Aiden **Zelakiewicz**

Student · Undergraduate Researcher

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Education

The Ohio State University *Columbus, Ohio*

BS in Physics and Astronomy & Astrophysics *Expected Graduation: May 2023*

- Cumulative GPA of 3.91
- Six-time Dean's List recipient
- Relevant Coursework: Computational Physics, Statistical Mechanics, Quantum Mechanics, Electricity & Magnetism, Astro Data Analysis, Big Data Analytics, Linear Algebra, Differential Equations

Research Projects

Mapping NIR Extinction Towards the Galactic Center *Columbus, Ohio*

Advisor: B. Scott Gaudi & Samson A. Johnson; The Ohio State University *May 2021 - PRESENT*

- Creating 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. This is in collaboration with and advised by Dr. Samson A Johnson and Dr. B. Scott Gaudi.
- Project was primarily programmed in Python where Red Clump photometry data was fit to a luminosity function. The resultant parameters could then be used to determine the extinction and spectral reddening. To produce these calculations, packages such as NumPy. Astropy, Lmfit, emcee, SciPy, Matplotlib, and Pickle were used. This was conducted across numerous Python and data files, all managed using git to keep track of versions.
- A first author paper detailing this project is currently in the works.

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.
- Ability to reduce synthetic data creation run-time to less than 1% of 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.

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

Work Experience

The Ohio State University *Columbus, Ohio*

Undergraduate Researcher *May 2021 - PRESENT*

- Working with graduate student Samson A Johnson 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

Presentations & Posters

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

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

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

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

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

Honors & Awards

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

2019-2022 **Dean's List (6 out of 6 semesters)**, The Ohio State University — *Columbus, Ohio*

Volunteering & Outreach

Polaris
Columbus, Ohio
UNDERGRADUATE MENTOR | MENTEE: ERIN BERNTHOLD — *Aug. 2022 - PRESENT*
- 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*
- Science outreach event with a focus on sustainability.
- Created activity kits for use by attendees.

Extracurricular Activity

Buckeye Gaming Collective
Columbus, Ohio
COMPETITOR & VOTING MEMBER — *Aug. 2020 - PRESENT*
- Manager and leader of a podium-placing team.
- Partook in managing tryouts for a fielded roster.
- Organized broadcasts and handled tournament fees.

Delta Sigma Phi Fraternity
Columbus, Ohio
HISTORIAN & ASSISTANT NEW MEMBER EDUCATOR — *Mar. 2020 - PRESENT*
- Oversaw and produced media used for social pages.
- Assistant in ensuring new members uphold the standards and values of the organization.