

FAKHRI S. ZAHEDY

Observatories of the Carnegie Institution for Science | 813 Santa Barbara St, Pasadena, CA 91101, USA
fzahedy@carnegiescience.edu | (626)-304-0286 | <http://www.fakhrizahedy.com>

CURRENT POSITION

Carnegie Fellow 2019 - present
Observatories of the Carnegie Institution for Science

EDUCATION

The University of Chicago
Ph.D. in Astronomy & Astrophysics 2019
Thesis: *Multi-Pronged Studies of Diffuse Halo Gas around Massive Quiescent Galaxies*
Advisor: Prof. Hsiao-Wen Chen

The University of Chicago
M.S. in Astronomy & Astrophysics 2015

Massachusetts Institute of Technology (MIT)
B.S. in Physics, with concentrations in Astronomy and Music 2013
Cumulative GPA: 5.00/5.00
Inducted to Phi Beta Kappa and Sigma Pi Sigma

SELECTED AWARDS

Carnegie Postdoctoral Fellowship, Carnegie Observatories 2019 - present

Thacher Research Award for Postdoctoral Excellence, Carnegie Observatories 2021

James W. Cronin Memorial Fellowship, The University of Chicago 2018 - 2019

William R. Harper Dissertation Fellowship, The University of Chicago 2018

Hubble Space Telescope (HST) Cycle 25 Program, Principal Investigator (11 orbits, \$57k awarded) 2017

Brinson Chicago-Carnegie Predoctoral Fellowship, Carnegie Observatories 2016 - 2017

International Travel Grant Award, The American Astronomical Society (AAS) 2017

Hubble Space Telescope (HST) Cycle 24 Program, Principal Investigator (3 orbits, \$43k awarded) 2016

McCormick Graduate Fellowship, The University of Chicago 2013 - 2015

Phi Beta Kappa, Massachusetts Institute of Technology 2013

PREVIOUS RESEARCH EXPERIENCE

Research Assistant at The University of Chicago, <i>with Prof. Hsiao-Wen Chen</i>	2013 - 2019
Brinson Predoctoral Fellow at Carnegie Observatories, <i>with Dr. Michael Rauch</i>	2016 - 2017
Undergraduate Researcher at MIT, <i>with Prof. Jacqueline Hewitt</i>	2011
Undergraduate Researcher at Lowell Observatory, <i>with Dr. Deidre Hunter</i>	2010
Undergraduate Researcher at MIT, <i>with Prof. James L. Elliot</i>	2010

SUCCESSFUL OBSERVING PROPOSALS (AS PRINCIPAL INVESTIGATOR)

The 6.5m Magellan Telescopes: 37 nights	2019 - present
HST/STIS Cycle 30 , <i>A High-Definition View of the Baryon Cycle in Massive Galaxies</i> (GO-17146): 36 orbits	2022
HST/COS Cycle 25 , <i>Resolving the Multiphase ISM of an Elliptical Galaxy at $z \sim 0.4$</i> (GO-15250): 11 orbits	2017
HST/STIS Cycle 24 , <i>Resolving Fe-rich Neutral ISM in a Massive Quiescent Galaxy at $z \sim 0.4$</i> (GO-14751): 3 orbits	2016

SUCCESSFUL OBSERVING PROPOSALS (AS CO-INVESTIGATOR)

The Magellan Telescopes: 60+ nights	2014 - present
ESO/VLT MUSE: 49.5 hours	2016 - 2019
HST COS Cycle 25 , <i>COS Ultraviolet Baryon Survey</i> (GO-15163): 169 orbits	2017
HST COS Cycle 25 , <i>UV Observation of a QSO Sightline Intersecting an X-ray Identified Filament of the Cosmic Web</i> (GO-15198): 5 orbits	2017
HST ACS Cycle 25 , <i>Unveiling Quasar Fueling through a Public Snapshot Survey of Quasar Host Environments</i> (SNAP-15279): 124 targets	2017
HST ACS Cycle 24 , <i>Differentiating Gas Infall and Outflows with Resolved Star Formation Morphology</i> (GO-14667): 5 orbits	2017
NOAO Gemini GMOS-N: 2 nights	2015
MMT Hectospec & MAESTRO: 2 nights	2015

SCIENTIFIC TALKS

Astronomy Lunch Talk, The University of Washington, Seattle, CA	2022
CIERA Astrophysics Seminar, Northwestern University, Evanston, IL (Invited)	2022
Astronomy Tea talk, California Institute of Technology, Pasadena, CA (Invited)	2022

Carnegie Summer Research Program Colloquium, Carnegie Observatories (Invited)	2021
Cosmology, Galaxies, Intergalactic Medium (CGI) seminar, UC Santa Cruz (Invited)	2021
Radio Lunch Talk, California Institute of Technology, Pasadena, CA (Invited)	2021
Fundamental of Gaseous Halos Workshop, Kavli Institute of Theoretical Physics, UC Santa Barbara, Santa Barbara, CA	2021
Galaxies and Clusters Seminar Series, University of Michigan Astronomy Department (Invited)	2020
Epoch of Galaxy Quenching, Kavli Institute for Cosmology, Cambridge, UK	2020
Center for Computational Astrophysics Lunch Talk, Flatiron Institute, NY (Invited)	2020
The Circumgalactic Medium around Galaxies: When Baryons Invest Halos, Annual IAP Colloquium, Paris, France (virtual)	2020
Quenching and Transformation Through Cosmic Time, Aspen Center for Physics, CO	2020
UCSB Astro Lunch, UC Santa Barbara, Santa Barbara, CA (Invited)	2019
The Cosmic Baryon Cycle: 7th GMT Community Science Meeting, Carlsbad, CA	2019
Dissertation Talk, the 233rd American Astronomical Society Meeting, Seattle, WA	2019
Princeton University Astrophysics Galread Seminar, Princeton, NJ	2018
MIT Astrophysics Brown Bag Lunch Talk, Cambridge, MA	2018
Steward Observatory Galaxy Group Talk, Tucson, AZ	2018
Carnegie Observatories Lunch Talk, Pasadena, CA	2018
Northwestern University Circumgalactic Medium Workshop, Evanston, IL	2018
Intergalactic Interconnections Conference, Marseille, France	2018
The Circle of Life: Connecting the Intergalactic, Circumgalactic, and Interstellar Media, Kruger Park, South Africa	2017
STScI Spring Symposium: Lifecycle of Metals Throughout the Universe, Baltimore, MD	2017
Magellan Science Meeting, Washington, D.C.	2016
From Wall to Web Conference, Berlin, Germany	2016
Gas/Galaxies on Top of Quasars (GOTOQ) Workshop, Pittsburgh, PA	2016
Lowell Observatory Colloquia - MIT Field Camp Talks, Flagstaff, AZ	2011

SERVICE, MENTORING, AND TEACHING

Undergraduate Research Mentor , Carnegie Observatories	2021 - present
• Primary science mentor for Mr. Benjamin Snyder (Cal Poly Pomona)	
Science Referee for Nature Astronomy, The Astrophysical Journal (ApJ), ApJ Letters, and the Monthly Notices for the Royal Astronomical Society (MNRAS)	2018 - present

External Panelist for the <i>HST</i> Time Allocation Committee (Cycles 28, 29, and 30) and the NASA Earth and Space Science Graduate Research Fellowship Program	2020 - present
Mentor and Instructor, Carnegie Astrophysics Summer Student Internship (CASSI)	2020 - present
Organizer for Carnegie Summer Research Program Talk Series	2022
Organizer for Summer Tea Talks, Carnegie Observatories	2021
Postdoctoral Representative, Carnegie Observatories	2020 - 2021
Volunteer, Carnegie Observatories Annual Open House	2019
Graduate Admissions Committee, The University of Chicago	2018 - 2019
Astronomy Conversations Presenter, Adler Planetarium	2015 - 2016
Graduate Student Representative to the Faculty, Department of Astronomy & Astrophysics, The University of Chicago	2014 - 2016
Teaching Assistant, Department of Astronomy & Astrophysics, The University of Chicago (five academic quarters)	2013 - 2015
Teaching Assistant and Peer Advisor, the Experimental Study Group (ESG), MIT	2010 - 2011

ACADEMIC REFERENCES

Prof. Hsiao-Wen Chen (Ph.D Advisor)

Professor, The University of Chicago
 phone: (773) 702-8747 | email: hchen@oddjob.uchicago.edu

Dr. John S. Mulchaey

Director, Carnegie Observatories and Science Deputy, Carnegie Institution for Science
 phone: (626) 304-0257 | email: mulchaey@carnegiescience.edu

Dr. Michael Rauch (Carnegie Fellowship Advisor)

Staff Scientist, Carnegie Observatories
 phone: (626) 304-0262 | email: mr@obs.carnegiescience.edu

Dr. Gwen Rudie

Staff Scientist, Carnegie Observatories
 phone: (626) 304-0232 | email: mr@obs.carnegiescience.edu

Prof. Ann Zabludoff

Professor, The University of Arizona and Steward Observatory
 phone: (520) 626-2509 | email: azabludoff@as.arizona.edu

Publication Summary: 22 refereed papers (7 first-author, 4 second author, 11 co-author). 440 total citations (Google Scholar, June 2022). h-index: 12

First-Author and Second-Author Scientific Publications

11. **Zahedy, F. S.**, Chen, H.-W., Cooper, T. M., Boettcher, E., Johnson, S. D., Rudie, G. C., Chen, M. C., et al., *The Cosmic Ultraviolet Baryon Survey (CUBS) - III. Physical Properties and Elemental Abundances of Lyman Limit Systems at $z < 1$* , Monthly Notices of the Royal Astronomical Society, Volume 506, Issue 1, p.877-902 (2021; [link](#), 9 citations)
10. **Zahedy, F. S.**, Chen, H.-W., Boettcher, E., Rauch, M., French, K. D., Zabludoff, A. I., *Evidence for Late-Time Feedback from the Discovery of Multiphase Gas in a Massive Elliptical at $z = 0.4$* , The Astrophysical Journal Letters, Volume 904, Issue 1, L10 (2020; [link](#), 4 citations)
9. Chen, H.-W., **Zahedy, F. S.**, Boettcher E., Cooper T. M., Johnson S. D., Rudie G. C., Chen M. C., et al., *The Cosmic Ultraviolet Baryon Survey (CUBS) - I. Overview and the Diverse Environments of Lyman Limit Systems at $z < 1$* , Monthly Notices of the Royal Astronomical Society, Volume 497, Issue 1, pp. 498-520 (2020; [link](#), 21 citations)
8. Connor, T., **Zahedy, F. S.**, Chen, H.-W., Cooper, T. J., Mulchaey, J. S., Vikhlinin, A., *COS Observations of the Cosmic Web: A Search for the Cooler Components of a Hot, X-ray Identified Filament*, The Astrophysical Journal Letters, Volume 884, Issue 1, article id. L20 (2019; [link](#), 12 citations)
7. **Zahedy, F. S.**, Rauch, M., Chen, H.-W., Carswell, R. F., Stark, A. A., & Stalder, B., *Probing IGM Accretion onto $z \sim 2.8$ Ly α Emitters*, Monthly Notices of the Royal Astronomical Society, Volume 486, Issue 1, p.1392-1403 (2019; [link](#), 5 citations)
6. **Zahedy, F. S.**, Chen, H.-W., Johnson, S. D., Pierce, R. M., Rauch, M., Huang, Y.-H., Weiner, B. J., Gauthier, J.-R., *Characterizing Circumgalactic Gas around Massive Ellipticals at $z = 0.4$: II. Physical Properties and Elemental Abundances*, Monthly Notices of the Royal Astronomical Society, Volume 484, Issue 2, p.2257-2280 (2019; [link](#), 98 citations)
5. Chen, H.-W., **Zahedy, F. S.**, Johnson, S. D., Pierce, R. M., Huang, Y.-H., Weiner, B. J., & Gauthier, J.-R., *Characterizing Circumgalactic Gas around Massive Ellipticals at $z = 0.4$: I. Initial Results*, Monthly Notices of the Royal Astronomical Society, Volume 479, Issue 2, p. 2547-2563 (2018; [link](#), 52 citations)
4. **Zahedy, F. S.**, Chen, H.-W., Rauch, M., & Zabludoff, A. I., *HST Detection of Extended Neutral Hydrogen in a Massive Elliptical at $z = 0.4$* , The Astrophysical Journal Letters, Volume 846, Issue 2, article id. L29 (2017; [link](#), 10 citations)
3. **Zahedy, F. S.**, Chen, H.-W., Gauthier, J.-R., & Rauch, M., *On the Radial Profile of Gas-phase Fe/ α Ratio Around Distant Galaxies*, Monthly Notices of the Royal Astronomical Society, Volume 466, Issue 1, p. 1071-1081 (2017; [link](#), 18 citations)

2. **Zahedy, F. S.**, Chen, H.-W., Rauch, M., Wilson, M. L., & Zabludoff, A. I., *Probing the Cool Interstellar and Circumgalactic Gas of Three Massive Lensing Galaxies at $z = 0.4-0.7$* , Monthly Notices of the Royal Astronomical Society, Volume 458, Issue 3, p. 2423-2442 (2016; [link](#), 48 citations)
1. Hunter, D. A., **Zahedy, F. S.**, Bowsher, E. C., Wilcots, E. M., Kepley, A. A., & Goad, V., *Mapping the Extended HI Distribution of Three Dwarf Galaxies*, The Astronomical Journal, Volume 142, Issue 5, article id. 173 (2011; [link](#), 14 citations)

Co-Author Scientific Publications

11. Nakajima, K. , et al. (incl. **Zahedy, F. S.**), *EMPRESS V. Metallicity Diagnostics of Galaxies over $12 + \log(\text{O}/\text{H}) = 6.9 - 8.9$ Established by a Local Galaxy Census: Preparing for JWST Spectroscopy*, ApJS in press (2022; [link](#))
10. Xu, Y., et al. (incl. **Zahedy, F. S.**), *EMPRESS VI. Outflows Investigated in Low-mass Galaxies with $M_{\text{star}} = 10^4 - 10^7 M_{\odot}$: Weak Feedback in Low-mass Galaxies?*, ApJ, 929, 134 (2022; [link](#))
9. Boettcher, E. , et al. (incl. **Zahedy, F. S.**), *Discovery of a Damped Ly α Absorber Originating in a Spectacular Interacting Dwarf Galaxy Pair at $z = 0.026$* , The Astrophysical Journal Letters, Volume 926, Issue 2, article id. L33 (2022; [link](#))
8. Cooper, T. J., Rudie, G. C., Chen, H.-W., Johnson, S. D., **Zahedy, F. S.**, Chen, M. C., et al., *The Cosmic Ultraviolet Baryon Survey (CUBS) - IV. The Complex Multiphase Circumgalactic Medium as Revealed by Partial Lyman Limit Systems*, MNRAS, 508, 4359 (2021; [link](#))
7. Boettcher, E., Chen, H.-W., **Zahedy, F. S.**, Cooper, T. J., Johnson, S. D., Rudie, G. C., et al., *The Cosmic Ultraviolet Baryon Survey (CUBS) - II. Discovery of an H $_2$ -Bearing DLA in the Vicinity of an Early-Type Galaxy at $z = 0.576$* , ApJ, 913, 18 (2021; [link](#))
6. Huang, Y.-H., Chen, H.-W., Shectman, S. A., Johnson, S. D., **Zahedy, F. S.**, Helsby, J. E., Gauthier, J.-R., Thompson, I. B., *A Complete Census of Circumgalactic Mg II at Redshift $z < 0.5$* , Monthly Notices of the Royal Astronomical Society, 502, 4743 (2021; [link](#))
5. Gaikwad, P., Rauch, M., Haehnelt, M. G., Puchwein, E., Bolton, J. S., Keating, L. C., Kulkarni, G., Irsic, V., Banados, E., Becker, G. D., Boera, E., **Zahedy, F. S.**, et al., *Probing the Thermal State of the Intergalactic Medium at $z > 5$ with the Transmission Spikes in High-Resolution Ly α Forest Spectra*, Monthly Notices of the Royal Astronomical Society, 494, 5091 (2020; [link](#))
4. Chen H.-W., Boettcher, E., Johnson, S. D., **Zahedy, F. S.**, Rudie G. C., Cooksey K. L., Rauch M., Mulchaey, J. S., *A Giant Intragroup Nebula Hosting a Damped Ly α Absorber at $z = 0.313$* , The Astrophysical Journal Letters, Volume 878, article id. L33 (2019; [link](#))

3. Voit, G. M., Donahue, M., **Zahedy, F. S.**, Chen, H.-W., Werk, J. K., Bryan, G. L., O'Shea, B. W., *Circumgalactic Pressure Profiles Indicate Precipitation-Limited Atmospheres for $M_{\text{star}} \sim 10^9 - 10^{11.5} M_{\odot}$* , The Astrophysical Journal Letters, Volume 879, article id. L1 (2019; [link](#))
2. Chen, H.-W., Johnson, S. D., Straka, L. A., **Zahedy, F. S.**, Schaye, J., Muzahid, S., Bouche, N., et al., *Characterizing Circumgalactic Gas around Massive Ellipticals at $z \sim 0.4$: III. The Galactic Environment of a Chemically Pristine Lyman Limit Absorber*, Monthly Notices of the Royal Astronomical Society, 484, 431 (2019;[link](#))
1. Chen, H.-W., Johnson, S. D., **Zahedy, F. S.**, Rauch, M., & Mulchaey, J. S., *Gauging Metallicity of Diffuse Gas under an Uncertain Ionizing Radiation Field*, The Astrophysical Journal Letters, Volume 842, Issue 2, article id. L19 (2017; [link](#))

Science White Papers and Non-Refereed Publications

3. Voit, G. M., et al. (incl. **Zahedy, F. S.**), *Circumgalactic Gas and the Precipitation Limit*, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 405 (2019)
2. Chen, H.-W., et al. (incl. **Zahedy, F. S.**), *Tracking the Baryon Cycle in Emission and in Absorption*, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 329 (2019)
1. Rudie, G. C., et al. (incl. **Zahedy, F. S.**), *Observing Galaxies and Dissecting their Baryon Cycle at Cosmic Noon*, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 148 (2019)