Nicholas B. Andrews

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Education

University of Washington — Seattle, WA, USA
PhD, Aeronautics and Astronautics — Sep 2020 - present
Focus Area: Controls
Advisor: Professor Kristi Morgansen

University of Colorado — Boulder, CO, USA
MS, Aerospace Engineering — Aug 2015 - May 2017
Focus Area: Astrodynamics and Satellite Navigation Systems

University of Colorado — Boulder, CO, USA
BS, Aerospace Engineering — Aug 2012 - May 2016

Employment History

University of Washington — Seattle, WA, USA
Research Assistant — Sep 2020 - present

- Research focus: using observability tools to enhance the sensing capabilities of vision-guided underwater and space systems
- Member of Nonlinear Dynamics and Control Lab
- Completed elective coursework in optimization, robotics, artificial intelligence, and machine learning

The Boeing Company — Seal Beach, CA, USA
Systems Engineer 2 — Oct 2017 - Aug 2020

- Employed under Phantom Works Virtual Warfare Center
- Independently researched and developed estimation, model predictive control, and decision making algorithms
- Performed mission level analysis in support of proprietary space programs and helped lead operator-in-the-loop experiments with 100+ participants

Expeditions

Fulbright Research Grant — Trondheim, Norway
Visiting Researcher — Jan 2024 - July 2024

- Advised by Professor Kristin Y. Pettersen at the Norwegian University of Science and Technology (NTNU) and worked on European Research Council Advanced Grant CRÈME
- Researched and developed an online model-free observability-based algorithm to guide a system to a more observable state from a history of sensor data
- Designed, planned, and executed at-sea experiments in Trondheim Fjord using BluEye Drone and BlueROV experimental platforms

VISIONS 22 Newport, OR, USA
Student Participant Aug 2022

- 10-day at-sea research expedition through the University of Washington School of Oceanography
- Shadowed Canadian Scientific Submersible Facility team while they controlled remotely operated vehicle ROPOS during seafloor scientific instrument servicing and sample collection dives
- Contributed detailed entries to ROPOS dive log and processed sea water and tube worm samples for future experiments

Teaching

Summer Undergraduate Research Program Seattle, WA, USA
Project Advisor Jun 2023 - Aug 2023

- Project: AprilTag testing and cooperative robotic arm control for spacecraft proximity operations testbed
- Sponsors: Washington NASA Space Grant Consortium and Blue Origin
- Managed and provided technical guidance to a team of three undergraduates

AA 322 - Aerospace Laboratory 2 Seattle, WA, USA
Project Advisor Mar 2023 - Jun 2023

- Project: Ultra-wideband range sensor performance and noise characterization
- Sponsor: Blue Origin
- Managed and provided technical guidance to a team of four undergraduates

Summer Undergraduate Research Program Seattle, WA, USA
Project Advisor Jun 2022 - Aug 2022

- Project: Cooperative robotic arm control for spacecraft proximity operations testbed
- Sponsors: Washington NASA Space Grant Consortium and Blue Origin
- Managed and provided technical guidance to a team of three undergraduates

AA 322 - Aerospace Laboratory 2 Seattle, WA, USA
Project Advisor Mar 2022 - Jun 2022

- Project: AprilTag testing and robotic arm control for spacecraft proximity operations testbed
- Sponsor: Blue Origin
- Managed and provided technical guidance to two teams of four undergraduates

Technical Skills

Programming: Python, MATLAB, UNIX, LaTeX

Software: Git, Robot Operating System (ROS), Blender, Simulink, Systems Tool Kit (STK)

Awards and Honors

Fulbright Research Grant - Norway (6-10 months fully funded + travel stipend)	2023-2024
Washington NASA Space Grant Consortium Graduate Fellowship ($10,000/yr)	2021-2023
University of Washington GSEE Fellowship (Tuition waiver + stipend)	2020-2022
Boeing Virtual Warfare Center Employee of the Month	Mar 2020
University of Colorado BOLD Center Native American Scholarship ($4,000/yr)	2012-2016
University of Colorado First Nations Scholarship ($2,000/yr)	2012-2016

Publications

Conference Proceedings:

[1] N. B. Andrews and K. A. Morgansen, "Optimal fiducial marker placement for satellite proximity operations using observability gramians," in *45th Annual American Astronautical Society (AAS) Guidance, Navigation and Control (GN&C) Conference*, Feb. 2023.

[2] N. L. Brace, N. B. Andrews, J. Upsal, and K. A. Morgansen, "Sensor placement on a cantilever beam using observability gramians," in *2022 IEEE 61st Conference on Decision and Control (CDC)*, Dec. 2022, pp. 388–395.

Accepted:

[3] N. B. Andrews and K. A. Morgansen, "Relative pose observability analysis using dual quaternions," in *2024 63rd IEEE Conference on Decision and Control (CDC)*, Dec. 2024.

Presentations

Conferences:

[1] N. B. Andrews and K. A. Morgansen, "Optimal fiducial marker placement for satellite proximity operations using observability gramians," in *45th Annual American Astronautical Society (AAS) Guidance, Navigation and Control (GN&C) Conference*, Feb. 2023.