

Hayley Williams

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Employment

Beus Prize Postdoctoral Research Fellow

Sept 2025 - Present

Beus Center for Cosmic Foundations
Arizona State University – School of Earth and Space Exploration

Education

Ph.D. University of Minnesota

Sept 2019 - June 2025

Astrophysics

Thesis title: *The high-redshift Universe as seen through galaxy-cluster gravitational lenses*

B.A. University of California, Berkeley

Aug 2015 - May 2019

Astrophysics and Spanish Linguistics

First-Author Publications

A Magnified Compact Galaxy at Redshift 9.51 with Strong Nebular Emission Lines

April 2023

Hayley Williams, Patrick Kelly, Wenlei Chen, et al. Science, Volume 380, Issue 6643, pp. 416-420

[10.1126/science.adf5307](https://doi.org/10.1126/science.adf5307) [🔗](#)

Sp1149. I. Constraints on the Balmer $L - \sigma$ Relation for H II Regions in a Spiral Galaxy at Redshift 1.49 Strongly Lensed by the MACS J1149 Cluster

July 2024

Hayley Williams, Patrick Kelly, Wenlei Chen, et al. The Astrophysical Journal, Volume 969, Issue 1, id.54

[10.3847/1538-4357/ad4464](https://doi.org/10.3847/1538-4357/ad4464) [🔗](#)

Sp1149. II. Spectroscopy of HII Regions near the Critical Curve of MACS J1149 and Cluster Lens Models

July 2024

Hayley Williams, Patrick Kelly, Wenlei Chen, et al. The Astrophysical Journal, Volume 967, Issue 2, id.92

[10.3847/1538-4357/ad4354](https://doi.org/10.3847/1538-4357/ad4354) [🔗](#)

JWST's PEARLS: Temperatures of Nine Highly Magnified Stars in a Galaxy at Redshift 0.94 and Simulated Stellar Population Dependence on Stellar Metallicity and the Initial Mass Function

July 2025

Hayley Williams, Patrick Kelly, Rogier Windhorst, et al. Under review at The Astrophysical Journal

[10.48550/arXiv.2507.03097](https://arxiv.org/abs/10.48550/arXiv.2507.03097) [🔗](#)

JWST's PEARLS: A Candidate Massive Binary Star System in a Lensed Galaxy at Redshift 0.94

July 2025

Hayley Williams, Patrick Kelly, Emmanouli Zapartas, et al. Under review at The Astrophysical Journal

[10.48550/arXiv.2507.03098](https://arxiv.org/abs/10.48550/arXiv.2507.03098) [🔗](#)

Talks

Highly magnified individual stars at cosmological distances: nine massive stars detected as transient events in the Warhol galaxy at $z = 0.94$

Sept 2025

Tucson, AZ

Invited colloquium presentation at Steward Observatory, University of Arizona

Highly magnified stars in the Warhol arc

April 2025

Cambridge, MA

Invited talk at "Strong Lensing in the Next Decade"

Center for Astrophysics, Harvard & Smithsonian

Constraints on the Balmer $L - \sigma$ relation for H II regions in a lensed spiral galaxy at $z = 1.49$

June 2024

Madison, WI

Contributed Talk at the 244th meeting of the American Astronomical Society

An extremely compact yet highly star-forming magnified galaxy at $z = 9.51$

May 2024

Reykjavik, Iceland

Contributed talk at "Extreme galaxies in their extreme environments at extremely early epochs"

A highly magnified and extremely compact galaxy at $z = 9.51$ with strong emission lines







Contributed talk at "The James Webb Space Telescope turns one: the birth and growth of galaxies"

Sexten Center for Astrophysics

July 2023

Sesto, Italy




Accepted Proposals

HST	Stellar Initial Mass Function and Dark Matter from [OII] and Paschen-alpha Emission Maps Of the Giant Dragon Arc in the Hubble Frontier Fields Galaxy Cluster Abell 370 GO 18106  , PI Patrick Kelly, Co-I Hayley Williams	July 2025 Cycle 33
Keck	Interpretation of HST and JWST Imaging of Individual Magnified Stars at $z=0.725$ using OSIRIS AO Near-Infrared Spectroscopy 2025B U232, PI Alex Filippenko, Co-I Hayley Williams	June 2025 2025B
JWST	The Dragon survey: A Direct Probe of the Early Stellar Luminosity Function and Dark Matter through Multi-cycle Multi-cadence Microlensing at $z=0.73$ GO 7345  , PI Yoshinobu Fudamoto, Co-I Hayley Williams	March 2025 Cycle 4
JWST	JWST as a time machine: weighting the carbon produced exclusively by massive stars GO 6073  , PI Annalisa Citro, Co-I Hayley Williams	Feb 2024 Cycle 3
JWST	Early stars – Properties of lensed stars at $z \sim 7$ GO 5058  , PI Lucas Furtak, Co-I Hayley Williams	Feb 2024 Cycle 3
Keck	Flashlights: Many Extremely Magnified Individual Stars as Probes of Dark Matter and Stellar Populations to Redshift $z = 2$ PID 75/2022B N181, PI Patrick Kelly, Co-I Hayley Williams	June 2022 2022B
JWST	Imaging and Spectroscopy of Three Highly Magnified Images of a Supernova at $z=1.5$ DD 2767  , PI Patrick Kelly, Co-I Hayley Williams	Oct 2022 Cycle 1
JWST	Imaging and Spectroscopic Follow-up of a Supernova at Redshift $z=3.47$ DD 2756  , PI Wenlei Chen, Co-PI Hayley Williams	Oct 2022 Cycle 1

Awards

Beus Prize Postdoctoral Fellowship Beus Center for Cosmic Foundations Arizona State University – School of Earth and Space Exploration	Sept 2025
Robert O. Pepin Fellowship University of Minnesota – School of Physics and Astronomy	May 2024

Outreach

Our Expanding Universe  Bell Museum Planetarium Show <i>Assisted with script writing and show production</i>	June 2025 Minneapolis, MN
Interpreting the Invisible Universe  A Project Space Grant Art Exhibition <i>Science consultant for artist Holly Streekstra</i>	August 2024 Minneapolis, MN
Universe in the Park  Minnesota Institute for Astrophysics Public Outreach Event <i>Gave a public astronomy presentation and led a public observing night</i>	August 2024 Minneapolis, MN

Leadership and Service

Beus Seminar Committee Arizona State University	Sept 2025 - Present
Journal Club Organizer University of Minnesota	Sept 2023 - May 2025