

# TREVOR ABLETT

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## EDUCATION

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- Ph.D** (in progress), University of Toronto, Toronto, Ontario 2017 - Present  
Institute for Aerospace Studies, Space and Terrestrial Autonomous Robotics Systems Lab  
*Topic:* Addressing the Limitations of Imitation Learning in Robotic Manipulators  
*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

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1. **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 [submitted]*, February 2024, <https://papers.starslab.ca/sts-il/>
2. O. Limoyo, A. Konar, **T. Ablett**, J. Kelly, F. R. Hogan, and G. Dudek, “Working Backwards: Learning to Place by Picking,” no. arXiv:2312.02352, Dec. 2023
3. **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/>
4. 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**

5. **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/>
6. **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/>
7. 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
8. 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

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1. **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

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1. J. Kelly, O. Limoyo, and **T. Ablett**, “Method of Calibrating a Mobile Manipulator,” no. WO/2019/165561, International App. No. PCT/CA2019/050252, 2019
2. 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,” no. WO2017066870A1, 2017

## AWARDS

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### Queen Elizabeth II Graduate Scholarship in Science and Technology (QEII-GSST)

*University of Toronto*

September 2020 - August 2021  
Toronto, ON

- \$5000 per semester, \$15000 total.

### Ontario Graduate Scholarship (OGS)

*University of Toronto*

September 2019 - August 2020  
Toronto, ON

- \$5000 per semester, \$15000 total.

### Kenneth M. Molson Fellowship

*University of Toronto*

October 2019  
Toronto, ON

- \$2500.

### Ontario Graduate Scholarship (OGS)

*University of Toronto*

September 2018 - August 2019  
Toronto, ON

- \$5000 per semester, \$15000 total.

### Douglas Patton Hogg Memorial Award

*University of Toronto*

December 2018  
Toronto, ON

- \$2531.

**Ontario Graduate Scholarship (OGS)**

*University of Toronto*

September 2017 - April 2018

*Toronto, ON*

- \$5000 per semester, \$10000 total.

**University (Senate) Scholarship**

*McMaster University*

September 2013 - August 2014

*Hamilton, ON*

- \$800.

**McMaster Honour Award, Level 3**

*McMaster University*

September 2009 - August 2011

*Hamilton, ON*

- \$2000 per year, \$4000 total.

## TEACHING EXPERIENCE

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**University of Toronto**

*Teaching Assistant*

Winter 2018-Spring 2022

*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**

*Subject Matter Expert*

October 2018 - April 2019

*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**

*Teaching Assistant*

Winter 2018

*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**

*Teaching Assistant*

Fall 2016

*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**

*Teaching Assistant*

Winter 2015

*Hamilton, ON*

Course Title: Software Engineering 2DA4 - Digital Systems and Interfacing

- Administered labs using Verilog HDL and Altera based FPGAs

**McMaster University**

*Teaching Assistant*

Fall 2014

*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

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### **Samsung Research America**

*Research Intern – Applied Reinforcement Learning*

September 2022 - November 2023

*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**

*Controls Engineer in Training*

April 2015 - June 2016

*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**

*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