Taylor Peterson, MS

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Aerospace Engineer

- ✓ Dynamic and resilient aerospace engineer with a strong research foundation and specialized expertise in fluid system design and computational fluid dynamics (CFD) simulations.
- ✓ Successfully led complex engineering projects through all phases including conceptual design, part sourcing, prototype development, iterative refinement, ground testing, and final in-flight microgravity validation.
- ✓ Proven ability to collaborate effectively, communicate clearly, and excel in design, troubleshooting, and utilizing advanced engineering software.

SKILLS & EXPERTISE

Computational Fluid Dynamics | Troubleshooting | Test Procedures | 3D Printing (Filament & Resin) | C++ | Python | MATLAB
R | HTML | Post Processing | 3D Modeling | Data Analysis
Relationship Building | Communication| Problem Solving | Leadership | Project Management | Time Management
ANSYS | Star-CCM+ | SolidWorks | AutoDesk Inventor | LaTeX | Microsoft 360 | AutoDesk Inventor Nastran | Fusion 360

PROFESSIONAL EXPERIENCE

NASA Glenn Research Center, Virtual **Aug 2024 – Present**

OSTEM Research Intern

Conducting CFD simulations of cryogenic line and tank chilldown scenarios.

- Using ANSYS FLUENT and CFD-Post to set-up, run, and post process simulations of;
  - Line chilldown of various flow rates and temperatures using liquid hydrogen.
  - Tank chilldown and fill with liquid nitrogen.
- All simulations are validated against experimental results.
- Using MATLAB to recreate boiling curves from pool boiling literature, determining the best correlations to use for microgravity predictions.

Zero-Gravity (Zero-G) Corporation, Various Locations **July 2021 – Present**

Parabolic Flight Coach

Guide groups of 15-25 people through parabolic flights experiences, spanning both research and consumer flights.

- Effectively engaging with Zero-G flyers, ensuring research objectives are achieved safely and efficiently.
- Prioritizing passenger safety on the ground and during flight, both mentally and physically.
- Assisting in payload readiness reviews pre-flight and installing/uninstalling experimental equipment on the aircraft.

University of Central Florida, Orlando, FL **Aug 2021 – Aug 2024**

Graduate Researcher

As part of a collaboration with imec, I created CFD simulations and microfluidic experiments to study osteoporosis in astronauts. This experiment has seen flight on Blue Origin's New Shepard Vehicle on NS-24.

- Conducted CFD simulations in Star-CCM+ on microfluidic geometries that represent bone structures in normal and microgravity.
- Fabricated microfluidic devices from PDMS to validate CFD.
- Researched bone loss in microgravity, providing valuable insight for CFD and lab experiments.
- Guided a group of undergraduate students in learning about the topic, fabricating the devices, and conducting experiments.

Wisconsin Space Grant Consortium/Carthage College, Kenosha, WI **Feb 2018 – May 2021**

Project and Mechanical Lead

Actively contributed to experiments focused on a fuel gauging technology, Modal Propellant Gauging (MPG), and sloshing behavior in microgravity to advance space technology on top of full time undergraduate courseloads. All experiments were rigorously tested multiple times on parabolic flights. MPG experiments were successfully launched on Blue Origin's New Shepard Vehicle (Jan 2019, Dec 2019 & Aug 2021).

MPG:

- Used SolidWorks to improve the payload CAD model and used FEA to predict modal responses in 1g and 0g.
- Used MATLAB to generate frequency response functions from lab and in-flight modal data.
- Created various CFD simulations in SimFlow/Paraview on propellant tanks in microgravity.

MPG-Propellant Refueling and on-Orbit Transfer Operations:

- Used AutoDesk Inventor to design a complete payload for MPG testing in transfer operations.
- Sourced parts and constructed the payload, including liquid flow loop testing between two tanks.
- and constructed the payload, making necessary deigns iterations throughout testing.

EDUCATION

Ph.D. Aerospace Engineering, *Embry Riddle Aeronautical University* **Estimated Summer 2027**

M.S. Aerospace Engineering, *University of Central Florida, Orlando, FL* **Aug 2024**

B.A. Physics and Minor in Mathematics, *Carthage College, Kenosha, WI* **May 2021**

AWARDS

National Science Foundation Graduate Research Fellowship **March 2023**

ISS National Lab Space Leader Fellowship **July 2022**

Sigma Pi Sigma Inductee – Physics Honor Society **Feb 2021**

2020 Lemelson-MIT "Move it!" Student Prize Competition **Feb 2020**

PAPERS

Peterson, Taylor, "A Study of the Effects of Microgravity Through Porous Media in Microfluidic Devices." (2024). *Graduate Thesis and Dissertation 2023-2024.* 290. https://stars.library.ucf.edu/etd2023/290 **Aug 2024**

Le Henaff, Sylvian, Peterson, Taylor et al.,"A Study of Microfluidic Device Geometries on Fluid Instabilities." *Proceedings of the ASME Fluids Engineering Division Summer Meeting*, 2022, https://doi.org/10.1115/FEDSM2022-87470. **Feb 2022**

Peterson, Taylor, "Propellant Mass Gauging via Modal Analysis on the International Space Station." P*roceedings of the 31st Wisconsin Space Conference*, 2021, https://doi.org/10.17307/wsc.v1i1.336 **Feb 2022**

Peterson, Taylor et al., "Modal Propellant Gauging in Microgravity." *Proceedings of the 29th Wisconsin Space Conference*, 2019, https://doi.org/10.17307/wsc.v1i1.300. **Mar 2020**