SEAN D. JOHNSON

Department of Astronomy, University of Michigan
(713)−562−1666 ⋄ seanjoh@umich.edu ⋄ www.sdjohnson.org

CURRENT POSITION

- LSA Collegiate Fellow, Department of Astronomy, University of Michigan *2020 − present*
- Assistant Professor, Department of Astronomy, University of Michigan *2020 − present*

EDUCATION

The University of Chicago

- PhD. in Astronomy & Astrophysics *2016*

  Thesis: Studies of the relationship between galaxies and the inter/circum-galactic medium

  Advisor: Professor Hsiao-Wen Chen
- M.S. in Astronomy & Astrophysics *2011*
- B.S. in Mathematics & B.A. in Physics with specialization in Astrophysics, with Honors *2010*

RESEARCH INTERESTS: OBSERVATIONS OF GALAXY EVOLUTION

- The inter- and circum-galactic medium and relationship to galaxy evolution
- Fueling of and feedback from star-formation in galaxies
- Feeding of and feedback from quasars
- Future telescopes & surveys: the Prime Focus Spectrograph and 30-m class telescopes

RESEARCH HIGHLIGHTS

- 8 first author, 6 second author, and 21 co-authored journal articles totaling over 600 citations
- h-index: 14
- Awarded five PI & two co-PI programs on *Hubble* (over 300 orbits) in Cycles 25 − 27 (2017-2019)
- $\$695,000$ in NASA grants as PI since 2017 ($1 million if including Hubble Fellowship)
- Awarded 30 nights on the 6.5-m Magellan Telescopes and 3 nights on NOAO 4-meters
- Primary advisor for three undergraduate research students at Princeton with one paper accepted to ApJ Letters and one submitted
- Science highlighted as motivating cases for 30-m class telescopes and new Magellan instruments including public access through NSF investment

SELECTED FELLOWSHIPS AND AWARDS

- Joint Carnegie−Princeton Fellowship *2016 − 2020*
- NASA Hubble Fellowship *2016 − 2019*
- American Astronomical Society Rodger Doxsey Travel Prize *2015*
- National Science Foundation Graduate Research Fellowship *2010 − 2015*
- Sigma Xi Grant-in-Aid of Research *2015*

– Brinson Pre-doctoral Fellow at the Carnegie Observatories *2013 – 2014*

– Illinois Space Grant Fellowship *2011 – 2012*

– McCormick Fellowship, The University of Chicago *2010 – 2012*

FIRST AND SECOND AUTHOR JOURNAL ARTICLES

*Primary advisor on student-led paper

14. *Helton, J., **Johnson, S. D.**, Greene, J. E., et al., *Discovery and origins of giant optically emitting nebulae around PKS 0454-22*, submitted

13. *Somalwar, J., **Johnson, S. D.**, Stern, J., Goulding, A .D., Greene, J. E, Zakamska, N. L., Alexandroff, R. M., Chen, H.-W., 2020, *The first spatially resolved rest-UV spectroscopy of a prototypical quasar driven superwind at low-z*, ApJ Letters, 890, 28

12. **Johnson, S. D.**, Mulchaey, J. S., Chen, H.-W., Wijers, N. A., Connor, T., Muzahid, S., Schaye, J., Cen, R., Carlsten, S. G., Charlton, J., Drout, M. R., Goulding, A. D., Hansen, T. T., Walth, G. L., 2019 *The Physical Origins of the Identified and Still Missing Components of the Warm-Hot Intergalactic Medium: Insights from Deep Surveys in the Field of Blazar 1ES1553+113*, ApJ Letters, 884, 2, L31

11. Chen, H.-W., **Johnson, S. D.**, Straka, L. A., Zahedy, F. S., Schaye, J., Muzahid, S., Bouché, N., Cantalupo, S., Marino, R., Wendt, M., 2019, *Characterizing circumgalactic gas around massive ellipticals at $z \approx 0.4$ III. The galactic environment of a chemically-pristine Lyman limit absorber*, MNRAS, 484, 1

10. **Johnson, S. D.**, Chen, H.-W., Straka, L. A., Schaye, J., Cantalupo, S., Wendt, M., Muzahid, S., Bouché, N., Herenz, E. C., Kollatchny, W., Mulchaey, J. S., Marino, R. A., Maseda, M. V., Wisotzki, L., 2018, *Galaxy and Quasar Fueling Caught in the Act from the Intragroup to the Interstellar Medium*, ApJ Letters, 869, L1

9. **Johnson, S. D.**, Chen, H.-W., & Mulchaey, J. S., Schaye, J., Straka, L. A. 2017, *The extent of chemically enriched gas around star-forming dwarf galaxies*, ApJ Letters, 850, L10

8. Chen, H.-W., **Johnson, S. D.**, Zahedy, F. S., Rauch, M., & Mulchaey, J. S. 2017, *Gauging Metallicity of Diffuse Gas under an Uncertain Ionizing Radiation Field*, ApJ letters, 842L, 19C

7. Straka, L. A., **Johnson, S. D.**, York, D. G., Bowen, D. V., Florian, M., Kulkarni, V. P., Lundgren, B., Peroux, C. 2016, *Magellan LDSS3 emission confirmation of galaxies hosting metal-rich Lyman-alpha absorption systems*, MNRAS, 458, 3760

6. **Johnson, S. D.**, Chen, H.-W., & Mulchaey, J. S. 2015, *On the origin of excess cool gas in quasar host halos*, MNRAS, 452, 2553

5. **Johnson, S. D.**, Chen, H.-W., & Mulchaey, J. S. 2015, *On the possible environmental effect in distributing heavy elements beyond individual gaseous halos*, MNRAS, 449, 3263

4. **Johnson, S. D.**, Chen, H.-W., Mulchaey, J. S., Tripp, T. M., Prochaska, J. X., & Werk, J. K. 2014, *Discovery of a transparent sightline at $\rho \lesssim$ 20 kpc from an interacting pair of galaxies*, MNRAS, 438, 3039

3. **Johnson, S. D.**, Chen, H.-W., & Mulchaey, J. S. 2013, *Probing the IGM-galaxy connection at $z < 0.5$ - II. New insights into the galaxy environments of O VI absorbers in PKS 0405−123*, MNRAS, 434, 1765

2. **Johnson, S. D.** & Moyer, E. J., 2012, *Feasibility of U.S. renewable portfolio standards under cost caps and case study for Illinois*, Energy Policy, 49, 449

1. Moyer, E. J., **Johnson, S. D.**, Goldberger, L., & Zhu, J., 2012, *Feasibility and Implications of the Michigan 2012 Proposal 3 for a 25% State Renewable Portfolio Standard*, RDCEP Policy Analysis Paper Series

OTHER CO-AUTHORED JOURNAL ARTICLES

21. Chen, Hsiao-Wen; Zahedy, Fakhri S.; Boettcher, Erin; Cooper, Thomas M.; Johnson, Sean D.; Rudie, Gwen C.; Chen, Mandy C.; Walth, Gregory L.; et al., 2020, *The Cosmic Ultraviolet Baryon Survey (CUBS) - I. Overview and the diverse environments of Lyman limit systems at* $z < 1$ MNRAS, 497, 498

20. Sowgat, M., Joop, S., Marino, R. A., Cantalupo, S., Brinchmann, J., Contini, T., Wednt, M., Wisotzski, L., Zabl, J., Bouché, N., Akhlaghi, M., Chen, H.-W., Claeyssens, A., **Johnson, S. D.**, Leclergq, F., Maseda, M., Matthee, J., Richard, J., Urrutia, T., Verhamme, A., 2020 *MUSE-QuBES: Calibrating the redshifts of Lyman-*α *emitters using stacked circumgalactic medium absorption profiles*, MNRAS, 496, 1013

19. den Brok, J. S., Cantalupo, S., Mackenzie, R., Marino, R. A., Pezzulli, G., Matthee, J., Johnson, S. D., Krumpe, M., Urrutia, T., Kollatschny, W., 2020, *Probing the AGN unification model at redshift* $z \sim 3$ *with MUSE observations of giant Ly*α *nebulae*, MNRAS, 495, 1874

18. Kado-Fong, E., Greco, J. P., Beaton, R., Goulding, A., **Johnson, S. D.**, et al., 2020 *Star Formation in Isolated Dwarf Galaxies Hosting Tidal Debris: Extending the Dwarf-Dwarf Merger Sequence*, AJ, 159, 103

17. Caplar, N., Pena, T., **Johnson, S. D.**, Greene, J. E., 2020 *Nonstationarity of AGN variability: The only way to go is down!*, ApJ Letters, 889, 29

16. Halevi, G., Goulding, A., Greene, J., Coupon, J., Golob, A., Gwyn, S., **Johnson, S. D.**, Moutard, T., Sawicki, M., Suh, H., Toba, Y., 2019, *HSC-XD 52: An X-ray detected AGN in a low-mass galaxy at* $z = 0.56$, ApJ Letters 885, 1, L3

15. Gaspari, M., Eckert, D., Ettori, S., Tozzi, P., Bassini, L., Rasia, E., Brighenti, F., Sun, M., Borgani, S., **Johnson, S. D.**, Tremblay, G., Stone, J., Temi, P., Yang, H.-Y. K., Tombesi, F., Cappi, M., 2019, ApJ, 884, 2, 169

14. Marino, R. A., Cantalupo, S., Pezzulli, G., Lilly, S. J., Gallego, S., Mackenzie, R., Matthee, J., Brinchmann, J., Bouché, N., Feltre, A., Muzahid, S., Schroetter, I., **Johnson, S. D.**, Nanayakkara, T., 2019, ApJ, 880, 47M

13. Chen, H.-W., Boettcher, E., **Johnson, S. D.**, et al. 2019, "A Giant Intragroup Nebula Hosting a Damped Lyα Absorber at z=0.313", ApJ Letters, 878, L33

12. Zahedy, F. S., Chen, H.-W., **Johnson, S. D.**; Pierce, R. M., Rauch, M., Huang, Y.-H., Weiner, B. D., Gauthier, J.-R., 2018, *Characterizing Circumgalactic Gas around Massive Ellipticals at* $z \approx 0.4$ *- II. Physical Properties and Elemental Abundances*, MNRAS, 484, 2

11. Schmidt, S. J., Shappee, B.-J., van Saders, J. L.; Stanek, K. Z., Brown, J. S.; Kochanek, C. S.; Dong, S.; Drout, M. R.; Frank, S; Holoien, T. W.-S.; **Johnson, S. D.**; Madore, B. F..; Prieto, J. L.; Seibert, M.; Seidel, M. K.; Simonian, G. V. A., *The largest M dwarfs flares from ASAS-SN*, ApJ, 876, 115S

10. Chen H.-W., Zahedy F. S., **Johnson S. D.**, Pierce R. M., Huang Y.-H., Weiner B. J., Gauthier J.-R., 2018, *Characterizing Circumgalactic Gas Around Massive Ellipticals at* $z \approx 0.4$ *- I. Initial results* MNRAS, 479, 2547C

9. Sun, A.-L., Greene, J. E., Zakamska, N. L., Goulding, A., Strauss, M. A., Huang, S., **Johnson, S.D.**, Kawaguchi, T., Matsuoka, Y., Marsteller, A. A., Nagao, T., Tobo, Y., et al. 2018, MNRAS, 480, 2302S

8. Stern, J., Faucher-Gigére, C.-A., Hennawi, J. F., Hafen, Z., **Johnson, S. D.**, Fielding, D., 2018, *Does circumgalactic O VI trace low-pressure gas beyond the accretion shock? clues from H I absorption, dust extinction, and line kinematics*, ApJ, 865, 91S

7. Lan T.-W., Ménard B., Baron D., **Johnson S. D.**, Poznanski D., Prochaska J. X., O'Meara J. M., 2018, MNRAS, 477, 3520L

6. Goulding, A. D., Greene, J. E., Bezanson, R., Greco, J., **Johnson, S. D.**, Leauthaud, A, Matsuoka, Y., Medezinski, E., Price-Whelan, A.M., 2018, *Galaxy Interactions Trigger Rapid Black Hole Growth: an unprecedented view from the Hyper Suprime-Cam Survey*, PASJ, 70S, 37G

5. Huang, Y.-W., Chen, H.-W., **Johnson, S. D.**, Weiner, B. J., 2016, *Characterizing the Chemically-Enriched Circumgalactic Medium of* $\sim$ 38000 *Luminous Red Galaxies in SDSS DR12*, MNRAS, 455, 1713

4. Chen, H.-W., Gauthier, J.-R., Sharon, K., **Johnson, S. D.**, Nair, P., & Liang, C. J. 2014, *Spatially resolved velocity maps of halo gas around two intermediate-redshift galaxies*, MNRAS, 438, 1435

3. Oka, T., Welty, D. E., **Johnson, S. D.**, York, D. G., Dahlstrom, J., & Hobbs, L. M., 2013, *Anomalous Diffuse Interstellar Bands in the Spectrum of Herschel 36. II. Analysis of Radiatively Excited* CH^+*, CH, and Diffuse Interstellar Bands*, ApJ, 773, 42

2. Dahlstrom, J., York, D. G., Welty, D. E., Oka, T., Hobbs, L. M., **Johnson, S. D.**, Friedman, S. D., Jiang, Z., Rachford, B. L., Sherman, R., Snow, T. P., Sonnentrucker, P., 2013, *Anomalous Diffuse Interstellar Bands in the Spectrum of Herschel 36. I. Observations of Rotationally Excited CH and* CH^+ *Absorption and Strong, Extended Redward Wings on Several DIBs*, ApJ, 773, 41

1. York, D. G., Straka, L. A., Bishof, M., Kuttruff, S., Bowen, D., Kulkarni, V. P., Subbarau, M., Richards, G., Vanden Berk, D., Hall, P. B., Heckman, T., Khare, P., Quashnock, J., Ghering, L., & **Johnson, S. D.**, *Galaxies with background QSOs - I. A search for strong galactic H*α *lines* 2012, MNRAS, 423, 3692

ASTRO 2020 DECADAL SURVEY WHITE PAPERS

4. Chen, H.-W., **Johnson, S. D.**, Rudie, G. C., et al. 2019, BAAS, 51, 329

3. Newman, A., Bezanson, R., **Johnson, S.**, et al. 2019, BAAS, 51, 145

2. Rudie, G. C., Chen, H.-W., Newman, A. B., **Johnson, S. D.**, et al. 2019, BAAS, 51, 148

1. Burchett, J., Butsky, I., Tremmel, M.,... **Johnson, S. D.**... et al. 2019, BAAS, 51, 534

AWARDED TELESCOPE PROPOSALS AS PI/CO-PI:

– *Hubble Space Telescope* Cycle 27 (2019):

  ⋆ GO-15935 – 21 orbits: "UV diagnostics as barometers for galactic scale AGN outflows" (PI, \$140k)

  ⋆ GO-15835 – 4 orbits: "Near-Ultraviolet Follow-up of the X-ray-detected Warm-Hot Intergalactic Medium Toward 1ES 1553+113" (co-PI with S. Muzahid; \$40k)

– *Hubble Space Telescope* Cycle 26 (2018):

  ⋆ GO-15655 – 39 orbits: "The first high resolution view of the full extent, morphology, and multi-phase nature of radio-loud and quiet AGN feedback with ACS+SBC" (PI; \$185k)

– *Hubble Space Telescope* Cycle 25 (2017):

⋆ GO-15163 – 169+169 (prime+parallel) orbits: "COS Ultraviolet Baryon Survey" (co-PI with Hsiao-Wen Chen)

⋆ GO-15279 – 124 object snapshot survey: "Unveiling Quasar Fueling through a Public Snapshot Survey of Quasar Host Environments" (PI; $170k)

⋆ GO-15280 – 5 orbits: "Spatially resolved rest-UV spectroscopy of a prototypical quasar driven superwind at low-z" (PI; $70k)

⋆ GO-15298 – 15 orbits: "The first high resolution image of coronal gas in a starbursting cool core cluster" (PI; $90k)

– Magellan 6.5-m: 30 nights in 2016B−2018B

– DuPont 2.5-m: 22 nights in 2016−2017

– CTIO Blanco 4-m: 2 nights in 2016A

– NOAO Mayall 4-m: 1 night in 2015A

– ARC 3.5-m: 24 half-nights in 2011-2013

TEACHING, MENTORING, AND PUBLIC OUTREACH

Undergraduate Research Mentor, Princeton University *2017-2020*

– Primary mentor for J. Somalwar, a Princeton undergraduate student working on UV diagnostics of quasar feedback from HST (Cycle 25, PI: S. Johnson, PID: 15280). Student led final paper accepted to ApJ Letters

– Primary mentor for J. Helton, a Princeton undergraduate student working on surveys of quasar fueling starting with a summer project and continuing as a junior year research project. Student led final paper submitted to MNRAS

– Primary mentor for L. Borders, an NSF−INCLUDES REU student. LeeRoy conducted measurements in SDSS spectra to provide targets for an on-going HST snapshot survey (Cycle 25, PI: S. Johnson, PID: 15279) and is now at Rutgers University as a Computer Science Major.

Co-founder of Astronomy on Tap Trenton *2019-2020*

– Coordinator of public astronomy talks in Trenton, NJ (≈40 members of the public in attendance)

Volunteer Math Professor, Princeton Prison Teaching Initiative *2016-present*

– Teaching for-credit college level math and statistics classes in state and federal prisons

– Five semesters teaching courses including: Statistics, Elementary Algebra, & Intermediate Algebra

High School Research Advisor, Bellaire High School *2017-2019*

– Advised five high school students in research projects using SDSS spectra

Grad. Extragalactic Astronomy and Cosmology (AST 522), Princeton University *2017*

– Guest lecturer for one class on the Intergalactic Medium

Instructor, Lifelong Learning *2015-2016*

– Taught hands-on courses on stars and spectroscopy as part of an education program for older adults

Instructor, Yerkes Winter & Summer Institute *2011-2015*

– 1-week, overnight science camps for students in The University of Chicago Upward Bound Program

– Lead Instructor in 2012

Space Explorers Instructor, The Kavli Institute for Cosmological Physics *2011 – 2012*

– Designed and taught a novel, year-long science course on order-of-magnitude estimation to 20 inner-city high school students from The University of Chicago Upward Bound Program

Instructor, The University of Chicago Department of Astronomy & Astrophysics *2010*

– CAPSTONE curriculum development course in astronomical databases for public high school students and teachers

Teaching Assistant, The University of Chicago Department of Mathematics *2009*

– Studies in Mathematics I: Number theory

SELECTED AND INVITED TALKS/WORKSHOPS

– Summer Astronomy Colloquium, Princeton University *2020*

– Tea Talk, Kavli Institute for Particle Astrophysics and Cosmology, Stanford University *2020*

– Astronomy Colloquium, The University of Texas at Austin *2020*

– Astronomy Colloquium, The University of Michigan, Ann Arbor *2019*

– Circumgalactic Medium Workshop (invited), Harnack House, Berlin, *2019*

– The Cosmic Baryon Cycle (invited), GMT Community Science Meeting, *2019*

– Circumgalactic Medium Workshop (invited), Northwestern University *2018*

– Multiphase AGN feeding and feedback (invited), Sexten Center for Astrophysics *2018*

– Astronomy Colloquium, The University of Pittsburgh *2018*

– Lunch Seminar, Leiden Observatory *2018*

– Chemical Evolution of the Universe (invited), GMT Community Science Meeting *2017*

– Whereabouts the Baryons (invited), Sexten Center for Astrophysics *2017*

– Astronomy Seminar, University of Pennsylvania *2017*

– Magellan Science Meeting, Washington D.C. *2016*

– Lunch Seminar, Leiden Observatory *2016*

– Astronomy Colloquium, University of Illinois at Urbana−Champaign *2015*

– Galread, Princeton University *2015*

– Science Lunch Talk, University of Wisconsin at Madison *2015*

– National Science Teachers Association, San Antonio *2013*

SCIENTIFIC COMMUNITY AND DEPARTMENT SERVICE

Contributions to 30-m telescope projects and instruments *2017−present*

– Giant Magellan Telescope Science Book, Chapter 7 co-author, *Building Galaxies from Cosmic Gas*

– U.S. ELT Key Science Program Development Participant and Key Science Project co-author

– Co-author for the MIRMOS IFS Science Case (Magellan)

Referee and reviewer for *2016−present*

– Nature, Nature Astronomy, ApJ, A&A
– NASA Earth and Space Science Graduate Research Fellowship Program
– Hubble Space Telescope
– National Science Foundation

Department Service

– Postdoc representative to Princeton's Department Climate and Diversity Committee (2019-2020)
– Student representative to the graduate admissions committee at U. Chicago (2015-2016)
– Student representative to the curriculum committee at U. Chicago (2012-2013)

REFERENCES

Professor Hsiao-Wen Chen (Ph.D. advisor) The University of Chicago
– email: hchen@astro.uchicago.edu phone: (773) 702-8747

Director John Mulchaey The Carnegie Observatories
– email: mulchaey@carnegiescience.edu phone: (626) 304-0257

Professor Jenny Greene (Hubble Fellowship advisor) Princeton University
– email: jgreene@astro.princeton.edu phone: (609) 258-0764

Professor Don York (Undergraduate and M.S. advisor) The University of Chicago
– email: don@astro.uchicago.edu phone: (773) 702-8930

Randy Landsberg (teaching and outreach advisor) The University of Chicago
– email: rhlandsberg@uchicago.edu phone: (773) 834-6743