

# Joseph E. Hand | Undergraduate Physics and Astronomy Student

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## Education

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8/2021 - **University of Kansas, Lawrence, Kansas**

5/2025 Bachelor of Science

- Majors: Physics, Astronomy
- Minor: Philosophy
- GPA: 4.00

## Honors and Awards

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| 2024 | Awarded Dorrit Hoffleit Undergraduate Research Scholarship               | \$3,600  |
| 2023 | Nominated by the University of Kansas for the 2024 Goldwater Scholarship |          |
| 2023 | Inducted into Sigma Pi Sigma, the physics honor society                  |          |
| 2022 | Inducted into Phi Kappa Phi, an inter-disciplinary honor society         |          |
| 2022 | Accepted into the University of Kansas' Honors Program                   |          |
| 2021 | Awarded KU Chancellor Merit Scholarship                                  | \$20,000 |

## Research Experience

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6/2022 - University of Kansas, Lawrence, Kansas

Present **Undergraduate Research Assistant in Astronomy**

Work with Dr. Crossfield on an independent research project to measure the chemical compositions of stars from spectra taken using the *HARPS* spectrograph.

- Utilize machine learning tool The Cannon
- Access public spectra from *HARPS* instrument using pyvo library
- Apply spectral processing techniques such as continuum normalization
- Convey results effectively to other members of the research team

6/2023 - University of California, Berkeley, California

8/2023 **REU Intern at the Berkeley SETI Research Center**

Participate in a 10-week internship at the Berkeley SETI Research center where I worked with Howard Isaacson and Dr. James Davenport.

- Design software tools to identify potential signs of intelligent life in APOGEE data
- Select promising astronomical targets to facilitate analysis
- Communicate my results to others in the field

## Publications

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- 6/2023    **The Astrophysical Journal**, Volume 949, Issue 2, id.79, 15 pp.  
Neda Hejazi, Ian J. M. Crossfield, Thomas Nordlander, Megan Mansfield, Diogo Souto, Emilio Marfil, David R. Coria, Jonathan Brande, Alex S. Polanski, **Joseph E. Hand**, and Kate F. Wienke, *Elemental Abundances of the Super-Neptune WASP-107b's Host Star Using High-resolution, Near-infrared Spectroscopy*

## Proposals

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- 9/2023    **ESO, HARPS** *Accepted 1/2024, 5 nights*  
Daniel Huber, Tim Bedding, Ian Crossfield, **Joseph Hand**, Ben Montet, Alex Polanski, *Homogeneous High-Resolution Spectroscopy of TESS Exoplanet Host Stars*

## Leadership Experience

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- 8/2023 -    University of Kansas, *Lawrence, Kansas*  
Present    **KU SPS Magazine Chief Editor**  
Elected by the KU Society of Physics Students to lead the club's semesterly magazine.
- 9/2022 -    University of Kansas, *Lawrence, Kansas*  
12/2022    **Undergraduate Teaching Assistant**  
Helped Dr. Judy Wu with teaching College Physics II (PHSX 115).
  - Assist with routine class activities (e.g. answering questions in class)
  - Host office hours to answer questions and solve practice problems
- 8/2022 -    University of Kansas, *Lawrence, Kansas*  
5/2023    **Undergraduate Student Department Representative**  
Volunteer to attend department meetings and participate in discussion of departmental matters.
  - Select elective classes to be offered in future semesters
  - Create curriculum map to organize subjects taught in the department

## Outreach

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- 4/2023    University of Kansas, *Lawrence, Kansas*  
            **Public Telescope Night Volunteer**  
Volunteer to help the department host public telescope nights to let the public view objects in the night sky through telescopes.
  - Assist members of the public view astronomical objects
  - Describe astrophysical phenomena and instrumentation to the public

- 11/2022    University of Kansas, *Lawrence, Kansas*  
**KU Carnival of Chemistry Volunteer**  
Volunteer at the Carnival of chemistry.
- Operate physics demonstrations
  - Explain concepts in physics to children of ages 5 and above

## Contributed Talks

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- 1/2024    **243rd AAS Meeting**, *New Orleans, Louisiana*  
Identifying Potential Technosignatures in APOGEE Data Using ALIAS
- 11/2023    **MARAC 2023**, *Atchinson, Kansas*  
Identifying Potential Technosignatures in APOGEE Data Using ALIAS
- 9/2023    **KU Astronomy Seminar**, *Lawrence, Kansas*  
Identifying Potential Technosignatures in APOGEE Data Using ALIAS
- 3/2023    **PALOOZA 2023**, *Lawrence, Kansas*  
HARPSpec: Using Machine Learning to Find Chemical Compositions of Stars from Their Spectra
- 3/2023    **KU Astronomy Seminar**, *Lawrence, Kansas*  
HARPSpec: Using Machine Learning to Find Chemical Compositions of Stars from Their Spectra
- 8/2022    **KU Undergraduate Research Symposium**, *Lawrence, Kansas*  
HARPSpec: Using The Cannon to Derive Stellar Parameters from Spectra

## Skills

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| <b>Document Creation</b>       | LaTeX, BibTeX, Beamer, ReStructured Text, Markdown |
| <b>Programming</b>             | Python, Java, Bash, GLSL/OpenCL                    |
| <b>Astronomy and Python</b>    | numpy, matplotlib, astropy, scipy, TheCannon       |
| <b>Computer Infrastructure</b> | Linux, ssh, git, Docker, computer networking       |