Christopher (CJ) O'Neill

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Education

University of Colorado Boulder Aug. 2022 - May 2026

B.S. in Aerospace Engineering, Minor in Planetary Science

- GPA: 3.95/4.0
- **Relevant Coursework:** Radar and Remote Sensing, Aerospace Electronics, Planets and their Atmospheres, Aerospace Vehicle Design, Attitude Dynamics and Orbital Mechanics, Aircraft Dynamics, Computational Methods

Research Experience

Undergraduate Research Assistant - Spacecraft Systems Engineer, May 2023 - Present

Laboratory for Atmospheric and Space Physics (LASP) – Boulder, CO

- Systems engineer for the Emirates Mission to the Asteroid Belt (EMA), planned to launch in Q1 2028.
- 15-20 hours per week during school year and 40 hours per week during summer.
- Spacecraft Simulations:
  - Engineered a novel Guidance, Navigation, and Control (GNC) algorithm utilizing JPL's SPICE toolkit, optimizing spacecraft attitude planning during asteroid flybys to enhance navigation precision and mission success rates for EMA.
  - Performed high fidelity, full dynamics simulations using Basilisk such as gravity assists, flybys, and maneuvers.
  - Integrated spherical harmonics into EMA attitude simulations, leading to accurate spacecraft positional models.
  - Created Camera Kernels (CKs) and Instrument Kernels (IKs), directly informing ConOps to prevent component over-temperatures and to optimize solar array pointing.
  - Analyzed observation windows to identify periods of stray light interference, informing optimal baffle design; presented at AIAA Student Conference and received 1_{st} place in the undergraduate category Apr. 2025; presenting peer-reviewed version at AIAA SciTech Forum Jan. 2026.
- EMA Spacecraft Design Document:
  - Architected a comprehensive spacecraft block diagram detailing all components and interconnections, providing a foundational blueprint that streamlined assembly, integration, and test (AIT) processes and enhanced operational efficiency.
  - Authored detailed overviews for each spacecraft subsystem and their components, outlining primary responsibilities, methodologies, and interactions.
  - Led technical reviews and prepared interface documentation in collaboration with subsystem leads, resolving critical inter-subsystem dependencies and ensuring design compatibility across the EMA spacecraft.

Undergraduate Research Assistant - Radar and Remote Sensing, CU Boulder Jan. 2025 - Present

- Research focused on utilizing novel radar technologies to characterize the spread of Rapid ʻŌhiʻa Death (ROD), aiming to protect the cornerstone species of Hawaiian forests by providing key information to disease containment strategists.
- Simulated radar cross sections of ʻŌhiʻa canopies containing healthy and infected trees which demonstrates the detectable changes in the trees' states using parameters of satellites currently in orbit; presenting at AIAA SciTech Forum Jan. 2026.
- Generated a full 3D synthetic aperture radar scenario of Hakalau National Wildlife Reserve utilizing open-source software and models such as MATLAB Radar Toolbox to provide the highest fidelity information on the success of this proposed radar application.

Publications

(*in rev*) Modeling Trajectory and Attitude to Optimize Baffle Design for the Optical Navigation System of the Emirates Mission to the Asteroid Belt, *Aerospace Research Central, AIAA SciTech Forum* — Jun. 2025
Christopher M. O'Neill Jr., Michael Bonnici

(*in rev*) Tracking the Spread of Rapid Ohia Death Using SAR, *AIAA SciTech Forum* — Jun. 2025
Christopher M. O'Neill Jr., S.T. Peters

Awards and Honors

Henry Ogrodzinski Scholarship Recipient - NASAO (National) — Jun. 2025
Balance Scholarship - Theta Xi Fraternity (Chapter) — Jun. 2025
1st Place - American Institute of Aeronautics and Astronautics (AIAA) Student Conference, Undergraduate Research Category — Apr. 2025
Academic Excellence Award - Interfraternity Council (University) — Dec. 2024
6x CU Boulder Esteemed Scholar - President Horace M. Hale Award — Aug. 2022 - Present
6x Dean's List - College of Engineering and Applied Science — Aug. 2022 - Present
Brems Scholar - Tau Beta Pi Engineering Honor Society (National) — Jul. 2024
Rudd Scholar - Theta Xi Fraternity (National) — Jun. 2024
Balance Scholarship - Theta Xi Fraternity (Chapter) — Jun. 2024
1st Place - Freshman Projects Section, Autonomous Soil Rover — Dec. 2022
Academic Excellence Award for Calculus III(Top student in the course) — Apr. 2022
Academic Excellence Award for Calculus B.C.(Top student in the course) — Apr. 2021

Leadership and Teaching Experience

Vice President - Tau Beta Pi Engineering Honor Society — May 2024 - May 2025

- Spearheaded the complete restructuring of the struggling organization
- Led back-to-back semesters of the largest initiation classes since 1980
- Drove engagement up by 10x, having events with >30 members
- Created $200 annual chapter scholarship to support a member who reflects the values of the organization
- Instituted transition documents to ensure smooth leadership transitions
- Select events during term:
  - Blanket making for Children's Hospital
  - Trick-Or-Can for Harvest of Hope ($> 200lb$ of food collected)
  - Creek Cleanup ($> 100lb$ of trash collected)

Teaching Facilitator - Intro to Thermodynamics and Aerodynamics, CU Boulder — Aug. 2024 - Dec. 2024

- Held regular office hours to support student learning by breaking down complex concepts and reinforcing foundational material outside of class.
- Accommodations Lead: Selected to manage logistics and testing arrangements for over 20 students requiring academic accommodations, ensuring accessibility and compliance with university policies.

Collegiate Mentor - STEMSCAPE, BAE Systems & CU Boulder — Feb 2023, 2024, 2025

- Mentored group of 8 high-school students through aerospace engineering spacecraft design challenge
- Help the students prepare presentation of spacecraft design to present to professional engineers
- Guided student group to win 1st place in 2024 and 2nd place in 2025
- Lead activities and puzzles to get >100 students excited about STEM

Student Ambassador, CU Boulder — Sep. 2022 - Oct. 2023

- Guided prospective students and their families on engaging campus tours, providing insights into academics, student life, and campus culture.
- Presented key information and responded to in-depth questions from families during high-profile Admitted Students Day panels attended by hundreds.