TRAVIS DRIVER

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EDUCATION

Georgia Institute of Technology August 2019 - January 2025
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*

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 & June 2024 - August 2024
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.

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.

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.

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

· Implemented 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.

Texas Spacecraft Lab June 2017 - January 2018
Algorithms Team Lead & Systems Engineer *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.

PUBLICATIONS

Paper Code Video More info

1. 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*, June 2024.
2. **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. <GNC Best Paper>
3. Ayush Baid*, **T. Driver***, Akshay Krishnan*, John Lambert*, 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.
4. **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.
5. **T. Driver** and P. Tsiotras. **Efficient Feature Description for Small Body Relative Navigation using Binary Convolutional Neural Networks**. In *AAS Guidance, Navigation, and Control (GNC) Conf.*, Breckenridge, CO, USA, February 2023.
6. **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.
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.

TEACHING

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.

HONORS & AWARDS

AIAA Guidance, Navigation, and Control (GNC) Best Paper (2024)
NASA Space Technology Graduate Research Fellowship (2021 - Present)
President's Fellowship, *Georgia Institute of Technology* (2019 - 2023)
University Honors, *The University of Texas at Austin* (2015 - 2019)

ADDITIONAL QUALIFICATIONS

Technical Skills: (*languages*) Python, C++, C, MATLAB, Bash, Fortran, Java; (*libraries*) PyTorch, Tensorflow, GTSAM, ROS, OpenCV
Certifications: Technician Class Operator Radio License, NASA GSFC Electrostatic Discharge Operator
Other: U.S. Citizen