Jay Aronow Frothingham

jfrothingham.github.io // jafroth@gmail.com // (681)776-2224 // 227 Rabbitt Patch Drive, Arbovale, WV 24915

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. Troubleshot critical telescope issues as the "On-call Support Scientist." Provided technical training to new Observatory staff and scientists. Performed specialty observations (radar, interferometric imaging). Regularly assessed telescope performance and data quality. Reviewed telescope time proposals on a technical basis. Prepared and corrected daily telescope observing schedules. Provided access to archival data, data products, and documentation upon request.

Student Researcher, Smith College Physics Department
September 2019 - September 2021 // Northampton MA
Completed independent research on several projects. Mechanical and electrical fabrication, circuit board design, software development, and soldering under a microscope. Trained and mentored new lab members. Led lab meetings in-person and remotely. Presented results to other researchers.

Hardware Engineering Intern, HP, Inc.
Summer 2019 // Corvallis OR
Optimized 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
Programmed FPGAs (Field Programmable Gate Arrays) to control and debug custom components. Revised 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

SKILLS

Languages: Proficiency in German. Limited studies in written and spoken Yiddish
Software: Python, IDL, Matlab, Java, Arduino, Javascript, Jupyter, Github, Verilog
Hardware: Microscopes, telescopes, oscilloscopes, voltmeters, function generators
Electronics: Arduino, breadboard, soldering, printed circuit board design
Design: Computer-aided design (CAD) programs including Solidworks, AutoCAD, and Inventor
Fabrication: 3D printers, laser cutters, hand tools, power tools; Manual and CNC mills and lathes; Bandsaws, table saws, jointers, planers

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).