Colton L. Ashcraft

Applied Physics & Applied Mathematics Student

Profile

Motivated Applied Physics and Applied Mathematics student with experience in quantum materials research, STEM education, and peer leadership. Skilled in scientific computing, data analysis, and hands-on instrumentation, with demonstrated success in tutoring, mentoring, and leading academic support teams. Committed to community-engaged STEM outreach and interdisciplinary problem-solving.

Contact

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Technical Skills

Programming & Computing:
• C++
• Python
• Linux environment
• SSH remote computing
• CERN ROOT, scientific computing tools

Scientific & Research Skills:
• STM exposure
• MBE exposure
• PMT testing and detector instrumentation
• Data analysis, signal processing, numerical methods
• Research writing, publication-level editing

Education

Ohio University, Athens, Ohio
Bachelor of Science (B.S.) — August 2022 – May 2026
Majors: Applied Physics, Applied Mathematics
Minor: Computer Science
Cumulative GPA: 3.26

Research Experience

Nanoscale & Quantum Phenomena Institute (NQPI) — Athens, Ohio
Quantum Mechanics Research Assistant | May 2024– Present

- Contributed to the creation of a major publication in quantum physics.
- Supported PhD researchers with experimental and theoretical tasks.
- Gained hands-on experience with Scanning Tunneling Microscopy (STM).
- Obtained practical exposure to Molecular Beam Epitaxy (MBE).
- Conducted detailed analysis in quantum mechanics and nanoscale systems.
- Collaborated in a team-based research environment, strengthening communication and scientific writing.
- Produced technical reports and research presentations.
- Applied advanced problem-solving skills to overcome research challenges.

Thomas Jefferson National Accelerator Facility — Newport News, Virginia
Nuclear Physics Research Analyst | May 2023 – May 2024

- Analyzed and tested 220 photomultiplier tubes (PMTs) for the CLAS12 CEBAF 12 GeV detector.
- Gained proficiency in C++, Linux, and cluster computing using Jefferson Lab's ifarm.
- Utilized CERN ROOT for signal/data analysis.
- Performed RF calibration procedures for the accelerator facility.
- Evaluated and tested PMT voltage dividers.
- Developed strong professional communication skills and grew through independent living and scheduling.
- Networked with scientists, faculty, and laboratory staff.
- Strengthened understanding of experimental and nuclear physics.

Teaching Experience

Ohio University STEM Academy — Athens, Ohio
Student Supervisor | August 2024 – Present

- Supervised tutoring spaces and managed academic support facilities.
- Trained new tutors and supported their professional development.
- Conducted observations of tutoring sessions and provided structured feedback.
- Collaborated with faculty and staff to address student needs and promote AAC services.
- Delivered personalized 1:1 instruction in Physics and Mathematics.

Ohio University Academic Achievement Center — Athens, Ohio
Physics and Mathematics Lead Tutor | January 2022 – August 2024

- Promoted to Lead Tutor in August 2022.
- Provided individualized Physics and Math tutoring, improving student comprehension and performance.
- Solidified mastery of advanced physics concepts through teaching.

Ohio University – Athens, Ohio
The Maker Movement and STEAMy Projects (HC2905) Teaching Assistant | August 2025 - December 2025

- Guided students from diverse backgrounds through hands-on STEAM projects, providing support in 3D modeling/printing, circuit design, coding, and iterative problem-solving.
- Assisted learners in developing maker-centered skills by teaching tool use, troubleshooting prototypes, and encouraging creativity, collaboration, and independent design thinking.

Leadership and Campus Involvement

Ohio University Honors Program — Athens, Ohio | August 2022 – Present

- Engaged in advanced seminars and leadership development.
- Enhanced skills in communication, networking, and scholarly reflection.
- Participated in research- and creativity-focused workshops.

Ohio University Bobcats for Discovery (OUBFD) — Athens, Ohio
Co-Founder, Treasurer (2022–2024), President (2024–Present)

- Co-created a community-engaged STEAM outreach organization, partnering with the Ohio Valley Museum of Discovery.
- Coordinated volunteers and led STEAM programming at events and workshops.
- Managed organizational operations, budgeting, and leadership initiatives.

Honors and Awards

- **Student Research Expo Presenter,** | Athens, Ohio — April 2024
- **Experiential Learning Award,** | Athens, Ohio — May 2023
- **Ohio Excellence Scholarship,** | Athens, Ohio — August 2022

Relevant Coursework

Physics:
Mechanics • Thermal Physics • Contemporary Physics • Electricity & Magnetism I & II (upcoming) • Electronics Lab • General Physics I & II • Physics Seminar • Photons &Electrons Lab • Photons & Nucleons Lab • Quantum Mechanics (IP)
Mathematics:
Calculus I–III • Differential Equations • Linear Algebra • Fourier Analysis & PDEs • Numerical Methods • Discrete Modeling
• Statistics & Probability • Advanced Calculus (IP) • Mathematical Statistics (IP)
Computer Science:
• Fundamentals of Computing • Introduction to Computer Science I & II • Discrete Structures • Introduction to Electrical Engineering • Data Structures (upcoming) • Professional & Ethical Computing

Projects and Research Output

GitHub Portfolio: https://github.com/cashcraf?tab=repositories
Research Posters

- **Mn_4N Magnetic & Lattice Study Poster**
  https://github.com/cashcraf/Mn4N_Poster/blob/main/Poster_FINAL.pdf
- **PMT Characterization Poster** https://github.com/cashcraf/PMT_Poster/blob/main/Poster_FINAL.pdf