

# Aiden Zelakiewicz

CORNELL UNIVERSITY · CARL SAGAN INSTITUTE

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## Education

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### Cornell University

Ithaca, NY

ASTRONOMY PHD CANDIDATE; ADVISORS: LISA KALTENEGGER & DMITRY SAVRANSKY

Aug. 2023-PRESENT

- New York Space Grant Fellow (FA25)
- Graduate Teaching Assistant: Astronomy 1101 (FA23), Astronomy 1102 (SP24), Astronomy 1101 (FA24)
- Carl Sagan Institute researcher
- Astronomy Graduate Network (AGN) President

### The Ohio State University

Columbus, OH

BS IN ASTRONOMY & ASTROPHYSICS

Aug. 2019 - May 2023

- Graduated Summa Cum Laude | 3.92/4.0 GPA | Dean's List all semesters

## Research Projects

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### Modified Sampling Functions for Exoplanet Yield Modeling

Ithaca, NY

ADVISOR: DMITRY SAVRANSKY; CORNELL UNIVERSITY

Mar. 2025 - PRESENT

- Created planet population model to use confirmed exoplanets and synthetic planets in an **EXOSIMS** simulated universe.
- Used kernel density estimators and studied different bandwidth selection techniques for non-Gaussian orbital parameter distributions.

### Modern Earth Reflection Spectra Retrievals with the Habitable Worlds Observatory

Ithaca, NY

ADVISORS: LISA KALTENEGGER & DMITRY SAVRANSKY; CORNELL UNIVERSITY

Dec. 2024 - PRESENT

- Modeled Modern Earth reflection spectra as would be seen by the Habitable Worlds Observatory Exploratory Analytical Cases.
- Created synthetic spectra using **ExoPrime** atmosphere models, **POSEIDON** radiative transfer routines, and **coronagraph** observatory noise models.
- Modeled HWO coronagraph instrument and point spread function using **HCIPy**.

### UV Spectral Inventory of FKGM Stars

Ithaca, NY

ADVISOR: LISA KALTENEGGER; CORNELL UNIVERSITY

June 2024 - Dec. 2024

- Compared IUE and FUSE data to HST spectra for cool stars, showing IUE's inability to characterize these important objects.
- Created guidelines for which spectral types and HWO targets do not have sufficient observations.
- Implemented and benchmarked MUSCLES spectra into mission simulation package, **EXOSIMS**.

### Mapping NIR Extinction Towards the Galactic Center

Columbus, OH

ADVISORS: B. SCOTT GAUDI & SAMSON A. JOHNSON; THE OHIO STATE UNIVERSITY

May 2021 - May 2025

COLLABORATORS: GEOFFREY BRYDEN (NASA JPL), DAVID NATAF (UNIVERSITY OF IOWA)

- Created a near-infrared extinction and reddening maps using H- and K-band photometry from the UKIRT microlensing survey.
- Fitted the luminosity function of Red Clump stars and used the maps to analyze universal extinction laws.
- Publication outlining this work accepted to AJ; <https://doi.org/10.3847/1538-3881/ae0c0b>.

### Synthesizing and Detecting Technosignatures Using Generative Adversarial Networks

Berkeley, CA

ADVISOR: JOHN HOANG; UNIVERSITY OF CALIFORNIA, BERKELEY

June 2022 - Aug. 2022

- Built conditional bi-directional generative adversarial networks to synthesize and detect radio technosignatures from the Green Bank Telescope.
- Utilized GPUs and parallel processing to improve model training times on supercomputer clusters.
- Created synthetic data 100 times faster than traditional iterative methods used by Breakthrough Listen team on large datasets.

## Honors & Awards

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- May 2026 **Eleanor York Award**, Awarded to an Astronomy PHD student for community service and academic achievement. *Ithaca, NY*
- Mar. 2026 **GPSA Special Grant**, \$4,500 grant awarded to renovate the Department of Astronomy lounge. *Ithaca, NY*
- Sep. 2025 **KISS Travel Grant**, Travel award to attend the Hybrid Space-Ground Observatories Workshop. *Pasadena, CA*
- Jul. 2025 **New York Space Grant Fellowship**, Awarded the NASA NYSG Graduate Fellowship for Fall 2025. *Ithaca, NY*
- Nov. 2024 **STSci Travel Grant**, Travel award to attend the HWO Retrieval Workshop. *Baltimore, MD*
- Apr. 2024 **NSF GRFP Honorable Mention**, Honorable Mention in the 2024 National Sciences Foundation (NSF) Graduate Research Fellowship Program (GRFP) competition.
- Nov. 2022 **L. Earl Slusher Scholarship**, Awarded to an astronomy major who has shown exceptional promise for going on to graduate work in Astronomy, selected by the department chair among faculty-nominated students. *Columbus, OH*
- Dec. 2021 **Tuttle Scholarship**, Recognizes outstanding astronomy majors, nominated by faculty. *Columbus, OH*
- 2019-2023 **Dean's List (8 out of 8 semesters)**, The Ohio State University *Columbus, OH*

## Work Experience

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### Cornell University

GRADUATE RESEARCH ASSISTANT

*Ithaca, NY*

*Jan. 2025 - PRESENT*

- Working with Profs. Dmitry Savransky and Lisa Kaltenegger to model the Habitable Worlds Observatory
- Member of HWO High Energy Working Group

### Cornell University

GRADUATE TEACHING ASSISTANT

*Ithaca, NY*

*Aug. 2023 - Jan. 2025*

- TA for Astronomy 1101 (FA23 and FA24) and 1102 (SP24), leading two sections for each course.
- Student Evaluations are available upon request, but some highlights are listed below.
  - > "...it is clear that Aiden's goal is not simply to cram an assortment of knowledge into students, but rather to educate them on fundamental concepts and guide them toward an appreciation and application of those concepts."
  - > "[Aiden] was empathetic, understanding, engaging, funny, and genuinely made me interested in astronomy..."

### The Ohio State University

UNDERGRADUATE RESEARCHER

*Columbus, OH*

*May 2021 - Aug. 2023*

- Work with Drs. Samson A Johnson and B. Scott Gaudi to create near-infrared extinction and reddening maps towards the Galactic Center

### University of California, Berkeley

BERKELEY SETI RESEARCH CENTER REU INTERN

*Berkeley, CA*

*June 2022 - Aug. 2022*

- Worked with Dr. John Hoang to use neural networks to synthesize radio technosignature data.

### Park Place Cafe

WAITER

*Milwaukee, WI*

*May - Aug. of 2019 & 2020*

- Critical time management skills under high stress situations
- Communication and general people skills

## Publications

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### FIRST AUTHOR

1. **The effect of phase angle on biosignature detection with the Habitable Worlds Observatory** *In prep*  
**Zelakiewicz, A. S.**, Savransky, D., Kaltenegger, L., and Rocchetti, G. (In prep)
2. **Identifying Surface Degeneracies in Single-Visit Reflected Light Observations of Modern Earth using the Habitable Worlds Observatory** *May 2026*  
**Zelakiewicz, A. S.**, Mullens, E., Kaltenegger, L., and Savransky, D. 2026, JATIS **12**(4), 041009
3. **A Near-Infrared Extinction and Reddening Map toward the Galactic Bulge Using UKIRT** *Nov 2025*  
**Zelakiewicz, A. S.**, Johnson, S. A., Gaudi, B. S., et al. 2025, AJ, **170**, 328

## COAUTHOR

1. **Toward a hybrid ground-space exoplanet observatory: summary of Caltech Keck Institute for Space Studies (KISS) program** *In prep*  
Soliman, A., [...], **Zelakiewicz, A. S.**, et al. (In prep)
2. **Scientific Discovery Space for the Habitable Worlds Observatory** *In prep*  
Dressing, C., [...], **Zelakiewicz, A. S.**, et al. (In prep)
3. **HWO Target Stars and Systems: A Survey of Archival UV and X-ray Data** *Oct 2025*  
Peacock, S., [...], **Zelakiewicz, A. S.**, et al. 2025, AJ, **170**, 293
4. **Exploring the Use of Generative AI in the Search for Extraterrestrial Intelligence (SETI)** *Aug 2023*  
Hoang, J., Zheng, Z., and **Zelakiewicz, A. S.** 2023, arXiv:2308.13125

## Volunteering & Outreach

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### Cornell Department Astronomy Prospective Graduate Visit

*Ithaca, NY*

ORGANIZER

*Mar. 2024-2026*

- Served as liaison between prospective students, current graduate students, and department.
- Prepared schedules for prospective graduate students.

### Cornell Departments of Physics and Astronomy TA Training

*Ithaca, NY*

TA TRAINING FACILITATOR

*June - Aug 2024 & 2025*

- Lead incoming Astronomy TAs in best practices for how to best mentor their students.
- Instructed a lesson on Inclusive Pedagogy to provide future TAs the tools and strategies they need to create a healthy learning environment.

### Astronomy Camp

*Mt. Lemmon, AZ*

INSTRUCTOR AND COUNSELOR

*June. 2023 - 2025*

- Counselor and mentor for middle-high schoolers interested in astronomy and astrophysics.
- Instruct campers how to observe and operate the 24", 32", and 61" telescopes on Mt. Lemmon.
- Gave a public lecture on exoplanet detection methods.

### Polaris

*Columbus, OH*

UNDERGRADUATE MENTOR | MENTEE: ERIN BERNTHOLD

*Aug. 2022 - May. 2023*

- Support and foster a healthy environment to increase retention of underrepresented physics/astronomy students.
- Mentor for incoming underrepresented freshman and sophomore physics/astronomy majors.
- Creating and overseeing an intro level research project with mentee.

### Breakthrough Discuss Conference

*Santa Cruz, California*

FRONT DESK ASSISTANT

*June 2022*

- Assisted the Breakthrough Initiative team to check attendees in during the conference and administer COVID-19 tests.

### WestFest

*Columbus, OH*

VOLUNTEER

*Sep. 2021 & 2022*

- Free science outreach festival with a focus on sustainability.
- Created activity kits for use by attendees.

## Technical Skills

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**Languages** Python, C++, Mathematica, Bash, LaTeX, MATLAB

**Specialized Packages** emcee, PyTorch, TensorFlow, Keras, POSEIDON, EXOSIMS, HCIPy, synphot

**Technology and Packages** Git & GitHub, Visual Studio Code

## Presentations & Posters

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### INVITED

Oct. 2025 **Modeling Earth Twin Observations for the Habitable Worlds Observatory** *Madison, WI*  
Wisconsin Center for Origins Research (WiCOR) Special Seminar | University of Wisconsin-Madison

### ACADEMIC

May 2026 **Pinpointing Degeneracies in Retrievals of Modern Earth with the Habitable Worlds Observatory** *Madison, WI*  
**Zelakiewicz, A. S.**, Mullens, E., Kaltenecker, L., Savransky, D. | AbSciCon 2026

Mar. 2026 **Exoplanet Characterization in Reflected Light Using the Habitable Worlds Observatory** *Pasadena, CA*  
**Zelakiewicz, A. S.**, Kaltenecker, L., Savransky, D. | KISS Hybrid Space-Ground Observatories

Jan. 2023 **A Near-Infrared Extinction and Reddening Map Towards the Galactic Bulge Using UKIRT** *Seattle, WA*  
**Zelakiewicz, A. S.**, Johnson, S. A., Gaudi, B. S., Bryden G. | 241st American Astronomical Society Meeting

Nov. 2022 **A Near-Infrared Extinction and Reddening Map Towards the Galactic Bulge Using UKIRT** *Columbus, OH*  
**Zelakiewicz, A. S.**, Johnson, S. A., Gaudi, B. S., Bryden G. | Great Lake Exoplanet Area Meeting

Nov. 2022 **A Near-Infrared Extinction and Reddening Map Towards the Galactic Bulge Using UKIRT** *Columbus, OH*  
**Zelakiewicz, A. S.**, Johnson, S. A., Gaudi, B. S., Bryden G. | Autumn Undergraduate Research Festival

Aug. 2022 **Reverse-Engineering Anomalous Dynamic Spectra with Conditional Bi-Directional Generative Adversarial Networks** *Berkeley, CA*  
**Zelakiewicz, A. S.**, Hoang, J. | Berkeley SETI Research Center Symposium

Jul. 2021 **Near Infrared Extinction and Reddening Towards the Galactic Center** *Columbus, OH*  
**Zelakiewicz, A. S.**, Johnson, S. A., Gaudi, B. S. | Summer Undergraduate Research Program Symposium

### PUBLIC

May. 2026 **Photographing Earth's Distant Relatives with the Habitable Worlds Observatory** *Madison, WI*  
Astronomy on Tap, Madison

May. 2026 **NASA Realtors: Finding Your Next Interstellar Vacation Home** *Ithaca, NY*  
Astronomy on Tap, Ithaca

Apr. 2026 **Are We Alone? NASA's Hunt for Earth 2.0** *Ithaca, NY*  
Cornell Astronomical Society Lecture Series

Jun. 2025 **Exoplanet Zoo** *Tucson, AZ*  
Advanced Teen Astronomy Camp

Mar. 2025 **Microlensing: The 4-Leaf Clover of Exoplanet Detection** *Ithaca, NY*  
Astronomy on Tap, Ithaca

Jan. 2024 **From Wisconsin to Outer Space** *Sussex, WI*  
Hamilton High School Science Club

Jun. 2023 **Exoplanets: Detecting Worlds Outside our Solar System** *Tucson, AZ*  
Beginner Teen Astronomy Camp

## Media Appearances

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Mar. 2026 **NASA Press Release**, NASA Research Proposes Technology to Seek Earth-Like Exoplanets

Mar. 2026 **The Cornell Daily Sun**, NASA's Artemis Program Opens a New Era of Scientific Discovery *Vol. 143, No. 21*

## Extracurricular Activity

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### Astronomy Graduate Network

PRESIDENT (FORMERLY EVENT COORDINATOR)

*Ithaca, NY*

May 2024 - PRESENT

- Meets monthly with department chair to discuss graduate student well-being.
- Coordinate and plan events for the graduate student body and broader Cornell Astronomy community.
- Organized a department-wide BBQ to foster departmental socialization.

## **Buckeye Gaming Collective**

COMPETITOR & VOTING MEMBER

- Manager and leader of a podium-placing team.
- Partook in managing tryouts for a fielded roster.
- Organized broadcasts and handled tournament fees.

*Columbus, OH*

*Aug. 2020 - May. 2023*