

Grace Daja

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA

May 2028

Bachelor of Science, Physics with Astrophysics track

GPA: 3.50

Liberty High School, Bethlehem, PA

June 2024

High School Diploma

GPA: 4.83

RESEARCH EXPERIENCE

Physics Department, Carnegie Mellon University

March 2025 - Present

Undergraduate Researcher, P.I. Dr. Antonella Palmese

Massive Binary Black Hole Systems (MBBH)

- Analyze variable objects reported to the Transient Name Server (TNS) from Dark Energy Spectroscopic Instrument (DESI) to identify the unique spectral signature of MBBH targets
- Cross-match DESI spectra with corresponding spectra from the Sloan Digital Sky Survey (SDSS) to search for broad line shifts and evolutions
- Utilize Zwicky Transient Facility (ZTF) lightcurves to identify possible MBBH periodicity

Division of Physics, Mathematics, and Astronomy, Caltech

June 2026 - Present

Summer Undergraduate Research Fellowship, P.I. Matthew Graham

Hunting for the Most Extreme Nuclear Transients

- Characterize ZTF lightcurves with rapid rise time and power law decay
- Develop and train classification models using Hidden Markov Models (HMMs) and Generalized Autoregressive Conditional Heteroskedasticity (GARCH) time-series analysis
- Analyze lightcurve data from the past 50 years for evidence of extreme nuclear transient candidates

PUBLICATIONS

Gokul P. Srinivasaragavan, Dongyue Li, Xander J. Hall et al. “EP250827b/SN 2025wkm: An X-ray Flash-Supernova Powered by a Central Engine and Circumstellar Interaction” (Dec 11, 2025) e-Print: [2512.10239](https://arxiv.org/abs/2512.10239) [[astro-ph.HE](https://arxiv.org/archive/hep)] (available for pre-print; currently under review)

Grace Daja, Xander J. Hall, Ekaterine Dadiani, Antonella Palmese. “Discovering Massive Binary Black Hole Systems (MBBH)” (in progress)

CONFERENCES

Society of Physics Students National Physics and Astronomy Congress

October 2025

- Presented a research poster on massive binary black hole systems to a national audience
- Broadened CMU SPS Chapter connections and activities

CU*IP at Fermilab National Accelerator

January 2025

- Attended conference for undergraduate women and gender minorities in physics.
- Viewed presentations and talks on particle and high energy physics, grad school, and a poster session.

SKILLS

Programming: Python

Software: Fusion360, LaTeX

PROJECT EXPERIENCE

Black Holes First Year Seminar Course Project

March 2025

- Mapped the black hole mass vs galaxy stellar mass over various redshifts using Python.
- Plotted characteristic strain vs frequency over redshifts of black hole merger gravitational waves and cross plotted with LISA detectability curve.
- Utilized data from the Illustris and Illustris TNG Project simulations.

LEADERSHIP/SERVICE

Kiltie Band

October 2025 - Present

Vice President of Marching Band

- Coordinate with other officers for rehearsal and game day logistics
- Disseminate information to the band at large
- Manage and maintain active member database including uniform and instrument distribution and organization

Society Of Physics Students (SPS)

September 2024 - Present

External Events Chair Transitioning to Vice President

- Coordinate events outside of normal SPS meetings such as fundraising events and assisting with the SPS journal club
- Initiate cross-organization interactions and events with local universities
- Arrange trips to local Pittsburgh attractions

Physics Steering Committee

April 2025 - Present

Sophomore Representative Transitioning to Junior Representative

- Act as a representative of the physics department class of 2028
- Liaison between students and department leadership (Department Head and Director of Undergraduate Affairs)
- Provide critical communication and insight on the student perspective on the use of department spaces, the metacurricular program, and undergraduate research

WORK EXPERIENCE

Teaching Assistant Assistant (TAA), CMU

September 2025 - Present

- Hold bi weekly recitations and assist graduate student TAs in Physics I for Science Students
- Engage and enable students in group work on complex physical problems
- Teach physical concepts and assist understanding during eventing help sessions

MEMBERSHIP/ACTIVITIES

Physics Steering Committee

(2025 - Present)

American Physical Society

(2024 - Present)

Society of Physics Students (SPS)

(2024 - Present)

Gender Minorities and Women in Physics

(2024 - Present)

Marching Band

(2017 - Present)

Spirit Racing Systems Buggy

(2024 - 2025)

HONORS/AWARDS/GRANTS

Dean's List

(2024, 2025, 2026)

SPS Underserved Student Travel Award

(2025)