Colin Rush

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EDUCATION

Bachelor of Science in Computer Science and Engineering **August 2020–May 2025**
The Ohio State University, Columbus, Ohio | GPA: 3.987
Artificial Intelligence Specialization

Bachelor of Science in Astronomy and Astrophysics **May 2021–May 2025**
The Ohio State University, Columbus, Ohio | GPA: 3.987

EMPLOYMENT

Research Intern, Breakthrough Listen, Berkeley SETI Research Center, UC Berkeley **June 2024–August 2024**
Berkeley, California

- Designed Python software to increase SNR of Allen Telescope Array radio data using statistical spectral kurtosis estimators to separate and discard noisy man-made signals from astrophysical observations
- Tested effectiveness using real and simulated pulsar data to fine-tune high-kurtosis limit and statistical parameters of replacement data
- Researched and shared this method's application in detection of extraterrestrial life, attended Breakthrough Discuss 2024

REU Intern, Arecibo Observatory **May 2023–August 2023**
Arecibo, Puerto Rico

- Developed aircraft detection software in Python and installed ADS-B aircraft antenna for CARLA, an autonomous lidar instrument for atmospheric observation
    - Collected and analyzed aircraft ADS-B messages to track aircraft position and automate laser shutdown according to FAA guidelines for infrared lasers
    - Performed in-field and simulated testing of laser transmission systems to validate legal regulatory requirements
    - Built real-time UI interface for remote users to track and monitor laser transmission and nearby aircraft, enabling oversight of on-site conditions and system efficacy
- Work published and presented at SPIE 2024, DOI: 10.1117/12.3002890

Teaching Assistant (Data Structures and Algorithms), OSU CSE Department **January 2023–May 2025**
Columbus, Ohio

- Assisted lectures, held office hours, graded assignments in flipped classroom model for OSU CSE2331
- Designed notes and review sessions to cover course content in data structures, algorithm analysis, and NP-Completeness

AmeriCorps Assistant Crew Lead, Rocky Mountain Youth Corps **June 2021–August 2022**
Steamboat Springs, Colorado

- Led crew of 8 to design and construct pulley system for alpine staircase construction at 14,000 feet, including logistics, budgeting, and safety protocols

RESEARCH & EXTRACURRICULARS

Scratify (CSE Capstone Project), Developer and Testing Lead **January 2025–May 2025**

- Developed JavaScript, React, and HTML/CSS web app using Spotify and Gemini APIs to generate custom playlists based on user data and image/text input
- Lead unit and UI testing using PyTest and Storybook, validating OAuth security, user experience, and backend behaviors

OSU Department of Physics, Research Assistant **August 2022–August 2023**

- Analyzed the behavior of information loss in quantum circuits using probabilistic modelling and Qiskit with Dr. Kyle Kawagoe

- Simulated quantum circuits, layered networks of quantum gates, using OOP to determine evolution of quantum state topology through a circuit

OSU Department of Astronomy, Research Assistant **September 2022–May 2023**

- Automated the creation of optical images of nearby galaxies, utilizing SDSS and SAOImageDS9 with PHANGS
- Worked with a team of student researchers in collaborative problem solving in data collection and project management

Engineers Without Borders, Project Lead **August 2021–December 2022**

- Designed and implemented improvements for the Weinland Park Tree Nursey, including rainwater collection and raised beds

CONFERENCES & PRESENTATIONS

- **SPIE Photonics West 2024,** January 2024
  Presented poster on autonomous aircraft detection for infrared LIDAR systems, 10.1117/12.3002890
- **Breakthrough Discuss,** July 2025
  Attended discussions on SETI, big data and AI, space mission concepts, and astrobiology
- **Penn State SETI Symposium,** August 2025
  Will present poster on spectral kurtosis research from internship at Breakthrough Listen

SKILLS & COURSEWORK

Technical Skills: Python (NumPy, Pandas, SciPy, PyTorch), HTML, Linux, C, Java, JavaScript, TensorFlow, LaTeX, CUDA, LTSpice

Relevant Coursework: Classical Mechanics, Quantum Mechanics, Differential Equations, Linear Algebra, Algorithm Design and Complexity Analysis, Digital Logic, General Astrophysics, Neural Networks, Computer Networking