

Justin Tomasi

Mobile Robotics, Computer Vision, Machine Learning, State Estimation

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Education

Master of Applied Science • University of Toronto

Toronto, Canada

Institute for Aerospace Studies • Space and Terrestrial Autonomous Robotic Systems (STARS) Lab

2018 - 2020

- Thesis title: "Learned Adjustments to Photometric Camera Parameters for Improved Visual Motion Estimation." Advised by Prof. Jonathan Kelly.
- Received Ontario Graduate Scholarship valued at \$10,000.

B.E.Sc., Electrical Engineering (with Distinction) • Western University

London, Canada

Department of Electrical and Computer Engineering • Faculty of Engineering

2011 - 2016

- Received NSERC undergraduate research award.
- Jean Ann Maynard Scholarship Recipient.
- Bluewater Power 4th Year Capstone Project Award.

Experience

Graduate Researcher • University of Toronto

Toronto, Canada

Institute for Aerospace Studies • Space and Terrestrial Autonomous Robotic Systems (STARS) Lab

2018 - 2020

- Conducted independent research on improving visual perception in challenging lighting conditions.
- Developed and tested a neural network based camera parameter adjustment system to aid visual odometry.
- Employed system on machine-vision cameras and conducted real-world experiments in vehicles.

Laboratory Teaching Assistant • University of Toronto

Toronto, Canada

ROB301: Introduction to Robotics • Division of Engineering Science

2019

- Guided and instructed students with robotics laboratory exercises in ROS.
- Assisted in development, implementation, and troubleshooting of new mobile robotics lab exercises.

Engineer-in-Training • London Hydro Inc.

London, Canada

Engineering and Operations

2017-2018

- Facilitated the development of small-scale solar generation projects with external clients.
- Assisted in development of technical standards for engineering equipment.
- Independently developed a process for detecting overloaded distribution transformers.

Projects

LiDAR-IMU Calibration for an Autonomous Vehicle • University of Toronto

Toronto, Canada

AER 1514 Mobile Robotics Course Project

2019

- Implemented a state-of-the-art sensor calibration technique for a 3D Velodyne LiDAR-to-IMU calibration.
- Utilized Velodyne point cloud and IMU data captured using aUToronto Autonomous.

SLAM using Factor Graphs and GTSAM • University of Toronto

Toronto, Canada

AER 1513 State Estimation Course Project

2018

- Implemented a 2D SLAM algorithm using factor graphs.
- Utilized the Georgia Tech Smoothing and Mapping library to solve a 2D SLAM problem.

Skills

Technical Expertise	Mobile Robotics, Machine Learning, Computer Vision, State Estimation
Programming	Python, C++, ROS, MATLAB, LaTeX, Git, Linux
Libraries	PyTorch, NumPy, SciPy, OpenCV, Libviso2, ORB-SLAM2, GTSAM, Gazebo
Hardware	FLIR Machine Vision Cameras, PCB/circuit Design, TurtleBot3, LiDARs

Professional and Extracurricular Activities

VP Social • Aerospace Students' Association

Toronto, Canada

University of Toronto Institute for Aerospace Studies

2018-2019

- The ASA represents graduate students at UTIAS and organizes athletic, social, academic and professional events.

Engineer in Training • PEO

Toronto, Canada

Professional Engineers Ontario

2016-Present

- The PEO is the regulatory body for the engineering profession in Ontario.

Student Volunteer • Canadian National Exhibition UTIAS Demo Booth

Toronto, Canada

University of Toronto Institute for Aerospace Studies

2019

- The Centre for Aerial Robotics Research and Education hosted a demonstration booth at the Canadian National Exhibition.

Awards & Honours

2019	Ontario Graduate Scholarship, \$10,000	<i>Toronto, Canada</i>
2016	Jean Ann Maynard Scholarship, \$1,800	<i>London, Canada</i>
2016	Bluewater Power Distribution 4th Year Project Award, \$400	<i>London, Canada</i>
2015	NSERC Undergraduate Research Award, \$4,500	<i>London, Canada</i>

Publications

- [1] J. Tomasi, "Learned adjustments to photometric camera parameters for improved visual motion estimation," Master's thesis, University of Toronto, 2020.
- [2] J. Tomasi, B. Wagstaff, and J. K. Kelly, "Learned Adjustments to Photometric Camera Parameters for Improved Visual Motion Estimation in Challenging Conditions," *IEEE International Conference on Robotics and Automation*, 2021, under review.
- [3] L. Clement, M. Gridseth, J. Tomasi, and J. Kelly, "Learning Matchable Image Transformations for Long-Term Metric Visual Localization," *IEEE Robotics and Automation Letters*, vol. 5, no. 2, pp. 1492–1499, 2020.