# Arshia Akhtarkavan

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## Work Experience

**Undergraduate Researcher in Astronomy** Nov 2023 – Present

*Steward Observatory, University of Arizona, Tucson, AZ*

- Processed incoming imaging and spectroscopic JWST data
- Conducted research on high-redshift galaxies using JWST NIRCam imaging and grism spectroscopy
- Identified and analyzed transient and variable sources in JWST survey data
- Contributed to the development of software for forward-modeling of galaxy kinematics
- Simulated JWST data for the training of machine learning models
- Worked full-time during summer and winter breaks and part-time during the academic year

**Grader, MATH 454 – ODEs and Stability Theory** Aug – Dec 2025

*Mathematics Department, University of Arizona, Tucson, AZ*

- Graded weekly problem sets and quizzes for an upper-division mathematics course
- Wrote detailed solution manuals for homework assignments and quizzes
- Graded midterm examinations with written feedback emphasizing mathematical rigor and clarity
- Identified common conceptual errors on exams and worked closely with the professor to address them in lectures

**Internship in a Mechanical Engineering Workshop** Jan – Mar 2023

*FH Aachen University, Essen, Germany*

- Gained expertise in operating basic machinery and learned practical skills in a workshop setting.
- Developed the ability to interpret and create schematics and diagrams.
- Acquired hands-on experience in using various tools and equipment for different tasks (calipers, lathes, saws, column drills, milling machines, hand tools, bench vices, etc.).

## Projects

**Research in Mathematical Physics** Islands Website

Performed research on the Nahm equations, focusing on constructing higher-order solutions and eventually generating an entirely new set of solutions. In parallel, rebuilt and expanded the Islands Project website after it had gone offline. This website serves as not only a central hub for the project but also as a starting point for students at different levels to get involved in theoretical/mathematical physics research.

## Education

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| 2023 – Expected 2027 | Bachelor of Science, **University of Arizona**, Tucson, AZ<br>*W.A. Franke Honors College*<br>Majors: Physics and Mathematics (Comprehensive Emphasis)<br>Minor: Astronomy | (GPA: 4.0/4.0) |
| 2022 – 2023 | Diploma, **Saba International High School**, Frankfurt, Germany | |
| 2020 – 2022 | High School, **The Atomic Energy Institute**, Tehran, Iran | |

## Publications

1. The First Photometric Evidence of a Transient/Variable Source at $z > 5$ with JWST DeCoursey C, Egami E, Sun F, **A. Akhtarkavan**, et al. (2025).
2. Slitless Areal Pure-Parallel HIgh-Redshift Emission Survey (SAPPHIRES): Early Data Release of Deep JWST/NIRCam Images and Spectra in MACS J0416 Parallel Field
   Sun F, Fudamoto Y, Lin X, Helton J. M., Hsiao T. Y-Y, Egami E, **Akhtarkavan A**, et al. (2025).
3. Discovery of 39 Transients/Variables ($z_{host}$ = 0.437–5.271) in GOODS-N using JADES and CONGRESS JWST/NIRCam Images
   DeCoursey C., Egami E., Sun F., **Akhtarkavan A**, et al. (2024).

## Conference Presentations

1. **Forward-Modeling Emission Line Galaxy Kinematics and Morphology with JWST NIRCam Grisms.**
   iposter presentation, 247th Meeting of the American Astronomical Society (AAS 247), January 2026
2. **Recreating the Islands project and Its Role in Mathematical Physics Research**
   Talk and Seminar, University of Arizona, April 2026

## Skills

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| Programming Languages | Python, C/C++, SQL |
| Scientific & Data Analysis Libraries (Python) | NumPy, Matplotlib, PyTorch, Astropy, SciPy, Specutils, Photutils, Pandas, JAX |
| Astronomy & Astrophysics Software | DS9, JWST Pipeline, Source detection and Photometry, Webbpsf, NIRCam imaging and grism spectroscopy |
| Software & Research Systems | Linux/Unix, Git/GitHub, HPC environments, remote computing (ssh), GPU-accelerated computing (CUDA), Jupyter, VS Code, Emacs, LaTeX, WordPress, Microsoft Office |

## Awards and Scholarships

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| 2025-2026 | Kenneth S. Krane Physics Scholarship |
| 2025-2026 | Evelyn O. Bychinsky Promising Astronomer Award |
| 2025-2026 | RII-Sponsored Campuswide Undergraduate Student-Initiated Original Research |
| 2023-2024 | Glenn C. Purviance Scholarship in Physics |
| 2023-2024 | Academic Year Highest Academic Distinction |
| 2023-Present | Dean's List with Distinction - Full Time |
| 2023-Present | Global Wildcat Tuition Award, University of Arizona |
| 2022 | Silver Medal, National Astronomy and Astrophysics Olympiad |

## Languages

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| English | Fluent |
| Farsi (Persian) | Native |
| German | B1 level |
| Mandarin Chinese | Currently learning |