

# ABRA GEIGER

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## EDUCATION

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**Cornell University**, Ithaca, NY

B.A., Physics and Math, Minor in Astronomy, 2022 to 2026 (expc.)

GPA: 3.99

## PEER-REVIEWED PUBLICATIONS

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1. **Geiger, A.**, et al. (36 authors) 2024. *The NANOGrav 12.5-Year Data Set: Probing Interstellar Turbulence and Precision Pulsar Timing with PSR J1903+0327* (in press at the Astrophysical Journal)

## OTHER PUBLICATIONS

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1. **Geiger, A.**, & Lam, M. T. 2022. *The Frequency-Dependent Scattering of Pulsar J1903+0327*. NANOGrav Memo Series No. 8, Tech. rep., NANOGrav

## RESEARCH EXPERIENCE

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**Cordes Astronomy Research Group**

**Cornell University**

*Research Assistant*

Sept 2022 - Present

- Analyze interstellar scattering utilizing python for application to pulsar timing as a member of the North American Nanohertz Observatory for Gravitational Waves (NANOGrav)
- Write peer-reviewed scientific publications on scattering research and conduct literature reviews
- Install and operate the Cornell Global Radio Explorer (GRex) Radio Telescope
- Collaborate and discuss weekly project reports with team of professors and researchers

**Flanagan Theoretical Physics Research Group**

**Cornell University**

*Research Assistant*

January 2025 - Present

- Study potential astrometric methods of gravitational wave detection and quantify their limits
- Work towards an honors senior thesis relating to this research

**Ravi Astronomy Research Group**

**California Institute of Technology**

*Research Assistant*

June 2024 - August 2024

- Simulated spectroscopic absorption and emission from circumgalactic clouds of gas and dust to better deduce circumgalactic cloud properties from optical observations
- Conducted optical spectroscopic observations of globular clusters at the Keck and Palomar observatories
- Prepared a final report to be developed into a publication focusing on forecasting for upcoming spectroscopic surveys of the Milky Way

**Lam Astronomy Research Group**

**Rochester Institute of Technology**

*Research Assistant*

Sept 2021 - Aug 2022

- Measured and analyzed interstellar scattering variations for millisecond pulsar J1903+0327 utilizing python
- Modeled autoregressive variations in timing residuals for millisecond pulsar B1937+21 utilizing python

- Presented and discussed progress in weekly meetings with a team of pulsar timing researchers

## ACCEPTED CO-AUTHORED PROPOSALS FOR TELESCOPE TIME

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<b>Greenbank Telescope</b>	2024
<i>Cyclic Spectroscopy of Three Pulsars with Considerable Pulse Broadening</i> (45 hours)	
<b>Murchison Widefield Array</b>	2023
<i>Measuring the Pulse Broadening Times of PSR J1935+1616 at Low Radio Frequencies</i> (3 hours)	

## AWARDS AND FELLOWSHIPS

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Barry Goldwater Scholar (2025)  
 Society of Physics Students Jocelyn Bell Burnell Outstanding Leadership Scholarship (2025)  
 Cornell Astronomy Cranson W. and Edna B. Shelly Undergraduate Research Award (2025)  
 Cornell Quill and Dagger Senior Honors Society (2025)  
 Caltech Summer Undergraduate Research Fellowship (2024)  
 McNair Scholar (2023)  
 Cornell Arts & Sciences Nexus Scholar (2023)  
 AP Scholar with Distinction (2022)  
 Donald F. and Maxine B. Davison Foundation Scholarship (2022)  
 George Eastman Young Leaders Award (2021)  
 Clarkson University Leadership Scholarship (2021)

## PRESENTATIONS

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<b>Cornell Undergraduate Physics Poster Session</b>	December 2024
Talk: <i>Probing Interstellar Turbulence and Precision Pulsar Timing with PSR J1903+0327</i>	
<b>NANOGrav Fall Collaboration Meeting</b>	October 2024
Talk: <i>Probing Interstellar Turbulence and Precision Pulsar Timing with PSR J1903+0327</i>	
<b>Caltech Student-Faculty Programs Final Presentations</b>	August 2024
Talk: <i>Tracing the Milky Way Circum-Galactic Medium With Optical Spectroscopy</i>	
<b>Cornell Astronomy Undergraduate Research Poster Forum</b>	May 2024
Poster: <i>Probing Interstellar Turbulence and Precision Pulsar Timing with PSR J1903+0327</i>	
<ul style="list-style-type: none"> <li>• Awarded 2024 Friends of Astronomy Undergraduate Poster Winner</li> </ul>	
<b>American Astronomical Society Winter Meeting</b>	January 2024
Poster: <i>Probing Interstellar Turbulence and Precision Pulsar Timing with PSR J1903+0327</i>	
<b>Cornell Arts &amp; Sciences Nexus Capstone Presentations</b>	July 2023
Talk: <i>Probing Interstellar Turbulence and Its Intermittency Through Observation of a Millisecond Pulsar</i>	
<b>Cornell Astronomy Undergraduate Research Poster Forum</b>	May 2023
Poster: <i>The Frequency-Dependent Scattering of Pulsar J1903+0327</i>	
<b>Cornell Undergraduate Research Board Spring Symposium</b>	May 2023
Poster: <i>The Frequency-Dependent Scattering of Pulsar J1903+0327</i>	

- Awarded Best in Category for Physical Sciences

**APS Conference for Undergraduate Women in Physics**

January 2023

Poster: *The Frequency-Dependent Scattering of Pulsar J1903+0327***Rochester Institute of Technology Undergraduate Research Symposium**

July 2022

Talk: *The Frequency-Dependent Scattering of NANOGrav Pulsar J1903+0327***TEACHING EXPERIENCE**

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**Physics Learning Strategies Center****Cornell University***Tutor*

Jan 2025 - Present

- Tutor students from a wide variety of physics courses, including mechanics, electricity and magnetism, quantum mechanics, and more for about 5 hours per week

**PHYS 1116: Mechanics and Special Relativity****Cornell University***Undergraduate Teaching Assistant*

Jan 2023 - Dec 2023

- Collaborate with professors and graduate student TAs to support students in augmented introductory physics
- Host weekly office hours to aid students in homework completion and content comprehension

**LEADERSHIP AND SERVICE**

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**Cornell Society of Physics Students****Cornell University***President*

Jan 2025 - Present

- Facilitate the organization of physics speaker events, career panels, social events, mentorship programs, local outreach, the Cornell Physics Wiki, an annual poster session, and an annual formal
- Host about a dozen events per semester
- Serve on the CEDI committee, and continue to facilitate DEI initiatives in the Cornell Physics Department (see more below)

*Vice President*

Dec 2023 - Jan 2025

- Organize and oversee  $\sim 10$  physics events per semester, collaborating with the president and executive board
- Lead our undergraduate peer mentorship program and our undergraduate-graduate mentorship program
- Serve on the CEDI committee and continue the "A Physicist Is" project (more information below)

*Women in Physics Chair*

Feb 2023 - Dec 2023

- Spearhead tri-weekly outreach for  $\sim 40$  local fifth grade students by gathering and training volunteers, communicating weekly physics concepts, and coordinating with local fifth grade teacher and The Ithaca Physics Bus
- Plan and host  $\sim 10$  physics events per semester: including professional development workshops, speakers, etc
- Serve as a student-faculty liaison on the Cornell Physics Committee for Climate, Equity, Diversity, and Inclusion (CEDI)

- Develop "A Physicist Is" under Prof. Holmes to highlight the diversity of careers and people in physics

## **The Stemminist Movement**

**Cornell Chapter**

*Outreach Co-Director*

Nov 2022 - May 2024

- Co-lead a committee of 5 members to organize  $\sim 10$  STEM outreach programs for middle school students each year
- Train co-director and committee members in organizational workflow and event planning
- Foster an empowering community for women in STEM at Cornell and beyond through professional development workshops, invited talks, socials, and more
- Won and executed a grant for \$2500 for a project to distribute 300 STEM kits to youth in the local area

## **Cornell Astronomical Society**

**Cornell University**

*Keyholder*

Feb 2023 - Present

- Manage sky tours and telescope observing for weekly open houses at Cornell's Fuertes Observatory
- Write astrophysics columns in our newsletters

## **Ballet & Books**

**Ithaca Chapter**

*Dance Teacher*

Sept 2022 - Present

- Lead weekly ballet classes for  $\sim 15$  students aged 6-9 years, managing a team of 2 teaching assistants

*Treasurer*

Jan 2023 - Dec 2024

- Manage club logistics including semesterly show planning, fundraisers, finances, and funding allocation
- Won and executed a grant for \$2500 for our students dancewear and performance

## **Cornell Tatkon Center for New Students**

**Cornell University**

*Orientation Leader*

Aug 2023

- Facilitate small group sessions and large-scale events with new students
- Support and guide new students through the transition to campus life
- Engage in training for developing inclusive spaces, building connections, and strengthening teamwork

## **Court-Kay-Bauer Residence Hall Student Council**

**Cornell University**

*Vice President*

Sept 2022 - June 2023

- Plan and run events for the 275+ residents of Court-Kay-Bauer Hall every 1-to-2 months
- Collaborate with other Hall Councils and Residential Student Congress for larger scale events

## **Rochester Museum and Science Center**

**Rochester, NY**

*Volunteer*

Dec 2022 - Jan 2023

- Present the "Science On A Sphere" exhibit and its connection to scientific research and discovery
- Monitor and tidy the museum and assist with other operational tasks as needed

## SKILLS

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**Programming:** Python, Java, Latex, HTML

**Computer:** UNIX, Microsoft (Word, Powerpoint, Excel, Office), Google Workspace

**Language:** Native Fluency in English, Intermediate French

## AFFILIATIONS

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*Associate Member*, North American Nanohertz Observatory for Gravitational Waves

*Member*, American Astronomical Society

*Member*, American Physical Society

*Member*, Society of Physics Students