**Elijah E. Mullens**

**Department of Astronomy and Carl Sagan Institute, Cornell University,**

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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](mailto:nkl@cornell.edu))

**Master’s Degree Received November 2024**

August 2017 – **University of Florida**

May 2021*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 – **Nagoya University (NUPACE Program)**

August 2020 **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 – 2021Presidential Scholarship, *University of Florida*

2017 – 2021 Florida Bright Futures Scholarship Academic Scholars Award

2019 – 2020JASSO Scholarship, *Nagoya University*

**Fellowships:**

2022 – 2023 Deans Excellence Fellowship, *Cornell University*

2023 – NSF GRFP, Grant No. 2139899

**Grants:**

2023Cornell University Conference Grant (for PP7)

2024 Cornell University Conference Grant (for AAS243)

2025 Cornell University Research Travel Grant (for NASA internship)

**Awards:**

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](https://news.cornell.edu/stories/2025/06/cornell-astronomers-win-time-james-webb-space-telescope)

**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](https://www.space.com/astronomy/when-the-sun-dies-could-life-survive-on-the-jupiter-ocean-moon-europa)

[Universe Today Article](https://www.universetoday.com/articles/will-europa-become-a-habitable-world-when-the-sun-becomes-a-red-giant)

Mullens & Lewis 2025

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

[Cornell Chronicle Article](https://news.cornell.edu/stories/2025/07/sun-dogs-other-celestial-effects-could-appear-alien-skies)

**Co-authored Publications:**

Grant et al 2023

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

[Press Release](https://www.nasa.gov/missions/webb/webb-detects-tiny-quartz-crystals-in-the-clouds-of-a-hot-gas-giant/)

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 – **NASA Goddard Space Flight Center**

August 2025 Intern (PI: Sarah Moran)

*Experimental and Modeling Investigation of Exoplanet Cloud Properties*

August 2024 – **Cornell University Astronomy Department**

May 2025 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 – **Space Telescope Science Institute**

August 2022 *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 – **Challenger Learning Center of Tallahassee**

June 2022*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 – **Volunteer Research Assistant**

June 2022*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 – **Undergraduate Researcher**

December 2020*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 – **Individual Work**

February 2020*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– **Florida State University**

April 2021 **Global Partners Certificate**

**Equity, Diversity, and Inclusion Certificate**

August 2021 – **Coursera**

October 2021 **The University of Sydney: Data-driven Astronomy**

October 2019 – **NUPACE Program**

August 2020 **Nagoya University: Certificate of Completion**

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**CONFERENCES**

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 – **Graduate Mentor**

August 2025 To: Isabella Huckabee

September 2023 **– GRASHOPR**

May 2024Graduate 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 **–** **FSU Astronomy Club**

August 2022Helped 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 **– Sea-to-See Program**

August 2022 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 **– Challenger Learning Center of Tallahassee**

August 2022 Volunteered at the James Webb Space Telescope (JWST) Pre-Launch Party.

September 2021 **–** **Tallahassee Astronomical Society**

August 2022 Helped set up and facilitate demonstrations using sun-filler telescopes at the JWST Pre-Launch Party.

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

August 2022

August 2021 **–** **Tallahassee Scientific Society**

August 2022 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 **–** **oSTEM**

August 2022 *oSTEM Global Chapter*

August 2019 **–** **名大セクマイサークル『雨玉』**

February 2020 Circle at Nagoya University “Ametama”

*Nagoya University*

August 2019 **–** **Language Exchange Club**

February 2020 *Nagoya University*

August 2019 **–** **留学サークル**

February 2020 Foreign Students Club

*Nagoya University*

August 2018 **–** **oSTEM**

May 2019 Non-profit professional association

*University of Florida*

August 2017 **–** **J-Club**

May 2018 Japanese Language and Culture Club

*University of Florida*

August 2017 **–** **Model UN**

May 2018 GatorMUN 2018

*University of Florida*

**REFERENCES**

**Nikole Lewis**

Associate Professor

*Cornell University, Department of Astronomy*

[Nikole.lewis@cornell.edu](mailto:Nikole.lewis@cornell.edu)

**Catherine Zucker**

Astrophysicist

*Smithsonian Astrophysical Observatory*

[Catherine.Zucker@cfa.harvard.edu](mailto: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](mailto:John.wojdylo@s.phy.nagoya-u.ac.jp)

**Bonnie Halsell**

Office Manager

*Challenger Learning Center, Tallahassee*

[bhalsell@challengertlh.com](mailto:bhalsell@challengertlh.com)