# TRAVIS DRIVER

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## EDUCATION

**Georgia Institute of Technology** August 2019 - Present
*Doctor of Philosophy, Robotics* *GPA: 4.00/4*
Advisor: Professor Panagiotis Tsiotras

**Georgia Institute of Technology** May 2022
*Master of Science, Aerospace Engineering* *GPA: 4.00/4*

**The University of Texas at Austin** May 2019
*Bachelor of Science, Computational Engineering, High Honors* *GPA: 3.93/4*

## RESEARCH EXPERIENCE

**Dynamics and Control Systems Lab (DCSL)** August 2019 - Present
*Graduate Research Assistant* *Atlanta, GA*

· Conducting research in computer vision, 3D perception, and navigation for proximity operations in space.

**NASA Jet Propulsion Laboratory** May 2023 - August 2023
*Visiting Technologist* *Pasadena, CA*

· Advanced structure-from-motion and photometric stereo techniques for small body surface reconstruction.

**NASA Goddard Space Flight Center** June 2022 - September 2022
*Visiting Technologist* *Greenbelt, MD*

· Developed novel feature description and hazard detection methods for small body relative navigation.

**Nonlinear Estimation and Autonomy Research (NEAR) Group** September 2018 - May 2019
*Undergraduate Research Assistant* *Austin, TX*

· Implemented feature detection and tracking algorithms for autonomous spacecraft rendezvous.

**Texas Spacecraft Lab** June 2017 - January 2018
*Algorithms Team Lead (Sept. 2017 - Jan. 2018), Systems Engineer (June 2017 - Sept. 2017)* *Austin, TX*

· Led team of 5+ engineers to implement machine learning and computer vision algorithms to track target spacecraft for the Seeker mission.
· Designed, integrated, and tested the GUI used to monitor real-time electrical power systems data in orbit for the ARMADILLO mission

**Institute for Computational Engineering and Sciences** May 2017 - August 2017
*Undergraduate Research Assistant* *Austin, TX*

· Implemented and evaluated novel clustering methods for a stochastic Monte Carlo optimization, sampling, and integration software library.

## INDUSTRY EXPERIENCE

**Sandia National Laboratories** June 2019 - August 2019
*Software R&D Intern* *Albuquerque, NM*

· Implemented feature-based visual-SLAM algorithms for GPS-denied autonomous drone navigation.
· Applied deep learning techniques for robust and efficient object detection in X-ray images.

**Northrop Grumman** January 2018 - August 2018
*Guidance, Navigation & Control Engineer Intern* *Wallops Island, VA*

· Implemented novel Inertial Navigation System (INS) calibration methods improving navigation performance by $\sim 43\%$.
· Designed software interface to configure the on-board Flash memory of the Attitude Control System.

## TEACHING EXPERIENCE

**COE 301: Introduction to Computer Programming** August 2017 - December 2017
*Teaching Assistant, The University of Texas at Austin* *Austin, TX*

· Aided in teaching core programming concepts in MATLAB, C++, and Fortran to a class of 100+ engineering students.

## PUBLICATIONS

1. **T. Driver**, A. Vaughan, Y. Cheng, A. Ansar, J. Christian, and P. Tsiotras. **Keypoint-based Stereophotoclinometry for Characterizing and Navigating Small Bodies: A Factor Graph Approach**. In *AIAA SciTech Forum*, Orlando, FL, USA, January 2024. **(Best Student Paper Finalist)**
2. Ayush Baid*, John Lambert*, **T. Driver***, Akshay Krishnan*, Hayk Stepanyan, and Frank Dellaert. **Distributed Global Structure-from-Motion with a Deep Front-End**. *arXiv:2311.18801*, November 2023. *These authors contributed equally to this work.
3. **T. Driver**, K. Skinner, M. Dor, and P. Tsiotras. **AstroVision: Towards Autonomous Feature Detection and Description for Missions to Small Bodies Using Deep Learning**. *Acta Astronautica: Special Issue on AI for Space*, 210:393–410, September 2023.
4. **T. Driver** and P. Tsiotras. **Efficient Feature Description for Small Body Relative Navigation using Binary Convolutional Neural Networks**. In *AAS Guidance, Navigation and Control (GN&C) Conf.*, Breckenridge, CO, USA, February 2023.
5. **T. Driver***, K. Tomita*, K. Ho, and P. Tsiotras. **Deep Monocular Hazard Detection for Safe Small Body Landing**. In *AAS/AIAA Space Flight Mechanics Meeting*, Austin, TX, USA, January 2023. *These authors contributed equally to this work.
6. M. Dor, **T. Driver**, K. Getzandanner, and P. Tsiotras. **AstroSLAM: Autonomous Monocular Navigation in the Vicinity of a Celestial Small Body — Theory and Experiments**. *Int. J. of Robotics Research*, 2024. `[Accepted]` `[Preprint]`
7. **T. Driver**, K. Skinner, M. Dor, and P. Tsiotras. **Deep Feature Detection and Description for Small Body Relative Navigation**. In *3rd Spacing Imaging Workshop*, Atlanta, GA, USA, October 2022.
8. M. Dor, K. Skinner, **T. Driver**, and P. Tsiotras. **Visual SLAM for Asteroid Relative Navigation**. In *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, 1st Workshop on AI for Space, Virtual, June 2021.
9. **T. Driver**, M. Dor, K. Skinner, and P. Tsiotras. **Space Carving in Space: A Visual SLAM Approach to 3D Shape Reconstruction of a Small Celestial Body**. In *AAS/AIAA Astrodynamics Specialist Conf.*, Virtual, August 2020.

## HONORS & AWARDS

Best Student Paper Finalist, *AIAA SciTech Forum* (2024)
NASA Space Technology Graduate Research Fellowship, *NASA* (2021 - Present)
President's Fellowship, *Georgia Institute of Technology* (2019 - 2023)
University Honors, *The University of Texas at Austin* (2015 - 2019)

## SKILLS

**Programming:** C++, C, Python, MATLAB, C#, Fortran, Bash, Java
**Software:** GTSAM, ROS, OpenCV, PyTorch, Tensorflow, Blender, SolidWorks
**Certifications:** Technician Class Operator Radio License, NASA GSFC Electrostatic Discharge Operator