

Zi Cong (Daniel) Guo

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Education

Ph.D. in Aerospace Engineering 2020 – 2026

University of Toronto Institute for Aerospace Studies (UTIAS), Canada

- Topic: Data-driven state estimation in robotics via Koopman-inspired learning
 - Designed learning-based methods for localization and SLAM in nonlinear robotic systems
 - Developed and validated methods on simulated and real-world datasets using *MATLAB*, *Python*, and *C++*
- Supervisor: [Timothy D. Barfoot](#)
- Transferred directly from M.A.Sc. to Ph.D.

B.A.Sc. in Engineering Science with a Major in Robotics Engineering 2015 – 2020

University of Toronto, Canada

- GPA: 3.89/4.0 (High Honours)

Publications

- [ICRA: Gaussian Inference on Manifolds](#) 2025
 - Recipient of the **ICRA Best Conference Paper Award**
 - A method for rigorous uncertainty estimation in constrained optimization
- [IROS: Learning-Enhanced Filtering](#) 2026
 - An EKF framework with data-driven measurement models for localization
- [T-RO: Learning-Based Localization and SLAM](#) 2024
 - A localization and SLAM framework using constrained optimization on learned system representations
- [RA-L: Learning-Based Batch State Estimation](#) 2022
 - A scalable batch state estimation framework using learned representations of nonlinear systems
- [Foundation and Trends: Continuous-Time Estimation](#) 2026
 - Continuous-time estimation and trajectory interpolation tools in the *GTSAM C++* robotics library

Work Experiences

Navigation Engineer Intern, *Zebra Technologies* 2018 – 2019

An [autonomous mobile robot platform](#) for capturing shelf data in crowded retail environments

- Owned the robot controller, redesigned the FSM, and maintained autonomy logic for robust real-world behavior
- Developed control and path-planning software using *C++*, *Python*, *ROS*, and *MATLAB*
- Performed on-robot validation, debugging, and sensor calibration in real-world environments
- Co-inventor on 2 granted US patents

Patents

- [US Patent: Dynamic Task Sequencing](#) 2024
 - An adaptive task planning and scheduling method for autonomous mobile robot systems
- [US Patent: Localization-Based Obstacle Handling](#) 2022
 - A map-aware obstacle handling method for autonomous navigation in retail environments

Technical Skills

- Languages and tools: *C++*, *Python*, *MATLAB*, *Git*, *Linux*
- Libraries: *ROS*, *GTSAM*, *Eigen*