

Carlton G.G. Passley

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Overview

Summary: A materials scientist with research experience at Argonne National Laboratory, Caltech, and Princeton Plasma Physics Laboratory. Hands-on work spans thin-film optics, surface characterization, and plasma diagnostics, with results including a 5% broadband reflectance antireflective coating for GaAs solar cells, and a power supply divider for an electron energy diagnostic.

Key Skills: Ellipsometry, AFM, SEM, Profilometry, Nanoindentation, Python, MATLAB, Circuit Design, CAD, Peer Instruction

Education

Delaware State University, Bachelor of Science - Physics, GPA: 3.80/4.0 - Summa Cum Laude **Aug 2022 – Dec 2025**

Relevant Coursework: Materials Science Engineering, Thermal Physics, Chemistry, Engineering Mechanics, Optics and Photonics, Multi-variable Calculus, Linear Algebra, Electricity and Magnetism

President's List: 3 semesters

Dean's List: 4 semesters

Presentations

Presenter - NSBP-NSHP Joint Conference, National Society of Black/Hispanic Physicists - San Jose, CA **Nov 2025**

- Poster: *Low-Cost Antireflective Coatings for Space-Based Solar Power*

Presenter - DSU Research Day, Delaware State University - Dover, DE **Apr 2025**

- Talk: *Power Supply Divider for an Electron Energy Analyzer for a Magnetic Reconnection Experiment*

Presenter - Bulletin of the AAS Vol. 57, American Astronomical Society - National Harbor, MD **Jan 2025**

- Poster: *Power Supply Divider for an Electron Energy Analyzer for a Magnetic Reconnection Experiment* - Presented by Carlton Passley - [Bibcode: 2025AAS...24515704P](#)

Coauthor - Bulletin of the APS, American Physical Society - Atlanta, GA **Oct 2024**

- Poster: *Preliminary Measurements of Non-Maxwellian Electron Energy Distributions During Magnetic Reconnection in a Laboratory Plasma* - Presented by Joshua Pawlak - [Abstract Link](#)

Presenter - NACtober, National Astronomy Consortium - Washington D.C., MD **Oct 2024**

- Talk: *Power Supply Divider for an Electron Energy Analyzer for a Magnetic Reconnection Experiment*

Presenter - Bulletin of the AAS Vol. 56, American Astronomical Society - New Orleans, LA **Feb 2024**

- Poster: *Electron Energy Analyzer for Magnetic Reconnection Experiment* - Presented by Carlton Passley - [Bibcode: 2024AAS...24336218P](#)

Coauthor - AGU Fall Meeting, American Geophysical Union - San Francisco, CA **Dec 2023**

- Poster: *MMS statistical analysis of magnetic structures in turbulent magnetotail* - Presented by Rachel Wang - [Bibcode: 2023AGUFMSM32B..02W](#)

Coauthor - APS Division of Plasma Physics Meeting, American Physical Society - Denver, CO **Oct 2023**

- Poster: *MMS statistical analysis of magnetic structures in turbulent magnetotail* - Presented by Rachel Wang - [Bibcode: 2023APS..DPPTO4002W](#)

Presenter - NACtober, National Astronomy Consortium - Washington D.C., MD **Oct 2023**

- Talk: *Electron Energy Analyzer for Magnetic Reconnection Experiment*

Experience

UVA Scully Group, Intern, University of Virginia – Charlottesville, VA **Jun 2026 - Present**

- Investigating corrosion mechanisms on Molten Salt Reactor structural alloys to improve material viability for reactor deployment
- Preparing and polishing electrode samples for electrochemical corrosion testing

SIP Argonne, Intern, Seasonal Internship Program at Argonne National Laboratory – Lemont, IL **Jan 2026 - May 2026**

- Used ultra-fast boring on metals to reduce the wear on, and cost of, drills in geothermal energy.
- Polished and characterized banded cross sections with scanning electron microscopy, profilometry, and nanoindentation.

Caltech Atwater Group SURF Fellow, Intern, California Institute of Technology – Pasadena, CA **Jun 2025 - Aug 2025**

- Lowered broadband GaAs reflectance to 5% by synthesizing and characterizing low-cost sol-gel/PMMA antireflective coatings (AFM, ellipsometry, R/T), and optimized performance via Transfer Matrix Method to support the Space Solar Power Project.

Princeton Plasma Physics Laboratory, Intern, Princeton University – Princeton, NJ **Jun 2024 - Aug 2024**

- Proposed, designed and built a Power Supply Divider enabling electron energy analyzer operations in a magnetic reconnection experiment, advancing study of non-thermal particle acceleration.

Princeton Plasma Physics Laboratory, Intern, Princeton University – Princeton, NJ **Jun 2023 - Jul 2023**

- *Project 1* - Resolved probe-to-circuit failures by redesigning circuitry with schematics, enabling diagnostic functionality.
- *Project 2* - Identified magnetic structures in Earth's magnetotail by analyzing NASA MMS data in Python for a gross study.

Ferroelectric Materials Laboratory, Research Assistant , <i>Delaware State University – Dover, DE</i>	Aug 2025 - Dec 2025
Conducted literature review, COMSOL simulations, and sputtering-based fabrication of ferroelectric HfZrOx thin films to optimize polarization switching for low-power computing applications.	
Mechanical Design Laboratory, Research Assistant , <i>Delaware State University – Dover, DE</i>	Aug 2024 - May 2025
Prototyped a handheld N₂O spectroscopy device by designing in Autodesk Inventor and executing optics/laser alignment with resin/filament 3-D printed parts to support atmospheric sensing.	
Theoretical Physics Laboratory, Research Assistant , <i>Delaware State University – Dover, DE</i>	Jan 2023 - May 2024
Investigated many-body quantum behavior by programming and solving eigenvalue bound-state problems for merging Rydberg atoms in MATLAB, generating model predictions for cold-gas systems.	

Teaching Experience

Physics & Math Tutor , <i>Delaware State University – Dover, DE</i>	Jan 2023 - Dec 2025
Elevated peer outcomes by delivering CRLA-trained support to 100+ students across upper-division physics (Quantum Mechanics, Thermal Physics, E&M) and math through multivariable calculus.	
Math Methods in Physics, Teaching Assistant , <i>Delaware State University – Dover, DE</i>	Aug 2025 - Dec 2025
Led weekly office hours, covering current course topics with study guides, practice tests, and interactive websites (e.g. Kahoot).	

Awards

Patti Grace Smith Fellowship Finalist , <i>Patti Grace Smith Fellowship</i>	Nov 2025
Highly selective fellowship that connects Black undergraduates with paid aerospace internships, one-on-one executive mentors, and career development within the commercial space sector.	
TEAM-UP Together Scholar , <i>TEAM-UP Together Scholarship Program</i>	Jul 2025
The TEAM-UP Together Scholarship Program, established in 2022, provides financial support to reduce barriers that can prevent students from pursuing or completing degrees in physics and astronomy. - TEAM-UP Together Website	
CRLA Level II Certification , <i>Delaware State University - Dover, DE</i>	Dec 2024
The highest tutoring certification within the College Reading & Learning Association, earned through weekly trainings over two semesters.	
NAC Scholar , <i>National Astronomy Consortium</i>	Jun 2023 & Jun 2024
Selected for a competitive program offering research opportunities, mentorship and a national network for underrepresented STEM students. Funded by the National Radio Astronomy Observatory (NRAO).	
Inspire Scholarship , <i>Delaware State University - Dover, DE</i>	Aug 2022
Delaware State University offers a 4-year, full tuition Inspire Scholarship available to qualifying Delaware high school graduates who enroll at Delaware State University in the fall semester right after high school graduation.	

Leadership

Social Committee President , <i>Delaware State University Tutorial Center - Dover, DE</i>	Jan 2024 - Dec 2025
Cultivated tutor community by planning and hosting over 40 events, from Game days to Hershey Park Trips, strengthening retention and morale.	
Boy Scouts of America , <i>Eagle Scout - Dover, DE</i>	Aug 2010 - Oct 2021
Increased recycling rates and future-proofed a local church by designing and implementing two multi-stream receptacles as an Eagle project.	