# Elijah E. Mullens

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## EDUCATION

August 2022 - **Cornell University**
**Ph.D., Astronomy and Space Sciences**
**Thesis Title**
*Cloudy with a chance of Silicates: An Exploration of Exoplanet Aerosols and Weather*
**Thesis Advisor**
Dr. Nikole Lewis (nkl@cornell.edu)
**Master's Degree Received November 2024**

August 2017 – May 2021 **University of Florida**
*Graduated Cum Laude, Cumulative GPA 3.88*
**Bachelor of Science, Mathematics**
*Graduated Cum Laude, Major GPA 3.914*
**Bachelor of Science, Physics**
*Graduated Cum Laude, Major GPA 3.993*
**Bachelor of Science, Astrophysics**
*Graduated Cum Laude, Major GPA 3.993*
**Minor, East Asian Languages and Literatures – Japanese**
*Minor GPA: 3.596*

October 2019 – August 2020 **Nagoya University (NUPACE Program)**
**Certificate of Completion**
*Exchange Program, Concentration in Physics and Japanese*

2017 **Tallahassee Community College / Florida State University**
**Associate of Arts**
*Dual-Enrollment*

## HONORS AND AWARDS

**Honors:** Dean's List, President's Honor Roll (*University of Florida)*

**Scholarships:**
2017 – 2021 Presidential Scholarship, *University of Florida*
2017 – 2021 Florida Bright Futures Scholarship Academic Scholars Award
2019 – 2020 JASSO Scholarship, *Nagoya University*

**Fellowships:**
2022 – 2023 Deans Excellence Fellowship, *Cornell University*
2023 – NSF GRFP, Grant No. 2139899

**Grants:**

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| 2023 | Cornell University Conference Grant (for PP7) |
| 2024 | Cornell University Conference Grant (for AAS243) |
| 2025 | Cornell University Research Travel Grant (for NASA internship) |

**Awards:**

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| 2025 | Cranson W. and Edna B. Shelly Award – Outstanding Teaching Award |

## SELECTED PROPOSALS AND PUBLICATIONS

**PI Proposals:**

JWST Cycle 4 GO (ID 7686)

*Brown Dwarf Broiler: Probing Chemical Quenching and Heat Redistribution in a Highly-Eccentric Brown Dwarf* (PI: Elijah Mullens)

JWST Cycle 4 GO (ID 8309)

*It's (poly)Morphin' Time! Solving the quartz quandary of WASP-17b* (PI: Elijah Mullens)

Cornell Chronicle Article on JWST Cycle 4 PI-ed Proposals

**Publications:**

Mullens et al 2023

*Characterizing the 3D Structure of Molecular Cloud Envelopes in the Cloud Factory Simulations'* ApJ 966:127

Mullens et al 2024

*Implementation of Aerosol Mie Scattering in POSEIDON with Application to the Hot Jupiter HD 189733 b's Transmission, Emission, and Reflected Light Spectrum'* ApJ, 977:105

Mullens et al 2025

*Life after Death: Europa in the evolving habitable zone of a Red Sun* MNRAS, 540:1

Space Article

Universe Today Article

Mullens & Lewis 2025

*Silicate Sundogs: Probing the Effects of Grain Directionality in Exoplanet Observations* ApJL, 988:L43

Cornell Chronicle Article

**Co-authored Publications:**

Grant et al 2023

*JWST-TST DREAMS: Quartz Clouds in the Atmosphere of WASP-17b'* ApJL, 956:L32

Press Release

Valentine et al 2024

*JWST-TST DREAMS: Nonuniform Dayside Emission for WASP-17b from MIRI/LRS'* AJ 168:123

Gressier et al 2025

*JWST-TST DREAMS: A Supersolar Metallicity in WASP-17 b's Dayside Atmosphere from NIRISS SOSS Eclipse Spectroscopy* AJ 169:57

Louie et al 2025

*JWST-TST DREAMS: A Precise Water Abundance for Hot Jupiter WASP-17b from the NIRISS SOSS Transmission Spectrum'* AJ, 169:86

## WORK AND RELEVANT EXPERIENCE

June 2025 – August 2025
**NASA Goddard Space Flight Center**
Intern (PI: Sarah Moran)
*Experimental and Modeling Investigation of Exoplanet Cloud Properties*

August 2024 – May 2025
**Cornell University Astronomy Department**
Teaching Assistant
- ASTRO 1195 – Observational Astronomy
  - Smaller class (30 students). Held night labs, graded homework, and taught a few guest lectures.
- ASTRO 1102 (Head – TA) – Our Solar System
  - Large class (130 students). Was in charge of TAs with multiple duties such as: attending lecture, holding office hours, developing material for discussion section, organizing TA duties.

June 2022 – August 2022
**Space Telescope Science Institute**
*Space Astronomy Summer Program Intern*
- Worked on a project titled 'Unveiling the Nature of Diffuse Interstellar Envelopes Around Dense Star-forming Clouds' (PI: Catherine Zucker)
- Developed a pipeline to compare interstellar cloud simulations to observations, gave a presentation at the 2022 SASP Symposium, will give a poster presentation at AAS 241 and Protostars and Planets VII. Resulting paper accepted for publication in ApJ.

December 2021 – June 2022
**Challenger Learning Center of Tallahassee**
*Planetarium Instructor*
- Created planetarium shows using Digistar 3, runs planetarium shows, and prepares and presents the monthly 'Monthly Skies Over Tallahassee' and other educational pre-shows ('Monthly Astronomy Learning Topic', 'Space News', 'Monthly Solar System Object') live

2019 – 2020
**English Camp Tutor**
- Organized by Meitetsu World Travels Inc. Conducted at Nagoya University
- Led and organized group activities for over 1,000 children
- Gave presentation on home country and taught basic math

October 2021 – June 2022
**Volunteer Research Assistant**
*Nagoya University, Department of Physics*
- Assistant to Professor Hiroshi Kobayashi on the origin of planetary systems. Achieved an understanding on creating orbital simulations; creating a comprehensive model for planet formation and Galilean moon formation; and modelling post-main sequence planetary system evolution (both compositional and orbital) and second-generation planetary formation around white dwarfs.

August 2020 – December 2020
**Undergraduate Researcher**
*University of Florida, Department of Astronomy*

- Contributed to Professor Charles Telesco's IMPS (Integrated Miniature Polarimeter and Spectrograph) project. Achieved an understanding of the instrument while learning further topics on polarimetry and astrobiology.

July 2019 – February 2020

**Individual Work**

*Nagoya University, Department of Physics*

- Further topics in Statistical Physics with Professor John Wojdylo, covering microcanonical and canonical formalism, quantum fluids, and mean field theory.

*Nagoya University, Department of Earth and Environmental Sciences*

- Further topics in Earth and Planetary Sciences with Professor Marc Humblet, research paper written on TESS and planetary detection methods.

*University of Florida, Department of Mathematics*

- Differential Geometry with Professor Luca Di Cerbo covering Do Carmo's *Differential Geometry of Curves and Surfaces*, with a presentation at the end.

## CERTIFICATES

December 2021–April 2021 — **Florida State University**
**Global Partners Certificate**
**Equity, Diversity, and Inclusion Certificate**

August 2021 – October 2021 — **Coursera**
**The University of Sydney: Data-driven Astronomy**

October 2019 – August 2020 — **NUPACE Program**
**Nagoya University: Certificate of Completion**
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## CONFERENCES

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|---|---|---|
| April 2023 | Protostars and Planets 7 | (*Poster presentation)* |
| January 2023 | AAS 241 | (*iPoster presentation)* |
| January 2024 | AAS 243 | (*iPoster presentation)* |
| June 2024 | AbGradCon 2024 | (*Organizer + Poster presentation)* |
| June 2024 | OPAG | (*Lighting Talk + Poster presentation)* |
| July 2024 | ERES | (*Accepted Talk)* |
| November 2024 | Unearthing, Unseeing: Archaeology | (*Attendee*) |
| January 2025 | MLA 2025 | (*Attendee*) |
| June 2025 | AAS 246 | (*Lab Astro Workshop Lighting Talk + iPoster presentation)* |
| July 2025 | OWL 2025 | *(Attendee w/ full funding)* |
| January 2026 | MLA 2026 | *(Accepted Talk)* |

## LANGUAGES

- English *(Native)*
- Japanese *(JLPT N3 level, lived in Japan for six months, 5 semesters taken)*

## ORGANIZATIONAL MEMBERSHIP/VOLUNTEER WORK

August 2024 – August 2025 — **Graduate Mentor**
To: Isabella Huckabee

September 2023 – May 2024 — **GRASHOPR**
Graduate Student School Outreach Program.

August 2024 – **Undergraduate Mentor**
To: Ian Branigan

June 2023 – **Cornell University Astronomy Department**
Two outreach events: middle school field trip and annual 4-H event

February 2022 – August 2022 **FSU Astronomy Club**
Helped found the club and organize events at the FSU observatory for both high schoolers and college students. Helped set up the observatory for undergraduate astronomy labs.

February 2022 – August 2022 **Sea-to-See Program**
Marine biology outreach program. Helped collect and take care of marine specimens from beaches in hometown. Helped set-up and run booths at local STEAM expos with marine specimen showcases.

November 2021 – August 2022 **Challenger Learning Center of Tallahassee**
Volunteered at the James Webb Space Telescope (JWST) Pre-Launch Party.

September 2021 – August 2022 **Tallahassee Astronomical Society**
Helped set up and facilitate demonstrations using sun-filler telescopes at the JWST Pre-Launch Party.

August 2021 – August 2022 **Astronomers for Planet Earth**

August 2021 – August 2022 **Tallahassee Scientific Society**
Ran and organized a booth with multiple physical science demonstrations (aimed at 3rd graders) for the 10th Annual Tallahassee Science Fair. Helped organize local science fairs. Volunteered as a science fair judge at the Tallahassee School of Math and Science's science fair, and the Capital Regional Science and Engineering Fair.

August 2021 – August 2022 **oSTEM**
*oSTEM Global Chapter*

August 2019 – February 2020 **名大セクマイサークル『雨玉』**
Circle at Nagoya University "Ametama"
*Nagoya University*

August 2019 – February 2020 **Language Exchange Club**
*Nagoya University*

August 2019 – February 2020 **留学サークル**
Foreign Students Club
*Nagoya University*

August 2018 – May 2019 **oSTEM**
Non-profit professional association
*University of Florida*

August 2017 – May 2018 **J-Club**
Japanese Language and Culture Club
*University of Florida*

August 2017 – May 2018 | **Model UN**
GatorMUN 2018
*University of Florida*

## REFERENCES

**Nikole Lewis**
Associate Professor
*Cornell University, Department of Astronomy*
Nikole.lewis@cornell.edu

**Catherine Zucker**
Astrophysicist
*Smithsonian Astrophysical Observatory*
Catherine.Zucker@cfa.harvard.edu

**John Andrew Wojdylo**
Designated Professor (G30)
*Nagoya University, Department of Physics*
*Solid State Theory Laboratory (Condensed-Matter Theory Group)*
John.wojdylo@s.phy.nagoya-u.ac.jp

**Bonnie Halsell**
Office Manager
*Challenger Learning Center, Tallahassee*
bhalsell@challengertlh.com