

Jay Aronow Frothingham

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EDUCATION

B.A. Engineering and Astronomy, 3.92 GPA
Smith College, Northampton MA, May 2023

EMPLOYMENT

Scientific Data Analyst, Green Bank Observatory

May 2023 - Present // Green Bank WV

Scientific and operational support of the Green Bank Telescope. Help radio astronomers prepare their observations, including writing observing scripts. Troubleshoot critical telescope issues as the "On-call Support Scientist." Provide technical training to new Observatory staff and scientists. Perform specialty observations (radar, interferometric imaging). Regularly assess telescope performance and data quality. Test and develop new telescope capabilities alongside software and hardware engineers. Review telescope time proposals on a technical basis. Oversee the proposal handling process from proposal submission to science reviews to time allocation decisions to project creation. Prepare and correct daily telescope observing schedules. Provide access to archival data, data products, and documentation upon request. Teach and promote best practices in radio data reduction.

Student Researcher, Smith College Physics Department

September 2019 - September 2021 // Northampton MA

Complete independent research on several projects. Mechanical and electrical fabrication, circuit board design, software development, and soldering under a microscope. Train and mentor new lab members. Lead lab meetings in-person and remotely. Present results to other researchers.

Hardware Engineering Intern, HP, Inc.

Summer 2019 // Corvallis OR

Optimize printer drum testbed control settings to improve motor torque and performance, allowing for more efficient testing.

Electrical Engineering Intern, HP, Inc.

Summer 2018 // Corvallis OR

Program FPGAs (Field Programmable Gate Arrays) to control and debug custom components. Revise circuit board designs using powerful PCB design software.

RESEARCH

Microwave Photonic Synthesizer Characterization for Applications in Radio Astronomy Instrumentation

National Radio Astronomy Observatory (NRAO) Research Experience for Undergraduates

Tested and characterized laser source for potential use as ngVLA (next-generation Very Large Array) local oscillator. Presented findings to external engineering representatives and NRAO mentors.

Research Mentor: William Shillue

A Circuit Board Printer for Muon Detector Construction and Classroom Use

Summer Undergraduate Research Fellowship, Smith College Dept. of Physics

Tested feasibility of a circuit board printer to manufacture components quickly and reliably. Assembled and tested muon detectors to assess quality of reflow soldering techniques. Designed and built an adjustable camera mount to improve equipment accessibility. Wrote documentation and user guide to circuit board printer. Presented results to Smith College Physics and Astronomy departments.

Research Advisor: Dr. Nathanael Fortune

Portable Muon Detectors for Tests of Time Dilation

STudent Research In DEpartments (STRIDE), Smith College Dept. of Physics

Used custom-built portable muon detectors to collect data at different elevations. Worked with peers to analyze data collected in various locations. Managed project milestones and scheduled lab meetings during periods of remote work. Presented results to Smith College Physics and Astronomy departments.

Research Advisor: Dr. Nathanael Fortune

A Python Package for Correction of Magnetic Field Dependence of Resistive Thermometers

Summer Undergraduate Research Fellowship, Smith College Dept. of Physics

Optimized Python code characterizing resistive thermometers' response to magnetic fields. Removed code redundancies by bundling custom functions into a package and defining a class. Automated essential functions and increased user control over other functions. Managed revisions through Gitlab. Wrote detailed documentation in Markdown and Python. Code used in analysis for published paper.

Research Advisor: Dr. Nathanael Fortune

Experimental Measurements of Phase Transitions in Superconductors Under Extreme Conditions

STudent Research In DEpartments (STRIDE), Smith College Dept. of Physics

Designed and fabricated custom lab equipment in a machine shop. Performed soldering under a microscope. Evaluated and modified test probe electronics and wiring.

Research Advisor: Dr. Nathanael Fortune

Using Arduino to Teach Mechatronics

Apprenticeships in Science and Engineering, Oregon State University, Corvallis OR

Developed a hands-on, Arduino-based system for use in Oregon State University's "Computer Control of Manufacturing Processes" class, teaching undergraduate engineering students fundamentals of industrial mechatronic systems including servo motion control using various types of sensors and feedback control components commonly used in manufacturing industries.

Research Advisor: Dr. Burak Sencer

PUBLICATIONS

LaBarre, P.G., Rydh, A., Palmer-Fortune, J., **Frothingham, J.A.**, Hannahs, S.T., Ramirez, A.P., Fortune, N.A. "Magnetoquantum oscillations in the specific heat of a topological Kondo insulator." *Journal of Physics: Condensed Matter* (2022).