Curriculum Vitae

Contact Information

Ryan McKnight, Ph.D.
Postdoctoral Research Scholar in Avionics
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Education and Registration

Engineer Intern (E.I.) License — Ohio Board of Engineers and Surveyors
License number: EI.14688

Ph.D. Electrical Engineering and Computer Science, 2025 — Ohio University

Title of Dissertation: Radio-Frequency Pulsar Timing Using Small-Aperture Antennas

M.S. Electrical Engineering, 2023 — Ohio University

B.S. Electrical Engineering, 2019 — Ohio University

Research Activities

Includes research conducted as an Undergraduate Research assistant (2017-2019), Graduate research assistant (2019-2025), and Postdoctoral Research Scholar (2025-present) at Ohio University, and as a Pathways Intern (2022-2025) at NASA Goddard Space Flight Center.

Radio-Frequency Pulsar Navigation and Timing
Use of signals from radio-frequency pulsars as a timing or navigation source. Applications include terrestrial timing resiliency for critical infrastructure (as an alternative to GNSS timing), or navigation for spacecraft in deep space. Involves use of long integration to recover very weak signals from below the noise floor.

GNSS Inter-Constellation Time Offset Estimation from LEO
Estimation of timing offsets between major GNSS constellations including GPS (USA), Galileo (EU), GLONASS (Russia), and Beidou (China) using a CubeSat in low Earth orbit. Successfully developed, launched, and operated the Bobcat-1 CubeSat in support of this work. Applications include enhanced multi-GNSS interoperability, enabling improvement of positioning/timing availability and accuracy for high-altitude or other low-visibility users. Continuing work to include development and operation of a long-term (> 10 years) experiment on board the PHASMA CubeSat mission in collaboration with the Libre Space Foundation (LSF).

GNSS Spectrum Monitoring from LEO
Monitoring and identification of instances of GNSS radio-frequency interference from low Earth orbit CubeSat platform. Bobcat-1 mission included basic spectrum monitoring capabilities; enhanced capabilities are currently under development for the PHASMA CubeSat mission. Upcoming work may allow for capability to geolocate interference or identify the interference source.

GNSS Navigation at or beyond Lunar Distances
Simulations and case studies of the use of GNSS to navigate spacecraft beyond lunar distances. This involves the use of low-SNR GNSS acquisition and tracking receiver technology and integration of GNSS range and Doppler measurements with orbital navigation filters.

X-Ray Pulsar Navigation and Timing (XNAV)
Research conducted during employment at NASA Goddard Space Flight Center. Estimation of X-Ray pulsar phase and frequency measurements using simulated data and data collected by NICER instrument on-board the International Space Station. Integration of pulsar measurements into orbital navigation filter.

Low SNR GNSS Acquisition using Long Integration
Investigation of various coherent/non-coherent long acquisition techniques to enable the acquisition and tracking of GNSS signals in low-SNR environments, e.g. in the presence of jamming or other interference or at high altitudes (up to lunar distance and beyond). Worked with flight-ready receiver implementation for use on lunar missions (NavCube3-mini) at NASA Goddard Space Flight Center.

Surface Navigation for Unmanned Aerial Systems
In-flight data collection and data processing of GNSS, INS, and computer vision data. Data supports research into navigation performance requirements, computer vision augmentation, and GNSS augmentation for Unmanned Aerial Systems (UAS) automatic surface operations.

Teaching Experience

Instructor of Record Ohio University, School of EECS

- EE 4853/5853 Electronic Navigation Systems, *Fall 2025*
- EE 3223 Electromagnetics and Materials II, *Spring 2024*

Teaching Assistant Ohio University, School of EECS

- EE 3334 Linear Signals and Systems, *Fall 2023*
- EE 4403/5403 Antenna and Microwave Theory, *Spring 2023*
- EE 3954 Microprocessors and Microcontrollers, *Spring 2023*

Employment

Postdoctoral Research Scholar in Avionics Ohio University
September 2025 – Present Athens, OH

– Collect and process flight data for research on surface navigation for unmanned aerial systems
– Design and implement GNSS data collection experiment on-board low-Earth orbit CubeSats
– Design and construct satellite tracking ground station to support CubeSat missions

Pathways Intern NASA Goddard Space Flight Center
June 2022 – July 2025 Greenbelt, MD

– Development of flight software and FPGA firmware for NavCube3-mini high-altitude space GNSS receiver platform
– Setup and operation of laboratory testing and verification procedures for NavCube3-mini
– Research involving navigation using X-Ray pulsar phase and frequency measurements (XNAV)

College Intern Technical Northrop Grumman
May 2020 – August 2020 San Diego, CA

– Operation, troubleshooting, and testing of LN-251 and KN-4074 embedded GPS/INS navigation units
– Laboratory and mobile testing using a replica of aircraft navigation system
– Held DoD Secret security clearance

Engineering Intern Athens Technical Specialists
September 2016 – July 2019 Athens, OH

– Printed circuit board (PCB) design and microcontroller firmware development

– Mechanical design and prototyping of custom injection molded enclosures and other parts

Engineering Intern SPOT Engineering
March 2014 – June 2018 Lancaster, OH

– Design and build industrial control systems for automated machinery using programmable logic controllers (PLCs)
– Build and repair printed circuit boards (PCBs), microcontroller firmware development
– Electrical and mechanical drafting

Scholarships, Fellowships, and Awards

- IEEE Aerospace and Electronic Systems Society, Graduate Engineering Scholarship, 2023
- U.S. Dept. of Ed., Graduate Assistance in Areas of National Need (GAANN) fellowship, Spring 2023 - Spring 2025.
- Ohio University Russ College of Eng. and Tech., Outstanding Senior in Electrical Engineering, April 2019
- Ohio University Russ College of Eng. and Tech., Outstanding Junior in Electrical Engineering, April 2018

Professional Memberships

- Member, Institute of Navigation
- Member, Institute of Electrical and Electronics Engineers
- Member, IEEE Aerospace and Electronic Systems Society

Professional Service

- Journal Review, *IEEE Transactions on Instrumentation and Measurement*, 2025
- Session Chair, *ION GNSS+ 2026*

Publications and Presentations

Refereed Journal Articles

[1] **R. McKnight**, B. C. Peters, S. Ugazio, and F. van Graas, "L-band pulse phase measurements of pulsar B0329+54 using a 1.8-m dish antenna," *IEEE Transactions on Instrumentation and Measurement*, vol. 74, pp. 1–12, 2025. DOI: 10.1109/TIM.2025.3580842.

Refereed Conference Papers

[1] B. C. Peters, **R. McKnight**, and S. Ugazio, "Analysis of GNSS-based navigation performance throughout a ballistic lunar transfer," in *Proceedings of the 2026 International Technical Meeting of the Institute of Navigation*, Anaheim, California, Jan. 2026.

[2] **R. McKnight** and F. van Graas, "Radio-frequency pulsar observation using small-aperture antennas," in *Proceedings of the 2022 International Technical Meeting of The Institute of Navigation*, Long Beach, California, Jan. 2022, pp. 856–866. DOI: 10.33012/2022.18259.

[3] Z. Arnett, **R. McKnight**, S. Ugazio, and F. van Graas, "Receiver inter-constellation time offset at low Earth orbit: An experiment with Bobcat-1, the Ohio University CubeSat," in *Proceedings of the 2022 International Technical Meeting of The Institute of Navigation*, Long Beach, California, Jan. 2022, pp. 844–855. DOI: 10.33012/2022.18176.

[4] S. Ugazio, B. C. Peters, K. Croissant, G. Jenkins, **R. McKnight**, and F. van Graas, "GNSS inter-system time-offset estimates and impact on high altitude SSV," in *Proceedings of the 2020 International Technical Meeting of The Institute of Navigation*, San Diego, California, Sep. 2020, pp. 320–330. DOI: 10.33012/2020.17146.

Non-Refereed Conference Papers

[1] S. Ugazio, M. Joerger, D. J. Larimer, K. Nagai, J. Wilhelm, B. C. Peters, and **R. McKnight**, "Defining requirements for safe, scalable, and seamless surface navigation for UAS: Challenges and perspectives," in *AIAA SCITECH 2026 Forum*, AIAA 2026-0498, Orlando, Florida, Jan. 2026. DOI: 10.2514/6.2026-0498.

[2] **R. McKnight**, B. C. Peters, Z. Arnett, and S. Ugazio, "Analysis of small-aperture radio-frequency pulsar data," in *Proceedings of the 2024 International Technical Meeting of the Institute of Navigation*, Long Beach, California, Jan. 2024, pp. 770–777. DOI: 10.33012/2024.19494.

[3] B. C. Peters, **R. McKnight**, Z. Arnett, S. Ugazio, and M. Braasch, "Exploring the use of GNSS beyond the moon," in *Proceedings of the 36th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2023)*, Denver, Colorado, Sep. 2023, pp. 1530–1543. DOI: 10.33012/2023.19386.

[4] Z. Arnett, B. C. Peters, **R. McKnight**, and S. Ugazio, "Characterization of multi-GNSS receiver biases and their temperature-induced variations in LEO," in *Proceedings of the 36th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2023)*, Denver, Colorado, Sep. 2023, pp. 1460–1473. DOI: 10.33012/2023.19360.

[5] A. McKibben, **R. McKnight**, B. C. Peters, Z. Arnett, and S. Ugazio, "Interference effects on a multi-GNSS receiver on-board a CubeSat in LEO," in *Proceedings of the 36th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2023)*, Denver, Colorado, Sep. 2023, pp. 1245–1258. DOI: 10.33012/2023.19247.

[6] S. Ugazio, Z. Arnett, **R. McKnight**, and B. C. Peters, "Receiver-specific GNSS inter-system bias in low Earth orbit," in *Proceedings of the 2023 International Technical Meeting of The Institute of Navigation*, Long Beach, California, Jan. 2023, pp. 831–843. DOI: 10.33012/2023.18678.

[7] **R. McKnight**, Z. Arnett, B. C. Peters, and S. Ugazio, "Performance characterization for a small-aperture radio-frequency pulsar experiment," in *Proceedings of the 35th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2022)*, Denver, Colorado, Sep. 2022, pp. 1933–1941. DOI: 10.33012/2022.18543.

[8] K. Croissant, G. Jenkins, **R. McKnight**, B. C. Peters, S. Ugazio, and F. van Graas, "Bobcat-1, the Ohio University CubeSat: Preliminary data analysis," in *Proceedings of the 2021 International Technical Meeting of The Institute of Navigation*, Jan. 2021, pp. 625–636. DOI: 10.33012/2021.17854.

[9] K. Croissant, G. Jenkins, **R. McKnight**, B. C. Peters, S. Ugazio, and F. van Graas, "Design and mission planning of Bobcat-1, the Ohio University CubeSat," in *Proceedings of the 33rd International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS+ 2020)*, Sep. 2020, pp. 1383–1393. DOI: 10.33012/2020.17649.

Invited Articles (Non-Refereed)

[1] S. Ugazio, Z. Arnett, B. C. Peters, **R. McKnight**, and A. McKibben, "GNSS timing measurements from a low Earth orbiting satellite," *GPS World Magazine*, vol. 35, no. 2, pp. 36–41, Feb. 2024.

(*GPS World Magazine*: Circulation approx. 30,000 copies per issue.)

Invited Presentations

[1] "Navigation and Timing using Radio-Frequency Pulsars", Institute of Navigation, Dayton Section Luncheon, Dayton, Ohio, 15 Feb 2024.