

Fig. 1 My rendition of the Parker Solar Probe, one of my favorite satellite missions.

# Candace Do

## Engineering Portfolio

Department of Mechanical and Aerospace Engineering (MAE)  
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PRINCETON  
School of Engineering and Applied Science

# Test Stand

Princeton Rocketry Club · March 2021 – Present

Test Stand Team Co-Lead: September 2021 – May 2022

Spaceport America Cup Team Co-Lead: Sept. 2022 – Present

**Researched** other amateur and university test stands to conceptualize and design a test stand for the Spaceport America Cup team. This test stand will support an N-class experimental motor created by the propulsion subteam.

**Hand-sized** dimensions for the test stand in Excel based on structural analysis principles and constraints given by the propulsion team.

**Designed** the test stand in PTC Creo using assemblies.

**Collaborated** with four other students during the design phase.

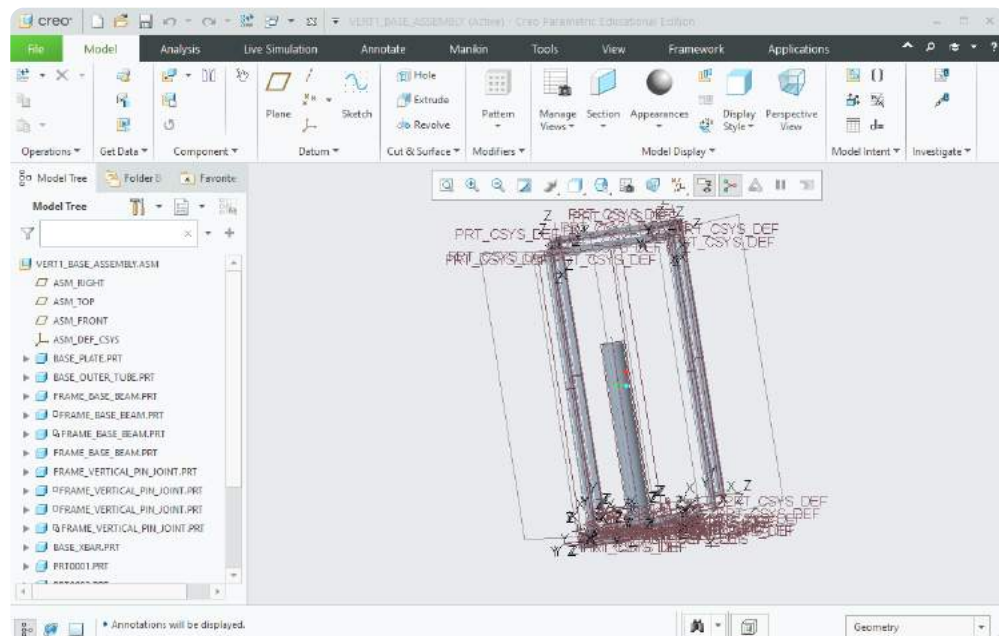


Fig. 2 Working on the test stand assembly in PTC Creo.

During Spring 2022, our team plans to conduct a **design review** with structural mechanics professors and **build smaller models** of the test stand for the propulsion team to use.

# Ion Source Research Project

Princeton Space Physics Lab · September 2021 – May 2022

**Contact:** Dr. David J. McComas, [dmccomas@princeton.edu](mailto:dmccomas@princeton.edu)

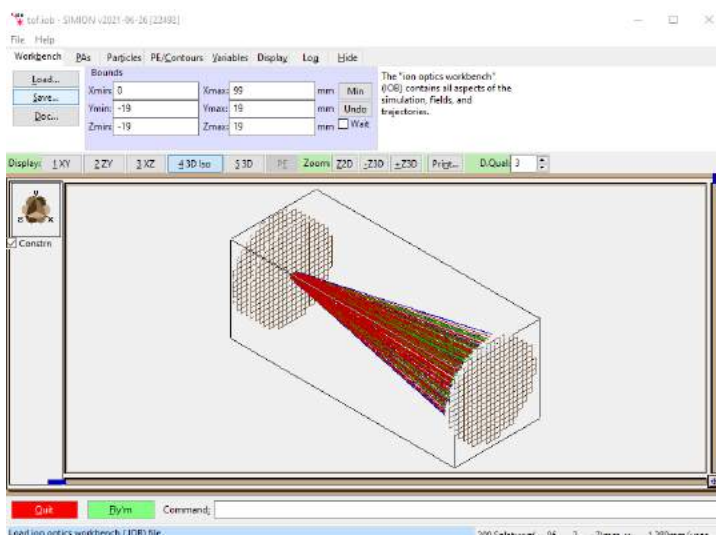
**Collaborated** with seven other students to work on the Space Physics Lab's ultra-high vacuum system, which will ultimately be used to calibrate space instruments built in the Space Physics Lab.

**Researched ion source design** to learn about the lab's ion source.

**Proposed experiments** to collect data on ion source capabilities, such as beam intensity and ion species. **Presented PDR** to lab leads and other staff.

**Simulated** ion source in SIMION software. Collected simulation data to compare to ion source data. **Analyzed** differences between simulation and real data and proposed reasoning behind discrepancies in a **CDR**.

**Acquired laboratory skills**, including using lab electronics, cleaning space instrument and vacuum system parts, and working with SIMION and Python.



**Fig. 3** An example model in SIMION.



**Fig. 4** The ion source and precision leak in the vacuum system.

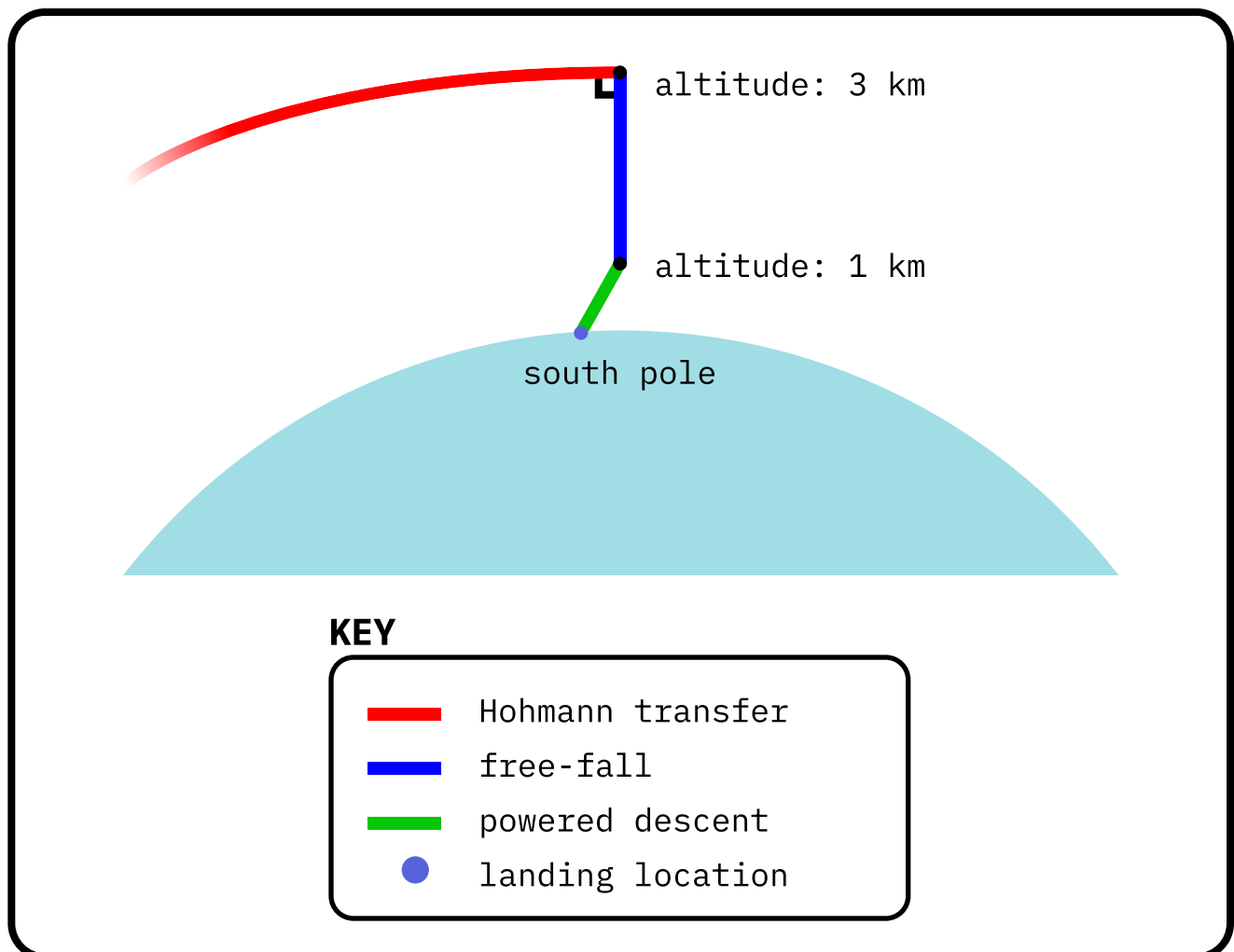
# EDL for Enceladus Lander

NASA L'SPACE Academy · May 2020 – December 2020

**Collaborated** with nine other students to research and plan a mission to one of Saturn's moons, Enceladus, to search for evidence of life by analyzing ground samples.

**Designed the entry, descent, and landing (EDL) maneuver** for the lander using physics principles and Python.

**Wrote a 50-page PDR in LaTeX** to submit to NASA technical staff for review.



**Fig. 5** A simple depiction of the EDL maneuver as presented in the PDR.

# NAR High Power Rocketry Level 1 Certification

Personal Project · May 2018

**Built** a high-power rocket using Apogee Components' Sumo kit.

**Simulated** the rocket in OpenRocket to determine key launch parameters, such as motor choice and additional nose weight.

**Launched** the rocket at Fire in the Sky in Mansfield, WA.

**Successfully recovered the rocket** to receive my National Association of Rocketry (NAR) High Power Rocketry [Level 1 Certification](#).



**Fig. 6** Preparing to paint the rocket.



**Fig. 7** The rocket launch.  
*Image courtesy of Venkatesh Rao.*