

ZOE HACKSHAW

The University of Texas at Austin ◊ Department of Astronomy

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<https://zoehackshaw.github.io/>

EDUCATION

University of Texas at Austin

2022-Present

PhD in Astronomy expected June 2027

University of Florida

2017-2021

Bachelor of Science in Astrophysics, *summa cum laude*

RESEARCH

Graduate Research Assistant

August 2022 - Present

Advisor: Prof. Keith Hawkins

University of Texas at Austin

- Used chemical cartography to map azimuthal variations in elemental gradients of stars in the Galactic disk, as well as investigated the stellar age-dependence on the azimuthal sub-structure.
- To study the origin history and formation pathways of Massive Alpha Enhanced stars, I analyzed the $^{12}\text{C}/^{13}\text{C}$ ratios of these stars as well as used diagnostics to investigate possible binarity.

Undergraduate Research Assistant

December 2019 - August 2022

Advisor: Prof. Rana Ezzeddine

University of Florida

PUBLICATIONS

- **Hackshaw Z.**, Hawkins K., Filion C., Horta D., Laporte C. F. P., Carr C., Price-Whelan A. M et al 2024 **ApJ**, DOI 10.3847/1538-4357/ad900e
“*[X/Fe] Marks the Spot: Mapping Chemical Azimuthal Variations in the Galactic Disk with APOGEE*”
- Kowkabany J., **Hackshaw Z.**, Ezzeddine R. et al 2022, **ApJ**, DOI 10.48550/arXiv.2209.02184
“*2MASS J05241392–0336543: A Detailed Abundance Analysis of the Most Lithium Enhanced Giant*”
- Shah S., Ezzeddine R., **Hackshaw Z.**, Ji A., Hansen T., Catelan M., Holmbeck E., Beers T. et al 2023, **ApJ**, DOI 10.3847/1538-4357/acb8af
“*Uranium Abundances and Ages of r-process Enhanced Stars with Novel U II Lines*”

AWARDS AND SCHOLARSHIPS

• **David L. Lambert Graduate Fellowship**

2024

University of Texas at Austin

• **Senior Thesis Highest Honors, *summa cum laude***

May 2021

University of Florida Department of Astronomy

• **FL Academic Scholar’s Award**

2017-2021

University of Florida

OBSERVING EXPERIENCE

McDonald Observatory

August 2024; October 2024

PI: Zoe Hackshaw, 7 nights

Spectroscopically observed FGK companions of polluted White Dwarfs on the Tull Coudé spectrograph on the 2.7 m telescope to characterize the planetary interiors that have been accreted onto the White dwarfs.

McDonald Observatory

June 2024

PI: Zoe Hackshaw, 7 nights

Used the Tull Coudé spectrograph on the 2.7 m Harlan J Smith Telescope to get over 45 hours of data on Gaia DR3 4318465066420528000, the companion of Gaia BH3 to get neutron capture abundances and place a nuclear cosmo-chronometric age on this system.

McDonald Observatory

February 2024

PI: Zoe Hackshaw, 7 nights

Spectroscopically observed 9 metal-poor stars with asteroseismic ages using the 2.7 m Tull Coudé spectrograph to place nuclear cosmo-chronometric ages on these sources. I additionally observed 6 metal-poor candidates from SDSS-V.

TEACHING AND MENTORSHIP

Research Mentor

Spring 2024 - Present

Abigail Skelton and Nachiket Yadav

Guided two undergraduate students in using the HETDEX and HETVIPS catalogs to obtain stellar parameters and elemental abundances of these stars using data-driven techniques.

Teaching Assistant

Spring 2023

AST 352K: Stellar Astronomy; University of Texas at Austin

Assisted Prof. Keith Hawkins with teaching, grading, as well as giving a guest lecture for AST 352K covering theoretical and observational stellar astronomy. I hosted weekly office hours to help students with the coursework.

CONFERENCE PRESENTATIONS

Milky Way Assembly Tale

June 2024

Istituto Nazionale Di Astrofisica

Presented a poster on my work using APOGEE DR-17 to uncover chemical azimuthal variations in the Galactic disk, investigating the age-dependence on the strength of these variations and showcasing similar trends in elements beyond $[\text{Fe}/\text{H}]$.

2023 SDSS-V Collaboration Meeting

August 2023

Sloan Digital Sky Survey-V

Gave a talk on my work using APOGEE DR-17 to uncover chemical azimuthal variations in the Galactic disk, investigating the age-dependence on the strength of these variations and showcasing similar trends in elements beyond $[\text{Fe}/\text{H}]$.

Stellar Properties from NLTE Radiative Transfer

May 2023

IRENA, the Kavli Institute for Cosmological Physics, and the University of Chicago

Presented an investigation-themed talk containing results of my previous work on star 2MASS J00101758–1735387 as well as highlighting the steps that need to be taken to answer long-standing questions about the formation of the Milky Way.

AAS Meeting Presentation

January 2021

American Astronomical Society

Submitted an abstract highlighting the methodology and results of my work on a metal-poor, r-process enhanced star, 2MASS J00101758–1735387. My iPoster on this work was presented as a part of the 2021 American Astronomical Society meeting.

OUTREACH AND SCIENCE COMMUNICATION

Astronomy Club Presentation

November 2024

Williamson County Astronomy Club

Gave a public talk at a library in Georgetown for the Williamson County Astronomy Club about stellar spectroscopy and how we can use the light from stars to piece together the formation history of the Milky Way.

Board of Visitors Summer Meeting

July 2024

McDonald Observatory and Department of Astronomy

Gave a public talk at the McDonald Observatory and Department of Astronomy Board of Visitors meeting about stellar spectroscopy, Galactic archaeology and the peculiar chemistry of the Galactic disk.

UT STEM Girl Day

February 2023

University of Texas at Austin

Led an interactive build-your-own-pulsar activity for the astronomy booth at STEM Girl Day, an annual event that the university puts on to encourage thousands of children to engage in science, technology, engineering, and math.

Girl Scout Presentation

April 2022

Daisy Troop 41119

Presented an interactive talk about the basics of the Sun, the Moon and the stars to a group of first grade girls in the Girl Scouts of the USA.

SEFS Presentation

February 2021

Western Pines Middle School

For the Scientist in Every Florida School (SEFS) Program, I presented a 30 minute long talk to eighth grade students about stellar evolution and astronomy.

LEADERSHIP AND EXTERNAL ACTIVITIES

Recruitment Officer

2023-2024

Department of Astronomy, University of Texas at Austin

I was elected to lead the recruitment of prospective graduate students of the Department of Astronomy. This culminates in the organization of the Prospective Visit, when the potential students travel to Austin for a weekend full of tours and welcoming activities.

AoT ATX Social Media Manager

2023-2024

Astronomy on Tap, Austin, TX

I manage the social media accounts and campaigns for the Austin, Texas chapter of Astronomy on Tap, a monthly public outreach event that hosts Astronomy talks at local breweries.

COMPUTATIONAL EXPERIENCE

Programming	Python, C++, GitHub
Software	BACCHUS, Turbospectrum, Spectroscopy Made Hard

PROFESSIONAL EXPERIENCE

Engineering Scientist Associate <i>Applied Research Laboratories at the University of Texas at Austin</i>	August 2021 - August 2022
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Worked in the Space and Geophysics Laboratory performing quality assurance and testing on High Rate Tracking Receivers deployed on numerous GPS satellites. This included assisting in the definition and implementation of testing and automation programs, generating and executing test cases, as well as providing technical interface to sponsors and other external organizations.