

# FAKHRI S. ZAHEDY

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## CURRENT POSITION

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

## EDUCATION

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**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

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**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 HST orbits and \$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 HST orbits and \$43k awarded) 2016

**McCormick Graduate Fellowship**, The University of Chicago 2013 - 2015

**Phi Beta Kappa**, Massachusetts Institute of Technology 2013

## PREVIOUS RESEARCH EXPERIENCE

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

## SUCCESSFUL OBSERVING PROPOSALS (AS PRINCIPAL INVESTIGATOR)

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<b>The 6.5m Magellan Telescopes:</b> 26 nights	2019 - present
<b>HST COS Cycle 25</b> , <i>Resolving the Multiphase ISM of an Elliptical Galaxy at <math>z\sim 0.4</math></i> (GO-15250): 11 orbits	2017
<b>HST STIS Cycle 24</b> , <i>Resolving Fe-rich Neutral ISM in a Massive Quiescent Galaxy at <math>z\sim 0.4</math></i> (GO-14751): 3 orbits	2016

## SUCCESSFUL OBSERVING PROPOSALS (AS CO-INVESTIGATOR)

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<b>The Magellan Telescopes:</b> 60+ nights	2014 - present
<b>ESO/VLT MUSE:</b> 49.5 hours	2016 - 2019
<b>HST COS Cycle 25</b> , <i>COS Ultraviolet Baryon Survey</i> (GO-15163): 169 orbits	2017
<b>HST COS Cycle 25</b> , <i>UV Observation of a QSO Sightline Intersecting an X-ray Identified Filament of the Cosmic Web</i> (GO-15198): 11 orbits	2017
<b>HST ACS Cycle 25</b> , <i>Unveiling Quasar Fueling through a Public Snapshot Survey of Quasar Host Environments</i> (SNAP-15279): 124 targets	2017
<b>HST ACS Cycle 24</b> , <i>Differentiating Gas Infall and Outflows with Resolved Star Formation Morphology</i> (GO-14667): 5 orbits	2017
<b>NOAO Gemini GMOS-N:</b> 2 nights	2015
<b>MMT Hectospec &amp; MAESTRO:</b> 2 nights	2015

## SCIENTIFIC TALKS

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Cosmology, Galaxies, Intergalactic Medium (CGI) seminar, UC Santa Cruz (virtual)	2021
Radio Lunch Talk, California Institute of Technology, Pasadena, CA (virtual)	2021
Fundamental of Gaseous Halos Workshop, Kavli Institute of Theoretical Physics, UC Santa Barbara, Santa Barbara, CA (virtual)	2021
Galaxies and Clusters Seminar Series, University of Michigan Astronomy Department (virtual)	2020

Epoch of Galaxy Quenching, Kavli Institute for Cosmology, Cambridge, UK (virtual)	2020
Center for Computational Astrophysics Lunch Talk, Flatiron Institute, NY (virtual)	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	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

## MENTORING, TEACHING, SERVICE, AND OUTREACH

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<b>Undergraduate Research Mentor</b> , Carnegie Observatories	
• Primary science mentor for Mr. Benjamin Snyder (Cal Poly Pomona)	2021 - present
<b>Science Referee</b> for Nature Astronomy, The Astrophysical Journal (ApJ), ApJ Letters, and the Monthly Notices for the Royal Astronomical Society (MNRAS)	2018 - present
<b>External Panelist</b> for the <i>HST</i> Time Allocation Committee (Cycles 28 & 29) and the NASA Earth and Space Science Graduate Research Fellowship Program	2020 - present
Organizer for Summer Tea Talk, Carnegie Observatories	2021
Postdoctoral Representative, Carnegie Observatories	2020 - 2021
Mentor and Instructor, Carnegie Astrophysics Summer Student Internship (CASSI)	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

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**Dr. Hsiao-Wen Chen (Ph.D Advisor)**

Professor, The University of Chicago

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**Dr. John S. Mulchaey**

Director, Carnegie Observatories and Science Deputy, Carnegie Institution for Science

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**Dr. Michael Rauch (Carnegie Fellowship Advisor)**

Staff Scientist, Carnegie Observatories

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**Dr. Gwen Rudie**

Staff Scientist, Carnegie Observatories

phone: (626) 304-0232 | email: [mr@obs.carnegiescience.edu](mailto:mr@obs.carnegiescience.edu)

**Dr. Ann Zabludoff**

Professor, The University of Arizona and Steward Observatory

phone: (520) 626-2509 | email: [azabludoff@as.arizona.edu](mailto:azabludoff@as.arizona.edu)

**Publication Summary:** 19 refereed papers (7 First Author, 4 Second Author, 8 Co-Author); 336 total citations (Google Scholar, October 2021); h-index: 11

## 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](#), 2 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](#), 13 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 $\alpha$  Emitters*, Monthly Notices of the Royal Astronomical Society, Volume 486, Issue 1, p.1392-1403 (2019; [link](#), 4 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  $z \sim 0.4$ : II. Physical Properties and Elemental Abundances*, Monthly Notices of the Royal Astronomical Society, Volume 484, Issue 2, p.2257-2280 (2019; [link](#), 81 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  $z \sim 0.4$ : I. Initial Results*, Monthly Notices of the Royal Astronomical Society, Volume 479, Issue 2, p. 2547-2563 (2018; [link](#), 40 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/ $\alpha$  Ratio Around Distant Galaxies*, Monthly Notices of the Royal Astronomical Society, Volume 466, Issue 1, p. 1071-1081 (2017; [link](#), 17 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](#), 45 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](#), 11 citations)

## Co-Author Scientific Publications

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 in press (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<sub>2</sub>-Bearing DLA in the Vicinity of an Early-Type Galaxy at  $z = 0.576$* , ApJ, 913, 18 (2021; [link](#), 2 citations)
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](#), 8 citations)
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 $\alpha$  Forest Spectra*, Monthly Notices of the Royal Astronomical Society, 494, 5091 (2020; [link](#), 30 citations)
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 $\alpha$  Absorber at  $z = 0.313$* , The Astrophysical Journal Letters, Volume 878, article id. L33 (2019; [link](#), 15 citations)
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](#), 19 citations)
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](#), 15 citations)
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](#), 12 citations)

## 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)