Full CV

CONTACT

Mailing address
227 Rabbitt Patch Drive
Arbovale, WV 24915

(681)776-2224
jafroth@gmail.com

Technical CV

CONTACT

Mailing address
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jafroth@gmail.com

EDUCATION

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

EXPERIENCE

Scientific Data Analyst, Green Bank Observatory
Green Bank WV
May 2023 - Present

Student Researcher, Smith College Physics Department
Northampton MA
September 2019 - September 2021

Hardware Engineering Intern, HP, Inc.
Corvallis OR
Summer 2019

Electrical Engineering Intern, HP, Inc.
Corvallis OR
Summer 2018

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

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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.
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Using Arduino to Teach Mechatronics
Apprenticeships in Science and Engineering, Oregon State University, Corvallis OR
research description here
Research Advisor: Dr. Burak Sencer

WORKSHOPS

Synthesis Imaging Workshop
National Radio Astronomy Observatory, Socorro NM
May 2024

Single Dish Summer School - Presenter, Observing Group Leader
Green Bank Observatory, Green Bank WV
dates here

Green Bank Telescope Observer Training Workshop - Presenter, Observing Group Leader
Green Bank Observatory, Green Bank WV
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AstroTech Astronomical Instrumentation Summer School
University of California, Berkeley CA
August 2022
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Green Bank Observatory, Green Bank WV
June 2022
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that National High Magnetic Field Lab summer school I did
details here

COURSEWORK

Course highlights
Engineering mechanics, circuit theory, thermodynamics
Physics through quantum mechanics
Mathematics through multivariate calculus
Introductory chemistry
Astronomy including telescopes and astrophysics

Observational Techniques in Optical and Infrared Astronomy
Programmed data reduction pipeline in Python. Observed open star cluster M34 using 16" Schmidt-Cassegrain telescope. Produced BVRI images, color-magnitude diagrams, and isochrone fits.

Astronomical Data Science
Demonstrated statistical concepts through collaborative Python programming in Jupyter notebooks and Google Colab. Independent projects using real-world data with scientific-style papers and presentations. Focus on best practices in written and visual communication of data.
Project titles:
- Investigation of Links Between Brightness and Orbits in Comets
- Exoplanet Distributions in Systems of Massive Host Stars
- Redesign of Decadal Survey Figure: Impacts of Well-Organized Data Archives

Astronomy & Public Policy
Practiced written and verbal science communication and outreach on topics including light pollution, contested observatory construction sites, and climate change.

Engineering Seminar: Remote Sensing
Wrote technical memos and frequently presented on published scientific articles. Designed and carried out a

ground-penetrating radar survey project concluding with presentation and formal scientific report.

Foucault Pendulum Repair (Physics)
Self-designed project to repair and possibly redesign non-functioning drive mechanism for Foucault pendulum displayed on Smith College campus. Will additionally develop display materials and sample lesson plans to increase awareness and educational impact of the Foucault pendulum.

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).

Outreach CV

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OUTREACH

Letters to a Pre-Scientist

Family Science Day

2 years of GSI and PING mentorship

GBT tours

County Science Fair Judging

Robotics Competition Judging

star parties (include Mission2Mars Canaan Star Party!)

Eclipse party

2023 Introduce A Girl To Engineering Day (IGTED), Volunteer Northampton, MA
Worked directly with parents and middle school girls to facilitate science activities. Child-safety certification.

2018, 2019 Girl Scout Brownie/Junior Robotics Badge Day, Organizer, Volunteer Corvallis, OR
Developed hands-on physics, programming, and design activities within published requirements for completion
of Robotics Badges. Taught physics to Girl Scouts aged 7-12 through building simple machines and catapults.

LEADERSHIP

2022 Smith College Jewish Community, Co-Chair Northampton, MA
Planned and led religious services hosted on campus. Organized and led a special "Sensory Shabbat" designed
to center the needs and experiences of students with autism and other disabilities.

2019-23 Smith College Glee Club, Vice President, Business Manager Northampton, MA
Kept records of leadership meetings and reported rehearsal attendance to supervisors. Managed event logistics
including food, location, and cleanup. Provided assistance as needed to all students in the Smith College choirs.

2015-19 FIRST Robotics Competition Team 997, Co-Captain, Lead Programmer Corvallis, OR
Arranged and participated in outreach including visits to local schools, showcase events at county and state fairs, social media presence, and interviews with local newspapers. Trained and supervised new students while meeting programming project deadlines. Repaired and maintained robot at competitions under time pressure while representing the team to judges and peers. Coordinated all team meetings and leadership discussions. Implemented workflow changes to improve team culture surrounding stress management and mental health. Provided support and mentorship to other LGBTQIA+ students on the team.

2019 FIRST Force Robotics Scrimmage, Organizer, Pit Manager Corvallis, OR
Hosted over a dozen high school robotics teams in a showcase event open to the public. Planned logistics and
directed all event volunteers. Arranged local media coverage of the event. Organized and participated in event
setup and cleanup. Served as contact person for attendees needing assistance during the event.

2015, 2016 Benton Girl Scout Day Camp, Program Assistant Corvallis, OR
Supervised a dozen Girl Scouts aged 11-13 in a rural day camp setting with one night of overnight camping. Safely taught wilderness skills including whittling, fire starting, and knot-tying. Assisted other Program Assistants in teaching and leading songs and activities.

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SKILLS

Languages:\

- Proficiency in German\
- Limited studies in written and spoken Yiddish

Electronics:
Arduino, breadboard, soldering, printed circuit board design. Motors, sensors, LEDs.

Design:
3D printers, laser cutters, hand tools, power tools. Repair and maintenance of 3D printers. Computer-aided design (CAD) programs including Solidworks, AutoCAD, and Inventor.

Metal/wood:
Manual and CNC mills and lathes. Bandsaws, table saws, jointers, planers.

Software:
Python, IDL, Java, Arduino, Javascript, Jupyter, Github.

Equipment:
Microscopes, telescopes, oscilloscopes, voltmeters, function generators.

CERTIFICATIONS

Techincal Rope Rescue Operations
October 2024
Rope Rescue course, Safety Educators LLC

American Heart Association Basic Life Support Provider
Octber 2024
Advanced First Aid and CPR course, Safety Educators LLC

Green Bank Observatory Tour Bus Driver
August 2024
non-CDL certification to operate 12m buses on Observatory property

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