

Katherine E. Melbourne

National Security Space Policy Analyst

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Education

- 2025 **M.S. Aerospace Engineering**, University of Colorado, Boulder, CO
Project Management Certificate & Astrodynamics and Satellite Navigation Concentration
- 2019 **B.S. Astrophysics**, Yale University, New Haven, CT

Research and Professional Experience

- 2024 – **The Aerospace Corporation Center for Space Policy and Strategy**, Arlington, VA
Senior Member of the Technical Staff
 - Secured more than 100 hours of customer funding for international comparative analyses
 - Develop frameworks for understanding policy based on the physics of space security
 - Research and present internal white paper about international legal framework for satellite ownership
 - Lead debate series papers framing two expert opinions on dynamic space operations and arms control
 - Analyze space development and diplomacy in Asia-Pacific region (South Korea, Taiwan, and India)
 - Serve as lead editor and member of editorial board on space science and policy papers
- 2023 – 2025 **University of Colorado VADeR Lab**, Boulder, CO
Graduate Research Assistant
 - Designed requirements-driven wargame to train USSF Guardians on xGEO operations and strategy
 - Applied knowledge of doctrine to creation of wargame learning objectives and game mechanics
 - Assessed and implemented feedback from wargame playtesters and industry partners
 - Wrote public comment on an FAA Notice of Proposed Rule Making about orbital debris mitigation
 - Passed qualification exams in Statistical Estimation and Algorithmic Motion Planning
- 2020 – 2023 **Ball Aerospace**, Broomfield, CO
Systems Engineer I
 - Led Technical Baseline and Engineering Review Boards for National Defense satellite program
 - Saved more than 12000 hours of program funding through creation of tool to sync databases
 - Employed knowledge of Space Domain Awareness for preparation of new business proposal efforts
 - Coordinated updates to James Webb Space Telescope commissioning procedure documentation
 - Adapted to anomalies in JWST mirror alignment processes while on console in front of customer
Associate Systems Engineer
 - Performed trade study on quantum-assisted super resolution and applications with research team
 - Collaborated on effort to build optical bench to test quantum super-resolution capabilities
 - Managed requirements for Roman Space Telescope contract between Ball and NASA GSFC
 - Presented science applications of Roman and JWST in full-team meetings

Internships

- Summer 2024 **The Aerospace Corporation**, Center for Space Policy and Strategy Graduate Intern
- Summer 2019 **Ball Aerospace**, Brooke Owens Fellow and Strategic Operations Intern
- Summer 2018 **National Aeronautics and Space Administration**, Astrophysics Research Intern
- Summer 2017 **Yale Wright Laboratory**, Yale College Dean's Research Fellow in Nuclear Physics
- Spring 2017 **National Aeronautics and Space Administration**, International and Interagency Relations Intern
- Summer 2016 **University of Chile**, International Research Fellow in Astrophysics

Awards and Grants

- 2025 **Payload Pioneer** (named one of the year's 30 under 30 space industry leaders)
- 2025 **Secure World Foundation Dr. Michael Simpson Scholarship** (\$1500)
- 2025 **Future Space Leaders Foundation Grant** (\$4000)
- 2024 **Military Operations Research Society Certificate in Wargaming Scholarship**
- 2022 **Ball Aerospace Go Beyond Performance Award** for contributions to positive team culture
- 2022 **Ball Aerospace Performance Execution Program Award** for contributions to JWST (\$2500)
- 2019 **Universities Space Research Association Distinguished Undergraduate** (\$5000)
- 2019 **Yale's Brady-Johnson Grand Strategy Program Grant** (\$3100)
- 2019 **Bruce M. Babcock '62 Travel Research Fellowship** (\$1200)
- 2019 **National Space Club and Foundation Keynote Scholarship Finalist**
- 2018 **Women in Aerospace Scholarship in Memory of Molly K. Macauley** (\$2000)
- 2018 **John Mather Nobel Scholar at NASA Goddard Space Flight Center** (\$3000)
- 2017 **Yale Center for Teaching and Learning STEM Education Undergraduate Fellow**
- 2017 **Connecticut Space Grant Undergraduate Research Fellowship** (\$5000)
- 2017 **Saybrook Residential College Research Fellowship** (\$545)
- 2017 **Yale College Dean's Research Fellowship** (\$4300)
- 2016 **Horkheimer/Smith First-Place Scholarship for Youth Astronomy Outreach** (\$1750)
- 2016 **Alan S. Tetelman '58 Fellowship for International Research in the Sciences** (\$3200)

Publications

- 2025 Frakes, P., **Melbourne, K.**, Perry, L. et. al., "Artificial Intelligence and the Space Enterprise: Taxonomy and Emerging Opportunities" (Issue Brief, Aerospace Center for Space Policy and Strategy)
- 2025 **Melbourne, K.**, Hillebrandt, A. "Regional Brief: Taiwan" (Aerospace Center for Space Policy and Strategy)
- 2025 **Melbourne, K.**, Swope, C., Penn, A., "In Brief: How Government and Commercial Entities Can Advance Space Initiatives Together" (War on the Rocks)
- 2025 **Melbourne, K.** "Strengthening the US-India partnership through space, Pacific Forum)
- 2024 **Melbourne, K.**, Wilson, R.S., "US-South Korea Relations in Space: A New Era for Partnership" (Korea Policy Journal Vol. 2. No. 2 Pp. 126-149, Korea Economic Institute)
- 2024 Roberts, T.G., Staats, B., **Melbourne, K.**, "Exotic Space Warfare: Military Importance of Sustained Maneuver" (Debate Series, Aerospace Center for Space Policy and Strategy)
- 2024 Moretto, M., **Melbourne, K.**, Holzinger, M."Recovery of Periodic Signals in Event Camera Data: Theory and Empirical Results" (AMOS Conference)
- 2023 Rigby, J., ..., **Melbourne, K.** "The Science Performance of JWST as Characterized in Commissioning" (10.1088/1538-3873/acb293)
- 2022 Hicks, B., Chonis, T., Coppock, E., Gordon, M., **Melbourne, K.**, et al. "*James Webb Space Telescope Wavefront Commissioning Contingency Response*" (doi: 10.11117/12.2630359)
- 2022 Acton, D.S., ..., **Melbourne, K.**, et al. "*Phasing the Webb Telescope*" (doi: 10.11117/12.2633474)
- 2020 **Melbourne, K.**, Youngblood, A., France, K. et al. "*Estimating the Ultraviolet Emission of M dwarfs with Exoplanets from Ca II and H α* " (doi: 10.3847/1538-3881/abbf5c)

Presentations and Media

- 2025 **Popular Astronomy Club banquet**, Rock Island, IL
"Orbital Mechanics and Political Dynamics: The Physics and Strategy of Space Warfare"
- 2025 **International Astronautical Congress**, Sydney, Australia
"Defining Right-of-Way on Orbit: Lessons from Autonomous Vehicle Standards Translated to Space Traffic Management"

- 2024 **The DownLink Podcast** (Interview), Virtual
"Space Competition: Trump's South Korean Space Opportunity"
- 2023 **Rocky Mountain Society of Women Engineers Regional Meeting** (Panel), Westminster, CO
"Women of Webb: Team Members Who Helped Bring the Flagship Observatory through Commissioning"
- 2020 **Keck Science Meeting** (Poster), Virtual
"Predicting the UV Emission of M dwarfs with Exoplanets from Ca II and H-alpha"
- 2020 **American Astronomical Society** (Poster), Honolulu, HI
"How to Predict the UV Emission of an M dwarf"
- 2019 **Extreme Solar Systems IV** (Poster), Reykjavik, Iceland
"Predicting the UV Emission of M dwarfs with Exoplanets from Ca II and H-alpha"
- 2019 **North Central Region of the Astronomical League Convention**, Moline, IL
"Our Coolest Neighbors: M Dwarfs and the Search for Earth 2.0"
- 2019 **American Astronomical Society** (Poster), Seattle, WA
"Characterizing the UV Emission of M Dwarfs with Exoplanets"
- 2018 **Yale Undergraduate Research Association** (Poster), New Haven, CT
First Place: "Characterizing the UV Emission of M Dwarfs with Exoplanets"
- 2018 **NASA Goddard Space Flight Center Intern Research Fair** (Poster), Greenbelt, MD
First Place: "Characterizing the UV Emission of M Dwarfs with Exoplanets"
- 2018 **Conference for Undergraduate Women in Physics**, New York City, NY
First Place: "The Effects of Stellar Activity on Radial Velocity Exoplanet Detection"
- 2017 **American Physical Society Division of Nuclear Physics** (Poster), Pittsburgh, PA
"Analyzing CUORE Data and Geant4 Simulation"
- 2016 **University of Chile Astronomy Department Professional Seminar**, Santiago, Chile
"The Effects of Stellar Activity on Radial Velocity Exoplanet Detection"
- 2014 **Research Internship for Science and Engineering Symposium** (Poster), Boston, MA
"Calibrating a Color-Magnitude Relationship of M Dwarf Stars with Known Distances"

Observing Experience

- 2019 **W. M. Keck Observatory**, Waimea, HA
Keck I High Resolution Echelle Spectrometer
- 2016 **La Silla Observatory**, Atacama Desert, Chile
Swiss 1.2 Meter Leonard Euler Telescope
- 2013 **Kitt Peak National Observatory**, Tucson, AZ

Outreach and Community Involvement

- 2025 **Dwight D. Eisenhower Memorial Trust for the National Mall Volunteer**, Washington, DC
- 2023 – 2024 **Boulder Area Agency for Aging Senior Respite Companion**, Boulder, CO
- 2021 – 2024 **Zedd Factor Fellowship Professional Mentor**, Virtual
- 2020 – 2022 **University of Colorado Boulder and Ball Aerospace "Big Sister" Mentor**, Boulder, CO
- 2020 **Space Generation Fusion Forum Delegate**, Virtual
- 2020 **EMER-GEN Delegate (in conjunction with AMOS Conference)**, Virtual
- 2019 **Space Generation Advisory Council Congress Delegate**, Washington, D.C.
- 2018 – 2019 **Girls Science Investigations Volunteer**, New Haven, CT
- 2017 – 2018 **Camp Kesem Counselor and Unit Lead for families affected by cancer**, New Haven, CT
- 2015 – 2018 **Yale Women in Physics Co-President and Secretary General**, New Haven, CT