

Dhruv Jain

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Objective: Looking for an opportunity to leverage my Aerospace Engineering experience with numerical methods, numerical optimization, data analysis, 3D visualization, and software development to solve hard and exciting engineering problems.

Availability (flexible): January 2024 – August 2024

Education:

Purdue University, West Lafayette, IN, USA

- **M.S.** in Aeronautical & Astronautical Engineering, Astrodynamics and Controls Dec 2023
Advisor: Kathleen Howell, Multi-Body Dynamics Research Group
Thesis: Leverage Quasi Periodic Orbits (QPOs) in the Circular Restricted Three Body Problem to design transfer trajectories between periodic orbits in the cislunar space **GPA: 4.00/4.00**
- **B.S.** in Aeronautical & Astronautical Engineering, Minor in Astronomy Dec 2020
Focus: Dynamics & Controls, and Design **GPA: 3.97/4.00**

Technical Skills: Python, MATLAB, SIMULINK, Git, Command Line Interface, Linux, C++, C

Industry Experience

Dhruva Space, Hyderabad, India (*renowned space tech startup*)

Jun 2020 – Aug 2020

Spacecraft Dynamics and Control Systems Intern

- Designed and built an **attitude dynamics and controls simulator software** for CubeSat in **Python** by using **OOP** principles for software-in-the-loop testing under **minimal supervision**.
- Analyzed the simulated passive magnetic **attitude control** behavior to instruct the choice of attitude control hardware for the Thybolt CubeSats launched in 2022.
- Interfaced with another intern to oversee the implementation of **sensor models and Unscented KF algorithm**.

Research Experience

Multibody-Dynamics Research Group, Prof. Kathleen Howell, Purdue University

Jan 2021 - Present

Graduate Researcher

- Leveraged **linear algebra** and **vector calculus** principles through **numerical methods** in **Python** to effectively compute 10+ novel families of QPOs using the Circular Restricted Three Body Problem in the cislunar space.
- Exploited manifolds theory, Poincare maps, k-d tree, UMAP to **independently compute fuel-optimal transfer trajectories** between periodic orbits.
- Innovated a **new transfer design framework** for transfers between periodic orbits by leveraging *5-dimensional* hyperbolic invariant manifolds of QPOs and **numerical optimization**.
- Developed software using **Python**, Command Line Interface and **Git (version control, code review and regression testing)** in an **agile software development environment** to make a part of my code public ([1](#), [2](#)).
- Demonstrated **technical presentation and writing** skills to clearly report complex developed results.

Aerodynamic Deorbit Experiment, Prof. David Spencer, Purdue University

Jan 2019 – May 2019

Undergraduate Research Assistant

- Orbit Modeled and ran **Monte-Carlo Analysis** for 10,000+ cases in STK and FreeFlyer by interfacing with **MATLAB** to compute and analyze CubeSat lifetime and ground station contact time for variable right ascension of ascending node, epoch, coefficient of drag and solar radiation pressure area.
- Developed a function in C to interface flight software with **IMU** in **Linux** environment using Raspberry Pi.

Engineering Projects

Senior Spacecraft Design Project, Prof. James Garrison, Purdue University

Aug 2020 – Dec 2020

Systems Engineer

- **Collaborated with 8 peers** to develop a satellite constellation mission with Signals of Opportunity technology payload to collect sub-soil moisture data.
- **Formulated top-level requirements**, carried out and analyzed coverage and revisit calculations of satellite constellation with various P, I and L band receiver satellites using **MATLAB** and **Python**
- Identified margins, risks, development approach and flight software requirements.
- Ideated with all the team members to realize various aspects of space mission design ranging from **mission operations** and communication to structure and propulsion.