

Joseph E. Hand | Undergraduate Physics and Astronomy Student

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Education

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

5/2025 Bachelor of Science

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

Honors and Awards

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

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

- 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

- 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

- 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

- 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

- 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

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