

TRACIE CONN

trconn@mtu.edu

(906) 487-1854 (office)

EDUCATION

The University of Texas at Arlington — PhD, 2016, *Aerospace Engineering*

The University of Texas at Austin — B.S., 2006, *Aerospace Engineering*

EXPERIENCE

Michigan Technological University

Aug 2026 - present

Assistant Teaching Professor, Department of Mechanical and Aerospace Engineering

- Fall 2026 teaching assignment includes Statics and Space Mechanics courses

Orbital AI LLC

Aug 2020 - Mar 2022

Small Business Founder / Principal Investigator

- Awarded a National Science Foundation (NSF) Small Business Innovation Research (SBIR) Phase I grant for \$256k to conduct research and development work on reinforcement learning for automated guidance and control of spacecraft systems
- Leveraged advances in Machine Learning to train spacecraft to perform their own station-keeping through training in high-fidelity simulations
- Designed, trained, and tested a Deep Reinforcement Learning (DRL) agent to achieve swarm formation flying missions
- Award details and outcomes available at: www.nsf.gov/awardsearch/show-award/?AWD_ID=2022349

Ford Motor Company

Feb 2018 - Aug 2020

Software Engineer

- Researched and implemented sensor fusion and path planning algorithms for Ford *BlueCruise*, a hands-free driving feature
- Transitioned research algorithms to *BlueCruise* production-intent C++ code while using industry standard software development tools, including: Visual Studio Code, git and GitHub, python, MATLAB, JIRA, and Linux operating systems
- Designed and implemented unit tests, integration tests, and regression tests to ensure robust and accurate software deliverables
- Operated multi-state long distance driving tests to validate autonomous driving feature performance
- Analyzed large test data sets to assess performance of sensors and validate algorithm performance

NASA Ames Research Center, Mission Design Division

Jan 2017 - Feb 2018

Aerospace Engineer

- Lead the development team for the Swarm Orbital Dynamics Advisor software project (SODA), a mission simulation and trade study analysis tool for satellite swarms that relies on Python and the General Mission Analysis Tool (GMAT)

- Designed and simulated control algorithms for swarm mission concepts, including ellipsoid volume constraints and in-train distributions
- Matured small satellite mission concepts in early, pre-Phase A study by producing simulation, analysis, and feasibility engineering products
- Coordinated with academic counterparts to define requirements for an upcoming multi-satellite demonstration of new technology and infused these requirements into the overall larger Project
- Received certification to serve as Contracting Officer's Representative (COR)

The University of Texas at Arlington

Adjunct Professor : Astronautics

Aug 2016 - Dec 2016

Graduate Teaching Assistant : Air Breathing Engine Propulsion

Jan 2014 - May 2014

Graduate Research Assistant : Satellite Technology Lab

Jan 2013 - May 2013

Google Summer of Code

May 2013 - Sep 2013

Program Participant

- Completed a project to implement low density parity check code (LDPC) functionality in GNU Radio release version 3.7.9, a free and open-source software development toolkit for software-defined radios
- Created prototype signal processing functions in Python, using the NumPy library
- Transferred functionality into C++ using the GNU Scientific Library for matrix operations

Barrios Technology, NASA Johnson Space Center

May 2009 - Aug 2012

Project Engineer

- Supported the International Space Station (ISS) Mission Evaluation Room Crew Health Care System console and provided real-time anomaly resolution during on-orbit maintenance tasks
- Integrated ISS crew reports of hardware issues with engineering data in order to develop corrective actions
- Monitored the ISS Treadmill 2 performance, tracked required on-orbit maintenance tasks, and developed maintenance procedures

Applied Research Laboratories, The University of Texas at Austin

Jun 2006 - Jul 2008

Engineering Scientist Associate

- Made use of and actively contributed to the GPS Toolkit, an open-source library
- Developed GPS analysis tools in C++, including: observation and ephemeris data processing, double difference computation, observed range and clock residual computation, and data availability analysis
- Analyzed GPS observation and navigation data for quality assurance of the NGA Monitor Station Network
- Created and performed tests for MSN software development releases

AWARDS

1. 2019: Ford Research and Advanced Engineering Technical Achievement Award (Team Award).
Highway Assist - DAT 2.0.
2. 2017: Core team member co-author on awarded NASA Space Technology Mission Directorate Early Career Initiative for up to \$2.5M over two years for proposal titled "Autonomous Guidance and Control System for Deployable Entry Vehicles"

3. May 2014 - Dec 2016: NASA Earth and Space Science Fellowship, Planetary Science Research Program. *Unbiased Observation of Titan's Dynamic Ionosphere Using a Constellation of Miniature Satellites*.
4. Aug 2014: Certificate of Excellence: Excellent Paper in the field of Aerospace Communication, AIAA International Communications Satellite Systems Conference. "Design of Telemetry Link for Direct Communication between Femtosatellites in Low Earth Orbit and Earth Ground Stations."

PATENT

Patent No.US 11,091,280 B1: *Modelling and analyzing inter-satellite relative motion*, Issued August 17, 2021

PUBLICATIONS

1. Dono Perez, A., Plice, L., Muetting, J., Conn, T., Ho, M., "Propulsion Trade Studies for Spacecraft Swarm Mission Design," *IEEE Aerospace Conference*, Big Sky, MT, Mar 2018.
2. Conn, T., Bookbinder, J., "A Small Spacecraft Swarm Deployment and Stationkeeping Strategy for Sun-Earth L1 Halo Orbits (Poster)," *231st American Astronomical Society Meeting*, Washington, D.C., Jan 2018.
3. Conn, T., Dono Perez, A., Plice, L., Ho, M., "Operating Small Sat Swarms as a Single Entity: Introducing SODA," *31st Annual AIAA/USU Conference on Small Satellites*, Logan, UT, Aug 2017.
4. Conn, T., "A Framework for Employing Femtosatellites in Planetary Science Missions, Including a Proposed Mission Concept for Titan," The University of Texas at Arlington, Department of Mechanical and Aerospace Engineering, 2016.

Note: publications 5-10 were authored under married name (Perez).

5. Perez, T., Subbarao, K., "A Survey of Current Femtosatellite Designs, Technologies, and Mission Concepts," *The Journal of Small Satellites (JoSS)*, Vol. 05, No. 03, Oct 2016.
6. Perez, T., Subbarao, K., "Orbit Determination of Femtosatellites used in Planetary Exploration Missions," *30th Annual AIAA/USU Conference on Small Satellites*, Logan, UT, Aug 2016.
7. Perez, T., Subbarao, K., "A Miniature Satellite Mission Case Study: Observation of Titan's Dynamic Ionosphere," *AIAA SPACE 2015 Conference and Exposition*, Pasadena, CA, Sep 2015.
8. Perez, T., Rondeau, T., McCarthy, N., "Open-source Forward Error Correction using GNU Radio," *AIAA SPACE 2015 Conference and Exposition*, Pasadena, CA, Sep 2015.
9. Harris, R., Kamte, N., Perez, T., et al., "A Reference Design for the Radionavigation of Femtosatellites," *27th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2014)*, Tampa, FL, Sep 2014, pp. 1720-1737.
10. Perez, T., Harris, R., "Design of Telemetry Link for Direct Communication between Femtosatellites in Low Earth Orbit and Earth Ground Stations," *32nd AIAA International Communications Satellite Systems Conference*, San Diego, CA, 2014.
11. Harris, R., Conn, T., Gaussiran, T., et al., "The GPSTk: New Features, Applications, and Changes," ION GNSS Conference, 2007.
12. Harris, R., Craddock, T., Conn, T., et al., "Open Signals, Open Software: Two Years of Collaborative Analysis using the GPS Toolkit," ION GNSS Conference, 2006.