DR. HANNAH BISH

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Space Telescope Science Institute
3700 San Martin Dr, Baltimore MD 21218, USA

Education

University of Washington, Seattle WA, USA
Ph.D., Astronomy 2022
Advisor: Prof. Jessica Werk
Ph.D. Thesis: *Multiphase Gas Flows in the Milky Way's Halo*
M.S., Astronomy 2016

Rutgers University, New Brunswick NJ, USA
B.S., Astrophysics 2014
Advisor: Prof. Eric Gawiser
Senior Thesis: *Ly-α Emission in High-Redshift Galaxies*

Professional Appointments

Postdoctoral Fellow, Space Telescope Science Institute, Baltimore MD, USA 2022 - present
Primary Research: *3D Interstellar Radiation Field Maps*
Secondary Research: *Impact of Satellite Galaxies on the CGM*
Supervisor: Dr. Joshua Peek

Research Assistant, University of Washington, Seattle WA, USA 2016 - 2022
Research: *Kinematics & Structure of Gas Flows in the Galactic Halo*
Advisor: Prof. Jessica Werk

Teaching Assistant, University of Washington, Seattle WA, USA 2014 - 2016
Courses Taught: Intro Astronomy (ASTR 101), The Planets (ASTR 150)

Research Assistant, Rutgers University, New Brunswick NJ, USA 2012 - 2014
Research: *Ly-α Emission Strength in Star-Forming Galaxies*
Advisor: Prof. Eric Gawiser

REU Student Researcher, American Museum of Natural History, New York NY, USA 2010
Research: *High Proper Motion Stars in the SUPERBLINK Survey*
Advisor: Prof. Sebastien Lepine

Teaching

Guest Lecturer, Astronomy Course for Middle School Girls, University of Washington Summer 2016
Teaching Assistant, ASTR 101: Intro to Astronomy with Prof. Oliver Fraser Winter 2016
Teaching Assistant, ASTR 101: Intro to Astronomy with Prof. Ana Larson Fall 2015
Teaching Assistant, ASTR 150: The Planets with Prof. Toby Smith Summer 2015
Teaching Assistant, ASTR 101: Intro to Astronomy with Prof. Chris Laws Spring 2015
Teaching Assistant, ASTR 101: Intro to Astronomy with Prof. Oliver Fraser Winter 2015
Teaching Assistant, ASTR 150: The Planets with Prof. Toby Smith Fall 2014

Mentoring and Outreach

Invited Speaker, Astronomy on Tap, Baltimore MD 2024

Invited Speaker, New Jersey Astronomical Association, Glen Gardner NJ 2023

Volunteer, Math Alliance Graduate Recruiting for Underrepresented Students, virtual 2021

Mentor, Pre-Major in Astronomy Program (Pre-MAP), University of Washington 2016 - 2020
Supervised research of four students: *Brittany Platt, Magdalyn Paige, Olivia Petry, & Travis Mandeville*

Invited Speaker, Everett Astronomical Society, Everett WA 2019

Invited Speaker, Astronomy on Tap, Seattle WA 2019

Volunteer, Meany Middle School Astronomy Outreach, Seattle WA 2019

Organizer, EquiTea Journal Club, University of Washington 2017 - 2019
Planned monthly discussions and workshops about issues of equity and inclusion

Volunteer, ARCS Educational Astronomy for Children & Parents, Seattle WA 2017

Volunteer, Planetarium Presenter for Visiting Groups, University of Washington 2016 - 2017

Honors and Awards

Marie Skłodowska-Curie Postdoctoral Fellowship 2025-2028

PI, ACCESS Explore Proposal (PHY230181), 400,000 SUs (∼333,000 compute hours) 2025

Co-I, HST Proposal (HST-GO-17733), 30 orbits 2024
Title: *When Clouds Collide: Observing Gas Accretion onto the Milky Way's Disk*

PI, ACCESS Explore Proposal (PHY230181), 400,000 SUs (∼333,000 compute hours) 2023

AAS Rodger Doxsey Prize 2022

Co-I, HST Proposal (HST-GO-16679), 71 orbits 2021
Title: *Mainly on the Plane: Solving the Milky Way CGM Anomaly with Low-Latitude QSOs*

Graduate Student Prize for Research Excellence, University of Washington 2019

Graduate Student Presentation Award, Wolfe Symposium in Astrophysics 2018

Co-I, HST Proposal (HST-GO-15154), 17 orbits 2017
Title: *Tracing Gas Flows from Halo to Disk: Observing the Milky Way's Galactic Fountain*

ARCS Foundation Graduate Fellowship 2014 - 2017

Magna cum laude, Rutgers University 2014

Honors thesis in Astrophysics, Rutgers University 2014

Aresty Research Center Grant, Rutgers University 2013

Richard J. Plano Summer Research Internship Award 2013

Rutgers University Academic Excellence Award 2013

Professional Service

Committee Member, ISM* Code of Conduct Committee, STScI 2025 - present

Organizer, Low Density Universe 'supergroup', Space Telescope Science Institute 2022 - present

Local Organizing Committee Member, STScI Spring Symposium 2025

Scientific Referee, The Astrophysical Journal 2024

Panel Support, JWST TAC Cycle 2 Peer Review, Space Telescope Science Institute 2023

Committee Member, University of Washington Graduate Admissions 2020

Organizer, EquiTea journal club for equity and inclusion 2018 - 2019

Organizer, Prospective Student Visit, University of Washington 2017

Technical Schools and Workshops

- CosmicAI Astro-AI Boot Camp, University of Texas at Austin 05/2025
  1-week intensive boot camp covering a broad overview of AI methods and scientific applications in a high-performance computing environment, with a focus on challenges in the domain of astronomy.
- Docker training, Space Telescope Science Institute, USA 12/2023
  2-day training on use of Docker containers to effect reproducible computational environments. Such environments are useful for ensuring reproducible research outputs and sharing open-source code.
- Interstellar Institute, Institut Pascal, France 07/2023
  3-week program for research development and collaboration among ISM experts. Worked with other participants to determine the best approach to building my 3-D model of the interstellar radiation field (currently under development) and investigate use cases.
- AWS training, Space Telescope Science Institute, USA 05/2023
  2-day training on using Amazon Web Services (AWS) for computationally-intensive research tasks.
- Planetarium training, University of Washington, USA 10/2019
  1-day training on planetarium equipment/software and development of custom planetarium shows for a range of visiting audiences at the university.
- Python Software Engineering Boot Camp, University of Washington, USA 09/2014
  2-day workshop on Python tools for scientific computing in astronomy.

Observing Experience

Awarded Proposals:

HST-GO 17733 Cycle 32, HST COS, 30 orbits (Co-I)	2024
HST-GO 16679 Cycle 29, HST COS, 71 orbits (Co-I)	2021
2020 Q4, APO 3.5-m, 20 hours (Co-I)	2020
2020B, MDM 2.4-m OSMOS, 20 hours (Co-I)	2020
HST-GO 15154 / Cycle 25, HST COS, 17 orbits (Co-I)	2017

Observing Nights:

Apache Point Observatory 3.5-m DIS, 1 night	2021
Apache Point Observatory 3.5-m DIS, 4 half-nights	2020
Keck HIRES, 3 half-nights	2017
Keck HIRES, 3 half-nights	2016
Apache Point Observatory 3.5-m DIS, 5 half-nights	2015
Manastash Ridge Observatory 0.75-m, 2 nights	2015
Schommer Observatory 20-in, 2 nights	2013
Green Bank Observatory 40-ft, 8 hours	2012

Data Reduction:

`coaddx1d`/IDL and personal pipeline/Python, HST COS

`xidl`/IDL and `HIRES`/IDL, Keck HIRES

`PypeIt`/Python, Apache Point Observatory 3.5-m DIS and MDM 1.3-m/2.4-m OSMOS

`PyDIS`/Python, MDM 2.4-m OSMOS

`IRAF`, Apache Point Observatory 3.5-m DIS, Schommer Observatory 20-in

Computing

Awarded Computing Time:

ACCESS Explore (PHY230181), 800,000 SUs/∼666,000 hrs. on Purdue Anvil Cluster (PI) 2024-2025

Experience:

Python: advanced, daily user

IDL: intermediate

JavaScript & D3: intermediate

Hyak supercomputer user, department time allocation, University of Washington

FASRC supercomputer user, department time allocation, Harvard University

Anvil supercomputer user, ∼666,000 hours, Purdue University

Presentations

Invited Talks:

University of Wisconsin - *LightCube: A 3D Model of the Local UV Interstellar Radiation Field* 2023

Carnegie Observatories - *LightCube: A 3D Model of the Local UV Interstellar Radiation Field* 2023

SAGA Collaboration Meeting - *QuaStar: A First Look at the Milky Way's Hidden CGM* 2023

STScI RadioQuiet Meeting - *QuaStar: A First Look at the Milky Way's Hidden CGM* 2021

STScI Milky Way Halo Meeting - *QuaStar: A First Look at the Milky Way's Hidden CGM* 2021

MUSYC LAE Meeting - *SED Properties of z∼2-3 LAEs* 2013

MUSYC LAE Meeting - *SpeedyMC Results for z=2.1 LAEs with CANDELS SEDs* 2012

Contributed Talks:

Inter+Stellar Symposium - *LightCube: A 3D Model of the Local UV Interstellar Radiation Field* 2025

IAU GA XXIII - *LightCube: A 3D Model of the Local UV Interstellar Radiation Field* 2024

AAS #243 353.06 - *LightCube: A 3D Model of the Local UV Interstellar Radiation Field* 2024

AAS #241 245.03D - *Galactic Gas Flows from Halo to Disk* 2023

AAS #236 205.03 - *QuaStar: A First Look at the Milky Way's Hidden CGM* 2020

Wolfe Symposium in Astrophysics - *Milky Way Gas Kinematics at the Disk-Halo Interface* 2018

Rutgers University - *MCMC SED Fitting in CANDELS* 2013

Tri-State Astronomy Conference - *Physical Properties of LAEs at z = 2.1* 2013

CANDELS Team Meeting - *To Stack or Not to Stack: SED Properties of z=2.1 LAEs* 2013

Posters:

AAS #225 143.55 - *What Determines the Strength of Lyα Emission in Star-Forming Galaxies?* 2015

AAS #223 145.05 - *To Stack or Not to Stack: Physical Properties of LAEs at z = 2.1* 2014

Aresty Research Symposium - *To Stack or Not to Stack: Physical Properties of LAEs at z = 2.1* 2014

AAS #221 147.32 - *Physical Properties of Lyman Alpha Emitters in CANDELS* 2013

Journal Articles

First Author:

1. **Bish, H.V.**; Peek, J.E.G.; Murray, C.; Gordon, K.; Clark, S.; Hamden, E. "*LightCube: A 3-D Model of the Local Interstellar Radiation Field*" (in prep.)
2. **Bish, H.V.**; Tollerud, E.; Hamanowicz, A. "*COS-SAGA I: Connecting the CGM of Milky Way Analogs and Their Satellite Populations*" (in prep.)
3. **Bish, H.V.**; Werk, J.K.; Di Teodoro, E.M.; Peek, J.E.G.; Zheng, Y.; Putman, M.E. "*Differential Accretion of Ionized Low-Velocity Gas at the Milky Way's Disk-Halo Interface*" (accepted to ApJ)
4. **Bish, H.V.**; Werk, J.K.; Peek, J.E.G.; Putman, M.E.; Zheng, Y. "*QuaStar: Measuring the Milky Way's Obscured Low-Velocity Circumgalactic Medium*" 2021, ApJ, 912, 8
5. **Bish, H.V.**; Werk, J.K.; Prochaska, J.X.; Rubin, K.H.R.; Zheng, Y.; O'Meara, J.M.; Deason, A.J. "*Galactic Gas Flows from Halo to Disk: Tomography and Kinematics at the Milky Way's Disk-Halo Interface*" 2019, ApJ, 882, 76

Co-Authored:

1. Tollerud, E.J.; Hamanowicz, A.; **Bish, H.V.**; Geha, M.; Wechsler, R.H.; Mao, Y; Kallivayalil, N.; Weinder, B.; Bordoloi, R.; Tumlinson, J.; Wetzel, A. "*COS-SAGA I: The Circumgalactic Medium of NGC3067 and its Lone Satellite*" (submitted to ApJL)
   – Contribution: Reduced and analyzed COS spectra, assisted with metallicity calculation.
2. Werk, J.K.; Tchernyshyov, K.; **Bish, H.V.**; Zheng, Y.; Putman, M.; Peek, J.E.G.; Schiminovich, D. "*The Plane Quasar Survey: First Data Release*"
   – Contribution: Carried out four half-nights of observations, reduced data for catalog.
3. Werk, J.K., Rubin, K.H.R., **Bish, H.V.**; Prochaska, J.X.; Zheng, Y.; O'Meara, J.M.; Lenz, D.; Hummels, C.; Deason, A.J. "*The Nature of Ionized Gas in the Milky Way Galactic Fountain*" 2019, ApJ, 887, 89
   – Contribution: Data reduction and analysis of low ions, two figures, scientific discussion.
4. Vargas, C.J., **Bish, H.V.**, Acquaviva, V., Gawiser, E.J., Finkelstein, S.L., Ciardullo, R., Ashby, M., Feldmeier, J., Ferguson, H., Gronwall, C., Guaita, L., Hagen, A., Koekemoer, A., Kurczynski, P., Newman, J., & Padilla, N. "*To Stack or Not to Stack: Spectral Energy Distribution Properties of Ly-Emitting Galaxies at z=2.1*". 2013, ApJ, 783, 26.
   – Contribution: SED fitting and primary data analysis, six figures, scientific discussion.

References

Prof. Jessica K. Werk
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Associate Professor
Department of Astronomy, University of Washington

Dr. Joshua E. G. Peek
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Associate Astronomer, Project Scientist
Data Science Mission Office, Space Telescope Science Institute

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Astrophysicist
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