

Lee Clement

Curriculum Vitae

University of Toronto Institute for Aerospace Studies
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Education

- 2013–Present **Ph.D. Candidate**, *University of Toronto*.
Mobile Robotics, Autonomous Navigation, Sensor Fusion, Computer Vision
- 2010–2013 **B.Sc.(Maj.) with Distinction**, *University of Manitoba*, GPA: 4.31/4.50.
Physics, Computer Science
- 2006–2010 **B.Comm.(Hons.) with Distinction**, *University of Manitoba*, GPA: 4.13/4.50.
Accounting, Finance

Research Experience

- 2013–Present **Ph.D. Candidate**, *University of Toronto Institute for Aerospace Studies*.
Thesis: Dense visual navigation and scene understanding for autonomous mobile robots
Supervisor: Prof. Jonathan Kelly
- 2013 **Research Assistant**, *Argonne National Laboratory - Physics Division*.
Participated in experiments with the Argonne Tandem Linac Accelerator System (ATLAS).
Supervisors: Prof. Kumar Sharma and Dr. Jason Clark
- 2012 **Research Assistant**, *University of Manitoba - Physics and Astronomy*.
Developed and implemented a bipolar outflow model in MATLAB and C for use in astro-physical modelling software.
Supervisor: Prof. Jason Fiege

Teaching Experience

- 2015–Present **Teaching Assistant**, *University of Toronto*.
AER 521 - Mobile Robotics and Perception
ROB 301 - Introduction to Robotics

Grants and Awards

- 2015 **NSERC Postgraduate Scholarship - Doctoral Program**, *University of Toronto*.
- 2014 **Kenneth Molson Fellowship**, *University of Toronto*.
- 2014 **NSERC Canada Graduate Scholarship - Master's Program**, *University of Toronto*.
- 2012, 2013 **NSERC Undergraduate Student Research Award**, *University of Manitoba*.
- 2011, 2012 **Centennial Scholarship in Physics**, *University of Manitoba*.

Volunteer Work

- 2016-Present **President**, *UTIAS Aerospace Students Association*.
The ASA is responsible for representing graduate students at UTIAS and organizing events.
Previously: Social Representative (2015-2016)
- 2016-Present **Member**, *UTIAS Student Experience Committee*.
The SEC is gathers data about the UTIAS student body's experiences at the Institute and makes a report to the Director summarizing the data and suggesting improvements.
- 2014-Present **Director**, *SEDS-Canada*.
Students for the Exploration and Development of Space (SEDS) is an international group of student-run organizations dedicated to promoting public interest in space.

Professional Affiliations

Student Member, *IEEE, IEEE Young Professionals, IEEE Robotics and Automation Society*.

Student Member, *Canadian Image Processing and Pattern Recognition Society (CIPPRS)*.

Publications

- [1] V. Peretroukhin, L. Clement, and J. Kelly, "Reducing drift in visual odometry by inferring sun direction using a bayesian convolutional neural network," in *Proceedings of the IEEE International Symposium on Robotics and Automation (ICRA'17)*, Singapore, 2017.
- [2] J. Lambert, L. Clement, M. Giamou, and J. Kelly, "Entropy-based Sim(3) calibration of 2D lidars to egomotion sensors," in *Proceedings of the IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI'16)*, Baden-Baden, Germany, 2016, Best Student Paper Award.
- [3] L. Clement, J. Kelly, and T. D. Barfoot, "Robust monocular visual teach and repeat aided by local ground planarity and colour-constant imagery," *Journal of Field Robotics*, 2016.
- [4] L. Clement, V. Peretroukhin, and J. Kelly, "Improving the accuracy of stereo visual odometry using visual illumination estimation," in *Proceedings of the IFRR International Symposium on Experimental Robotics (ISER'16)*, Tokyo, Japan, 2016.
- [5] V. Peretroukhin, L. Clement, M. Giamou, and J. Kelly, "PROBE: Predictive robust estimation for visual-inertial navigation," in *Proceedings of the 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2015, pp. 3668–3675.
- [6] L. Clement, J. Kelly, and T. D. Barfoot, "Monocular visual teach and repeat aided by local ground planarity," in *Proceedings of the 10th Conference on Field and Service Robotics (FSR)*, Toronto, Canada, Jun. 2015, pp. 547–561.
- [7] L. Clement, V. Peretroukhin, J. Lambert, and J. Kelly, "The battle for filter supremacy: A comparative study of the multi-state constraint kalman filter and

the sliding window filter," in *Proceedings of the 12th Conference on Computer and Robot Vision (CRV)*, Halifax, Canada, Jun. 2015, pp. 23–30.

- [8] V. Peretroukhin, L. Clement, and J. Kelly, "Get to the point: Active covariance scaling for feature tracking through motion blur," in *Proceedings of the ICRA Workshop on Scaling Up Active Vision*, Seattle, USA, May 2015.
- [9] L. Clement, J. Kelly, and T. D. Barfoot, "Monocular vision for long-range visual teach and repeat in unstructured environments," *NSERC Canadian Field Robotics Network (NCFRN) and Conference on Computer and Robot Vision (CRV) Joint Poster Session*, May 2014.
- [10] B. Russell, L. Clement, J. Hernandez, A. Byagowi, D. Schor, and W. Kinsner, "Implementation of a nanosatellite attitude determination and control system for the T-Sat1 mission," in *Proceedings of the Canadian Conference on Electrical and Computer Engineering (CCECE)*, Regina, Canada, May 2013.