> <i>University of Toronto</i>	October 2019 <i>Toronto, ON</i>
· \$2500.	
<b>Ontario Graduate Scholarship (OGS)</b> <i>University of Toronto</i>	September 2018 - August 2019 <i>Toronto, ON</i>
· \$5000 per semester, \$15000 total.	
<b>Douglas Patton Hogg Memorial Award</b> <i>University of Toronto</i>	December 2018 <i>Toronto, ON</i>
· \$2531.	
<b>Ontario Graduate Scholarship (OGS)</b> <i>University of Toronto</i>	September 2017 - April 2018 <i>Toronto, ON</i>
· \$5000 per semester, \$10000 total.	
<b>University (Senate) Scholarship</b> <i>McMaster University</i>	September 2013 - August 2014 <i>Hamilton, ON</i>
· \$800.	
<b>McMaster Honour Award, Level 3</b> <i>McMaster University</i>	September 2009 - August 2011 <i>Hamilton, ON</i>
· \$2000 per year, \$4000 total.	

## TEACHING EXPERIENCE

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<b>University of Toronto</b> <i>Teaching Assistant</i>	Winter 2018-Spring 2022 <i>Toronto, ON</i>
Course Title: AER521 - Mobile Robotics	
<ul style="list-style-type: none"><li>· Robotics course with both undergraduate and graduate level students</li><li>· Developed, administered, and graded MATLAB/ROS robotics laboratories</li></ul>	
<b>Coursera.org and University of Toronto</b> <i>Subject Matter Expert</i>	October 2018 - April 2019 <i>Toronto, ON</i>
Course Title: Self-Driving Car Specialization	
<ul style="list-style-type: none"><li>· Developing code, assignments and other supplementary material for a course on state estimation of self-driving cars.</li><li>· Assignments are on sensor fusion using filtering techniques, point cloud matching, and 3D geometry.</li></ul>	
<b>University of Toronto</b> <i>Teaching Assistant</i>	Winter 2018 <i>Toronto, ON</i>
Course Title: APS106 - Fundamentals of Computer Programming	
<ul style="list-style-type: none"><li>· First year programming course using Python</li><li>· Administered weekly programming laboratories to students and aided in ongoing development of course</li></ul>	
<b>University of Toronto</b> <i>Teaching Assistant</i>	Fall 2016 <i>Toronto, ON</i>
Course Title: ROB501 - Computer Vision for Robotics	
<ul style="list-style-type: none"><li>· Course with both undergraduate and graduate level students</li><li>· Administered MATLAB and computer vision tutorials</li><li>· Aided in development and marking of MATLAB based computer vision assignments</li></ul>	
<b>McMaster University</b> <i>Teaching Assistant</i>	Winter 2015 <i>Hamilton, ON</i>
Course Title: Software Engineering 2DA4 - Digital Systems and Interfacing	
<ul style="list-style-type: none"><li>· Administered labs using Verilog HDL and Altera based FPGAs</li></ul>	
<b>McMaster University</b> <i>Teaching Assistant</i>	Fall 2014 <i>Hamilton, ON</i>
Course Title: Software Engineering 3I03 - Communications Skills	
<ul style="list-style-type: none"><li>· Created presentation materials for tutorials on giving software engineering presentations</li><li>· Ran weekly mandatory tutorials for 30 students</li></ul>	

## WORK EXPERIENCE

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<b>Samsung Research America</b> <i>Research Intern – Applied Reinforcement Learning</i>	September 2022 - November 2023 <i>Montreal, QC, Canada</i>
<ul style="list-style-type: none"><li>· Development and implementation of new deep reinforcement and imitation learning algorithms to learn control policies to solve real-world robotics problems</li><li>· Development, improvement, and maintenance of software libraries for various learning, robotic, and sensing applications</li></ul>	
<b>Callisto Mechanical</b> <i>Controls Engineer in Training</i>	April 2015 - June 2016 <i>Niagara-on-the-Lake, ON</i>

- 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**

*Introductory Level Programming*

September 2013 - April 2015

*Hamilton, ON*

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

**Callisto Integration**

*Controls Engineer in Training*

May 2014 - August 2014

*Hamilton, ON*

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

**Venture Engineering and Science Camp**

*Computer/Technology/Robotics Instructor*

May 2013 - April 2014

*Hamilton, ON*

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

## VOLUNTEER EXPERIENCE

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**Bay Area Science and Engineering Fair (BASEF)**

*Team Mentor*

January 2017 - April 2017

*Burlington, ON*

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

**Industry Education Council of Hamilton**

*Code Club - Instructor*

January 2015 - June 2015

*Hamilton, ON*

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

## MEDIA APPEARANCES

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**Ridgeback Helping to Solve Challenging Mobile Manipulation Tasks**

*Clearpath Robotics*

Nov 18, 2020

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