Aiden **Zelakiewicz**

Cornell University · Carl Sagan Institute

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Education

Cornell University

Ithaca, New York

PHD in Astronomy; Advisors: Lisa Kaltenegger & Dmitry Savransky

Aug. 2023-PRESENT

- Graduate Teaching Assistant: Astronomy 1101 (FA23), Astronomy 1102 (SP24), Astronomy 1101 (FA24)
- Carl Sagan Institute researcher
- Astronomy Graduate Network (AGN) Event Coordinator

The Ohio State University

Columbus, Ohio

BS in Astronomy & Astrophysics

Aug. 2019 - May 2023

- Graduated Summa Cum Laude
- Cumulative GPA of 3.92 | Dean's List all semesters
- Highlighted Coursework: Computational Physics, Big Data Analytics, Astro Data Analysis, Statistical Mechanics, Planetary Science, Theoretical Mechanics

Research Projects

UV Spectral Inventory of FKGM Stars

Ithaca, New York

Advisor: Lisa Kaltenegger; Cornell University

June 2024 - PRESENT

- Collated archival UV spectra for International Ultraviolet Explorer (IUE) and Far Ultraviolet Spectroscopic Explorer (FUSE), creating coadded data products for stars in both observatories.
- 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 observations are missing and which HWO targets do not have observations.

Mapping NIR Extinction Towards the Galactic Center

Columbus, Ohio

Advisors: B. Scott Gaudi & Samson A. Johnson; The Ohio State University

Collaborators: Geoffrey Bryden (NASA JPL), David Nataf (University of Iowa)

May 2021 - PRESENT

- Created a near-infrared extinction and reddening maps for the *Nancy Grace Roman Space Telescope* microlensing survey using H- and K-band photometry data from the UKIRT observatory's microlensing survey.
- Project was primarily programmed in Python where Red Clump photometry data was fit to a luminosity function. The resultant parameters were used to determine the extinction and spectral reddening. Packages such as NumPy, Astropy, Lmfit, emcee, SciPy, Matplotlib, and Pickle were used to produce these calculations. This was conducted across numerous Python and data files, all managed using git to keep track of versions.

Synthesizing and Detecting Technosignatures Using Generative Adversarial Networks

Berkeley, California

Advisor: John Hoang; University of California, Berkeley

June 2022 - Aug. 2022

- Utilized novel conditional bi-directional generative adversarial networks (cBiGAN) for the Berkeley SETI Research Center advised by Dr. John Hoang. Used cBiGANs to synthesizes radio technosignature data and eventually detect anomalous data from the Green Bank Telescope.
- Utilized GPU and parallel processing to improve model training times on a supercomputer cluster. The models were constructed using PyTorch with both a sequential and functional format. Tracked and monitored training of the models using tools like Tensorboard and Neptune.
- Created synthetic data 100 times faster than traditional iterative methods used by Breakthrough Listen team on large datasets.
- Underwent training to operate the Parkes Telescope and conducted an observation at the Allen Telescope Array.

Honors & Awards

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, Ohio*

Dec. 2021 **Tuttle Scholarship,** Recognizes outstanding astronomy majors, nominated by faculty. *Columbus, Ohio*

2019-2023 **Dean's List (8 out of 8 semesters),** The Ohio State University *Columbus, Ohio*

Work Experience

Cornell University
Ithaca, New York

Graduate Research Assistant
Jan. 2025 - PRESENT

- Working with Profs. Dmitry Savransky and Lisa Kaltenegger to model the *Habitable Worlds Observatory*

Cornell University
Ithaca, New York

Graduate Teaching Assistant
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
Columbus, Ohio

Undergraduate Researcher
May 2021 - Aug. 2023

- Working with Dr. Samson A Johnson and Prof. B. Scott Gaudi to create near-infrared extinction and reddening maps towards Galactic Center
- Utilized H- and K-band photometry data from UKIRT fields.

University of California, Berkeley
Berkeley, California

Berkeley SETI Research Center REU Intern
June 2022 - Aug. 2022

- Worked with postdoctoral scholar Dr. John Hoang to create a cBiGAN to synthesize radio technosignature data.
- Used PyTorch to create the model and the Breakthrough Listen compute nodes to train it using GPUs and parallel processing.

Park Place Cafe
Milwaukee, Wisconsin

Waiter
May - Aug. of 2019 & 2020

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

Publications

First Author

1. **A Near-Infrared Extinction and Reddening Map Towards the Galactic Bulge Using UKIRT** *In Prep*
   Zelakiewicz, A.; Johnson, S. A.; Gaudi, B. S.; et al. (In Prep)

Coauthor

1. **Exploring the Use of Generative AI in the Search for Extraterrestrial Intelligence (SETI)** *Aug 2023*
   Hoang, J.; Zheng, Z.; **Zelakiewicz, A.** 2023, arXiv:2308.13125

Volunteering & Outreach

Cornell Departments of Physics and Astronomy TA Training
Ithaca, New York

TA Training Facilitator
July 2024 - Aug 2024

- 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 an inclusive learning environment.

Astronomy Camp
Mt. Lemmon, Arizona

Instructor and Counselor
June. 2023 & 2024

- Counselor and mentor for middle-high schoolers interested in astronomy and astrophysics.
- Operated 24", 32", and 61" telescopes and guided campers to observe on their own.
- Gave a public lecture on exoplanet detection methods.

Polaris *Columbus, Ohio*

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.
- Manned the COVID testing booth to check and administer COVID-19 tests.

WestFest *Columbus, Ohio*

Volunteer *Sep. 2021 & 2022*

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

Skills

Programming	Python, C++, Wolfram, Bash, LaTeX
Technology	Git & GitHub, PyTorch, TensorFlow Keras, Visual Studio Code, Mathematica, InDesign, Premiere Pro, Lightroom
Systems	Windows, Mac OS, Linux (WSL)
Languages	English - Native, French - Working Proficiency, Japanese - Basic

Presentations & Posters

Academic

Jan. 2023 **A Near-Infrared Extinction and Reddening Map Towards the Galactic Bulge Using UKIRT** *Seattle, Washington*
Zelakiewicz, A., 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, Ohio*
Zelakiewicz, A., 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, Ohio*
Zelakiewicz, A., 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, California*
Zelakiewicz, A., Hoang, J. | Berkeley SETI Research Center Symposium

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

Public

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

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

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

Extracurricular Activity

Astronomy Graduate Network

Ithaca, New York

Event Coordinator

May 2024 - PRESENT

- Coordinate and plan events for the graduate student body and broader Cornell Astronomy community.
- Organized a department-wide BBQ to foster more departmental socializing, per the result of the C&D committee's retreat.
- Organized and hosted a Graduate School Workshop for the Cornell Astronomical Society and the Society of Physics Students.

Buckeye Gaming Collective

Columbus, Ohio

Competitor & Voting Member

Aug. 2020 - May. 2023

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