

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

2024	Awarded Gene E. Feaster Scholarship	\$9,000
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

6/2024- Yale University, *New Haven, Connecticut*

8/2024 **Hoffleit Fellow at Yale University Department of Astronomy**

Work with [Dr. Malena Rice](#) to leverage orbital geometry of exoplanets in binary star systems to identify a sample of systems that make good exoplanet survey targets.

- Analyze large amounts of data from ESO's Gaia Space Telescope
- Utilize make to ease reproducibility of data products

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

6/2022 - University of Kansas, Lawrence, Kansas

Present **Undergraduate Research Assistant in Astronomy**

Work with [Dr. Ian 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

Publications

9/2024 **The Astrophysical Journal**, Volume 973, Issue 1, id.31, 21 pp.

Neda Hejazi, Ian J. M. Crossfield, Diogo Souto, Jonathan Brande, Thomas Nordlander, Emilio Marfil, Katia Cunha, David R. Coria, Zachary G. Maas, Alex S. Polanski, Natalie R. Hinkel, **Joseph E. Hand**, [High-resolution Elemental Abundance Measurements of Cool JWST Planet Hosts Using AutoSpecFit: An Application to the Sub-Neptune K2-18b's Host M dwarf](#)

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*

Observing Experience

7/2024 - **ESO, HARPS**

9/2024 One full night of observing and two partial nights of observing remotely using HARPS.

10/2023 **Siena College, Breyo 0.7m Telescope**

Remote observing for *Observational Astrophysics* class at the University of Kansas

Leadership Experience

8/2024 - University of Kansas, Lawrence, Kansas

Present **KU SPS Vice President**

Elected by the KU Society of Physics Students as vice president of the club, responsible for organizing outreach events

- 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

- 4/2024 University of Kansas, *Lawrence, Kansas*
Lawrence Kansas Solar Eclipse Website
Create a website for attendees to get information about the 2024 solar eclipse watching party hosted by the KU Society of Physics Students chapter.
See the website at <https://lawrencekansassolareclipse2024.github.io/>
- 4/2023- University of Kansas, *Lawrence, Kansas*
Present **Local KU SPS Outreach**
Volunteer at events hosted by local elementary schools in Lawrence, Kansas to demonstrate physics concepts relating to both electromagnetism and mechanics to students.
- 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

- 10/2024 **KU Astronomy Seminar**, *Lawrence, Kansas*
Using Orbital Geometries to Find Potential Exoplanet-Hosting Binary Star Systems
- 7/2024 **Yale Undergraduate Research Symposium**, *New Haven, Connecticut*
Using Orbital Geometries to Find Potential Exoplanet-Hosting Binary Star Systems
- 2/2024 **KU Astronomy Seminar**, *Lawrence, Kansas*
Identifying Potential Technosignatures in APOGEE Data Using ALIAS
- 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