

# AUTUMN STEPHENS

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📍 Boulder, CO, United States

## EDUCATION

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### University of Colorado-Boulder

*M.Sc. and Ph.D. / Astrophysics & Planetary Science*

*Aug 2023 - Present*

### The Ohio State University

*Bachelor of Physics / Astronomy & Astrophysics*

*Aug 2019 - May 2023*

## SKILLS

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**Languages:** English, American Sign Language (ASL)  
**Programming:** Python, Bash, C++, HTML, CSS, JavaScript,  $\text{\LaTeX}$   
**Other Tools:** Pandeia ETC, Remcom's XF

## RELEVANT COURSEWORK

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### Observations, Data Analysis and Statistics (ASTR 5550)

*Course Description:* Introduces multi-wavelength observational techniques, their limitations, and effects of various noise sources. Describes basic data handling, error analysis, and statistical tests relevant to modeling. Topics include probability distributions, model-fitting algorithms, confidence intervals, correlations, sampling, and convolution. Students derive physical measurements and uncertainties with hands-on analysis of real datasets.

### Atmospheric Chemistry (ATOC 5151)

*Course Description:* Thermal, mechanical, quantum, and radiative processes in gases and plasmas, with emphasis on spectroscopy, atomic and molecular physics, statistical mechanics, and kinetic theory, with applications in astrophysics, planetary physics, and plasmas.

### Atomic and Molecular Processes (ASTR 5110)

*Course Description:* Reviews basic kinetics and photochemistry of atmospheric species and stratospheric chemistry with emphasis on processes controlling ozone abundance. Tropospheric chemistry focusing on photochemical smog, acid deposition, oxidation capacity of the atmosphere and global climate change.

## RESEARCH EXPERIENCE

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### Studying Star Spots & Exoplanet Atmospheres

*PI: Dr. Zach Berta-Thompson*

- Collected spectroscopic data from four total telescopes spanning two sites
- Built a Python pipeline for processing data from the KOSMOS instrument at APO
- Produced multi-wavelength light curves to study exoplanet transits and starspots

*August 2023 - Present*

### Gravitational Microlensing

*PI: Dr. Scott Gaudi; Secondary Advisor: Dr. Samson Johnson*

- Resulted in a successfully-defended as an honors undergraduate thesis
- Simulated blended two-star spectra for stars in microlensing events
- Determined the percentage of microlensing events lens star parameters can be extracted from
- Characterized the effect of metallicity and effective temperature blended two-star spectra
- Used in a JWST Cycle 4 proposal

*May 2022 - May 2023*

### Developing Neutrino Detectors for IceCube

*PI: Dr. Amy Connolly; Secondary Advisor: Dr. Julie Rolla*

- Used genetically-evolving algorithms to generate novel neutrino detectors
- Studied gain patterns for generated detectors to track performance
- Generated 3D models of genetically-evolved neutrino detectors

*Aug 2021 - May 2022*

## GITHUB PROJECTS

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### **BlenderBraille**

Aug 2024

- Produces 3D-printable and size-compliant Braille given corresponding to user input
- Automatically generates tactile models from static images
- Allows for single-click conversion of Blender settings to allow users to export 3D-printable models

### **N-Body Simulations / Animations**

Dec 2021

- Described in-depth the simulation's physics using Jupyter markdown cells
- Used iterative methods to calculate forces between n-bodies in a simulation
- Used object-oriented programming to allow for easy simulation of n-bodies in a solar system
- Synced the simulation with the NASA exoplanet archive
- Animations of solar systems can be created using just the host star's name

## WORK EXPERIENCE

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### **CU Boulder Astrophysics & Planetary Science Department**

Aug 2023 - Present

#### *Teaching Assistant*

- Mentored and guided undergraduate students through astrophysical final projects
- Guest lectured for several classes (ASTR 1000; ASTR 1030; ASTR 3710; ASTR 3750; ASTR 3800)
- Designed and provided 3D-printed educational models to support learning objectives
- Trained students to operate spectroscopic equipment at Sommers-Bausch Observatory

### **OSU Physics / Astronomy Departments**

Aug 2021 - Present

#### *Teaching Assistant*

- Acting as TA for an artificial intelligence development course (PHYSICS 5680)
- Led and proctored GE astronomy course (ASTRON 1101)

## OUTREACH / EXTRACURRICULAR

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### **Sommers-Bausch Observatory (SBO) Open House**

Aug 2023 - Present

#### *Telescope Operator / Speaker*

- Setup and shutdown an observing deck with two 20" PlaneWave Telescopes
- Manage large crowds while fielding questions about astronomical topics

### **SciAccess Zenith Program**

Jan 2020 - May 2023

#### *Mentor / Operations Chair*

- Coordinated with See3D to create STEM 3D-models for BLV students
- Mentored K-12 students to prepare them for a STEM education and college life

### **SPOK Outreach Program**

Aug 2021 - May 2023

#### *Outreach Coordinator*

- Developed educational videos for K-12 students interested in STEM
- Designed activities several scientific fields for the Ohio State School for the Blind (OSSB)

## PRESENTATIONS / POSTERS

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### **Extracting Lens Star Properties From a Blended Source-Lens Spectra**

Nov 2022

#### *Great Lakes Exoplanet Area Meeting (GLEAM)*

- Briefly discussed my research in one-minute flash talk
- Generated animations to demonstrate how fitting for lens-star parameters works

### **Accessible Mentoring at the High School Level**

Nov 2021

#### *SciAccess Conference*

- Explained how the SciAccess Zenith and SPOK programs address a lack of diversity in STEM fields
- Addressed the unique difficulties that outreach programs are facing in the COVID-19 pandemic
- Laid out solutions to the challenges we faced as well as describing future plans for both programs