

ERIN T. BOETTCHER

CURRICULUM VITAE

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RESEARCH INTERESTS

The baryon cycle; interstellar and circumgalactic media; gaseous, disk-halo interfaces; diffuse ionized gas; galactic fountains and winds; magnetic fields and cosmic rays; spectroscopy.

EDUCATION

- Ph.D. Astronomy (minor: Physics), University of Wisconsin, Madison, WI, August 2018
- M.S. Astronomy, University of Wisconsin, Madison, WI, August 2014
- B.S. Astrophysics, Haverford College, Haverford, PA, May 2012, *Magna cum laude* with Honors

PROFESSIONAL PREPARATION

- 2021–Present **Postdoctoral Associate**, University of Maryland & NASA GSFC
 - *Advisor*: Dr. Edmund Hodges-Kluck
 - Characterizing circumgalactic gas and dust in nearby galaxies.
- 2018–2021 **Postdoctoral Scholar**, The University of Chicago
 - *Advisor*: Prof. Hsiao-Wen Chen
 - Studied interplay between CGM properties and galactic environment using *HST*-COS observations from the Cosmic Ultraviolet Baryon Survey (Papers [8](#), [12](#), [15](#)).
- 2014–2017 **National Science Foundation Graduate Research Fellow**, University of Wisconsin
- 2012–2018 **Graduate Research Assistant**, University of Wisconsin
 - *Advisors*: Profs. Ellen Zweibel, Jay Gallagher, and Robert Benjamin
 - Characterized the dynamical state of extraplanar diffuse ionized gas layers using optical emission-line spectroscopy and radio continuum observations of nearby galaxies (Papers [3](#), [4](#), & [6](#)).
 - Modeled cosmic ray sampling of the interstellar medium in starburst galaxies using Monte Carlo simulations (Paper [2](#)).
- 2011–2012 **Undergraduate Research Assistant**, Haverford College
 - *Advisor*: Prof. Beth Willman
 - Conducted a search for RR Lyrae stars in ultra-faint Milky Way companions using time-series photometry; detected the first known RRab star in Segue 2 (Paper [1](#)).
- 2011 **NSF Research Experiences for Undergraduates**, American Museum of Natural History
- 2010 **NSF Research Experiences for Undergraduates**, Williams College

FELLOWSHIPS, GRANTS, AND AWARDS

- 2017 Stebbins Award, University of Wisconsin Astronomy Dept.
◦ Annual award honoring a significant research achievement made during the previous year
- 2017 Bautz Graduate Travel Fellowship, University of Wisconsin Astronomy Dept. (\$2,000)
- 2014 National Science Foundation Graduate Research Fellowship (\$138,000)
◦ *A Spectroscopic Study of Extraplanar Diffuse Ionized Gas in Disk Galaxies*

TEACHING AND MENTORING EXPERIENCE

TEACHING ASSISTANTSHIPS

- Graduate Teaching Assistant, The Evolving Universe 103, University of Wisconsin (Spring 2018)
Undergraduate Teaching Assistant, Astronomical Ideas 101, Haverford College (Fall 2010)

STUDENTS MENTORED

- 2020–Present H. Zhu, University of Chicago PhD student (previously undergraduate)
◦ Diffuse ionized gas studies in nearby galaxies; reduction/analysis of longslit spectroscopy
- 2016–2017 L. Laufman & E. Y. Liu, University of Wisconsin undergraduates
◦ Reduction/analysis of optical emission-line spectroscopy

REFEREED PUBLICATIONS

- 15.** Boettcher, E., Gupta, N., Chen, H.-W., et al., submitted to ApJL
◦ *The Cosmic Ultraviolet Baryon Survey (CUBS): Joint MALS 21-cm and MUSE optical line mapping of a DLA associated with an interacting dwarf galaxy pair*
- 14.** Cooper, T. J., Rudie, G. C., Chen, H.-W., et al., incl. Boettcher, E. 2021, MNRAS, 508, 4359
◦ *The Cosmic Ultraviolet Baryon Survey (CUBS) IV: The complex multiphase circumgalactic medium as revealed by partial Lyman limit systems*
- 13.** Zahedy, F. S., Chen, H.-W., Cooper, T. J., Boettcher, E., et al. 2021, MNRAS, 506, 877
◦ *The Cosmic Ultraviolet Baryon Survey (CUBS) III: Physical properties and elemental abundances of Lyman-limit systems at $z < 1$*
- 12.** Boettcher, E., Chen, H.-W., Zahedy, F. S., et al. 2021, ApJ, 913, 18
◦ *The Cosmic Ultraviolet Baryon Survey (CUBS) II: Discovery of an H₂-Bearing DLA in the Vicinity of an Early-Type Galaxy at $z = 0.576$*
- 11.** Combes, F., Gupta, N., Muller, S., et al., incl. Boettcher, E. 2021, A&A, 648, A116
◦ *PKS1830-211: OH and HI at $z = 0.89$ and the first MeerKAT UHF spectrum*
- 10.** Gupta, N., Jagannathan, P., Srianand, R., et al., incl. Boettcher, E. 2021, ApJ, 907, 11
◦ *Blind HI and OH absorption line search: first results with MALS and uGMRT processed using ARTIP*
- 9.** Zahedy, F. S., Chen, H.-W., Boettcher, E., et al. 2020, ApJL, 904, L10
◦ *Evidence For Late-Time Feedback from the Discovery of Multiphase Gas in a Massive Elliptical at $z = 0.4$*
- 8.** Chen, H.-W., Zahedy, F. S., Boettcher, E., et al. 2020, MNRAS, 497, 498
◦ *The Cosmic Ultraviolet Baryon Survey (CUBS) - I. Overview and the diverse environments of LLSs at $z < 1$*
- 7.** Boettcher, E., Gallagher, J. S., III, Ohya, Y., et al. 2020, A&A, 637, A17
◦ *VV 655 and NGC 4418: Implications of an interaction for the evolution of a LIRG*
- 6.** Boettcher, E., Gallagher, J. S., III, & Zweibel, E. G. 2019, ApJ, 885, 160
◦ *A Dynamical Study of Extraplanar Diffuse Ionized Gas in NGC 5775*
- 5.** Chen, H.-W., Boettcher, E., Johnson, S. D., et al. 2019, ApJL, 878, L33

- *A Giant Intragroup Nebula Hosting a Damped Ly α Absorber at $z = 0.313$*
- 4. Boettcher, E.,** Gallagher, J. S., III, & Zweibel, E. G. 2017, *ApJ*, 845, 155 (featured in phys.org)
 - *Detection of Extraplanar Diffuse Ionized Gas in M83*
- 3. Boettcher, E.,** Zweibel, E. G., Gallagher, J. S., III, & Benjamin, R. A. 2016, *ApJ*, 832, 118
 - *Testing a Dynamical Equilibrium Model of Extraplanar Diffuse Ionized Gas in NGC 891*
- 2. Boettcher, E.,** Zweibel, E. G., Yoast-Hull, T. M., & Gallagher, J. S., III 2013, *ApJ*, 779, 12
 - *Cosmic Ray Sampling of a Clumpy Interstellar Medium*
- 1. Boettcher, E.,** Willman, B., Fadely, R., et al. 2013, *AJ*, 146, 94
 - *A Search for RR Lyrae Stars in Segue 2 and Segue 3*

LEADERSHIP AND SERVICE

PANEL REVIEWS

- 2020 Hubble Space Telescope Cycle 28 Panel Review
- 2019 Hubble Space Telescope Cycle 27 Panel Review

PUBLIC OUTREACH AND DIVERSITY, EQUITY, AND INCLUSION EFFORTS

- 2020–2021 Coordinator, Hiring Working Group, Dept. of Astronomy & Astrophysics
 - Co-organizer of efforts to promote diversity, equity, and inclusion in faculty and postdoc hiring, following the Strike for Black Lives at the University of Chicago
- 2018–2021 Member, Inclusion, Diversity, & Equity in Astronomy (IDEA), Univ. of Chicago
- July 2019 Panelist, Diversity Panel, International Cosmic Ray Conference (Madison, WI, USA)
 - Topic: Reducing programmatic barriers in the proposal review process
- 2016–2018 Graduate Student Outreach Organizer, Univ. of Wisconsin
 - Department liaison for campus and public outreach opportunities
 - Lead organizer, Astronomy Graduate Lectures for Undergraduates (AstroGLU)
- 2015–2016 Graduate Student – Faculty Liaison, Univ. of Wisconsin
- 2014–2015 Leader, Women of Wisconsin Strengthening Astronomy (WOWSA), Univ. of Wisconsin

SUCCESSFUL OBSERVING PROPOSALS

Experience as PI: 42 hrs on SALT, 5 nights on WIYN 3.5m

Experience as Co-I: 182 *HST* orbits, 37 hrs on SALT, 11 nights on Magellan, 4 nights on WIYN 3.5m

HUBBLE SPACE TELESCOPE (HST)

- 2017 *COS Ultraviolet Baryon Survey (CUBS)* (169 orbits; PI: H.-W. Chen)
- 2016 *The Perseus Project: Probing Metal Mixing, Dust Destruction, and Kinematics in the Vertical Extension of the Perseus Arm* (13 orbits; PI: J. C. Howk)

SOUTHERN AFRICAN LARGE TELESCOPE (SALT)

- 2017 *Spectropolarimetric Observations of the Dark-Hearted S0 Galaxy NGC 4418* (2.5 hrs)
- 2017 *Spectroscopic Survey of the Central Molecular Zones of Southern Galaxies* (34 hrs)
- 2017 **PI:** *The Kinematics of Extraplanar Diffuse Ionized Gas from Low to High SFR* (12.5 hrs)
- 2016 **PI:** *The Dynamical State of Extraplanar Diffuse Ionized Gas in NGC 5775* (8 hrs)
- 2015 **PI:** *A Kinematic Study of Diffuse Ionized Gas in M83* (9 hrs)
- 2015 **PI:** *[OIII] as a Tracer of Extraplanar Diffuse Ionized Gas in NGC 5775* (5 hrs)
- 2014 **PI:** *The Energy Balance of Extraplanar Diffuse Ionized Gas in NGC 253 and NGC 3044* (7 hrs)

MAGELLAN 6.5M TELESCOPES

2018–2019 *The Cosmic Ultraviolet Baryon Survey (CUBS)* (9 nights)

2018 *The Dynamical State of Extraplanar Diffuse Ionized Gas Along the Star-Formation Sequence* (2 nights)

WIYN 3.5M OBSERVATORY

2015 **PI:** *Probing the Extraplanar Diffuse Ionized Gas Properties of M33* (3 nights)

2014 **PI:** *A Kinematic Study of Diffuse Ionized Gas in NGC 891* (4 half nights)

2013 *A Spectroscopic Survey for Diffuse Ionized Gas in Starforming Galaxies* (4 nights)

ORAL PRESENTATIONS

2020 Seminar, University of Michigan (Virtual Seminar, Ann Arbor, MI, USA; September 2020)
◦ *Tracing the Baryon Cycle at the Disk-Halo Interface*

2020 Seminar, Carnegie Observatories (Virtual Seminar, Pasadena, CA, USA; September 2020)
◦ *Tracing the Baryon Cycle at the Disk-Halo Interface*

2020 Invited Talk, IAP Colloquium (Virtual Meeting, Paris, France; June 2020)
◦ *Tracing the Baryon Cycle at the Disk-Halo Interface*

2019 Contributed Talk, GMT Community Science Meeting (Carlsbad, CA, USA; September 2019)
◦ *Tracing the Baryon Cycle in Emission at the Disk-Halo Interface*

2019 Contributed Talk, Nine Billion Years of Neutral Gas Evolution (Garching, Germany; July 2019)
◦ *Probing multiphase gaseous galactic ecosystems in absorption and emission*

2018 Chalk Talk, University of Chicago (Chicago, IL, USA; November 2018)
◦ *The Disk-Halo Connection: An Emission-Line Perspective*

2018 Contributed Talk, Circumgalactic Medium Workshop (Evanston, IL, USA; August 2018)
◦ *New Perspectives on the Dynamical State of Gaseous, Disk-Halo Interfaces*

2018 Thesis Defense, University of Wisconsin–Madison (Madison, WI, USA; July 2018)
◦ *New Perspectives on the Dynamical State of Extraplanar Diffuse Ionized Gas Layers*

2018 Stebbins Award Talk, University of Wisconsin–Madison (Madison, WI, USA; January 2018)
◦ *New Perspectives on the Dynamical State of Extraplanar Diffuse Ionized Gas Layers*

2018 Dissertation Talk, AAS Meeting #231 (National Harbor, MD, USA; January 2018)
◦ *New Perspectives on the Dynamical State of Extraplanar Diffuse Ionized Gas Layers*

2017 Chalk Talk, Columbia University (New York, NY, USA; December 2017)
◦ *Testing a Dynamical Equilibrium Model of Extraplanar Diffuse Ionized Gas Layers*

2017 Seminar, Space Telescope Science Institute (Baltimore, MD, USA; December 2017)
◦ *New Perspectives on the Dynamical State of Extraplanar Diffuse Ionized Gas Layers*

2017 Colloquium, Max Planck Institute for Radio Astronomy (Bonn, Germany; June 2017)
◦ *The Kinematics of Magnetized, Extraplanar Diffuse Ionized Gas Layers*

2017 Contributed Talk, CHANG-ES Collaboration Meeting (Bochum, Germany; June 2017)
◦ *Extraplanar Gas in M83: Implications for Magnetic Dynamos*

2016 Invited Talk, CHANG-ES Collaboration Meeting (Madison, WI, USA; July 2016)
◦ *Testing a Dynamical Equilibrium Model of the Extraplanar Diffuse Ionized Gas in NGC 891*

2016 Seminar, University of Wisconsin–Madison (Madison, WI, USA; February 2016)
◦ *Testing a Dynamical Equilibrium Model of the Extraplanar Diffuse Ionized Gas in NGC 891*

2016 Seminar, University of Notre Dame (Notre Dame, IN, USA; February 2016)
◦ *Testing a Dynamical Equilibrium Model of the Extraplanar Diffuse Ionized Gas in NGC 891*

- 2015 Invited Talk, WIYN Board Meeting (Madison, WI, USA; September 2015)
 - *SparsePak Spectroscopy of Extraplanar Diffuse Ionized Gas in NGC 891*
- 2013 Seminar, University of Wisconsin–Madison (Madison, WI, USA; October 2013)
 - *Cosmic Ray Sampling of a Clumpy Interstellar Medium*
- 2013** Contributed Talk, AAS Meeting #221 (Long Beach, CA, USA; January 2013)
 - *A New RR Lyrae Star in Segue 2*

POSTER PRESENTATIONS

- 6. **Boettcher, E.**, Zweibel, E. G., Gallagher, J. S., III, et al. *Star Formation, Magnetic Fields, and Diffuse Matter in the Galaxy*, Madison, WI, USA, May 2016.
 - *Testing a Dynamical Equilibrium Model of the Extraplanar Diffuse Ionized Gas in NGC 891*
- 5. **Boettcher, E.**, Zweibel, E. G., Yoast-Hull, T., et al. AAS Meeting #223, 252.08. January 2014.
 - *Do Cosmic Rays Sample the Mean ISM Density of Starburst Galaxies?*
- 4. Gaughan, A., Smith, E., Dillaire, A., et al. AAS Meeting #223, 355.06. January 2014.
 - *The Haverford Variable Star Search: Ursa Major II and Bootes III*
- 3. **Boettcher, E.**, Rice, E., McLean, I. S., et al. AAS Meeting #219, 345.26. January 2012.
 - *Comparing Low- and High-Resolution Model Fits to T Dwarf Spectra*
- 2. Cunningham, E., **Boettcher, E.**, & Willman, B. AAS Meeting #218, 334.03. May 2011.
 - *The Haverford Variable Star Search project: Segue 2 and Segue 3*
- 1. Souza, S. P., **Boettcher, E.**, Wilson, S., et al. AAS Meeting #218, 322.01. May 2011.
 - *H α Monitoring of Early-Type Emission Line Stars*

PUBLIC ENGAGEMENT

PUBLIC LECTURES

- 2020 Talk, Lifelong Learning, Sulzer Library (Virtual Talk, Chicago, IL, USA; July 2020)
 - *Is “Empty” Space Really Empty? Probing the Dynamic Environments of Galaxies*
- 2017 Talk, Astronomy Graduate Lectures for Undergraduates (Madison, WI, USA; March 2017)
 - *The Life Cycle of Gas in Spiral Galaxies*
- 2016 Talk, East High School at UW-Madison Astronomy Dept. (Madison, WI, USA; April 2016)
 - *Gas in Spiral Galaxies*
- 2016 Talk, Astronomy Graduate Lectures for Undergraduates (Madison, WI, USA; April 2016)
 - *The Disk-Halo Connection in Spiral Galaxies*
- 2014 Talk, Space Place Guest Presentation (Madison, WI, USA; August 2014)
 - *Cosmic Rays as Probes of the High-Energy Universe*

PUBLIC OUTREACH

- Jan. 2020 Panelist, *Conference for Undergraduate Women in Physics (CUWiP)* (Chicago, IL, USA)
- July 2019 Volunteer, *Soapbox Science Chicago*, Navy Pier (Chicago, IL, USA)
- Spring 2019 Astronomy Conversations Presenter, Adler Planetarium (Chicago, IL, USA)
- Aug. 2017 Volunteer, *Saturday Science*, Wisconsin Institutes for Discovery (Madison, WI, USA)
- Dec. 2016 Volunteer, *Family Science Night*, Space Place (Madison, WI, USA)
- Oct. 2016 Telescope Operator, *Family Weekend*, Washburn Observatory (Madison, WI, USA)
- 2016–2017 Contributor, *Radio Astronomy*, weekly show on WORT 89.9 FM (Madison, WI, USA)
 - 7 episodes written, 14 radio appearances
- 2013–2018 Telescope Operator, Washburn Observatory Open House (Madison, WI, USA)

2012–2017 Organizer, *Expanding Your Horizons* Astronomy Workshop (Madison, WI, USA)
◦ Lead organizer, 2015; contributor, 2012–2017

Summer 2010 Planetarium Operator, Milham Planetarium (Williamstown, MA, USA)

PROFESSIONAL DEVELOPMENT COURSEWORK

Fall 2015 Teaching in Science and Engineering – the College Classroom (UW-Madison)

Fall 2014 An Introduction to Evidence-Based Undergraduate STEM Teaching (UW-Madison)

Summer 2014 Summer School in Statistics for Astronomers (Penn State University)

PROFESSIONAL MEMBERSHIP

COLLABORATIONS

2020–Present Member, MeerKAT Absorption Line Survey (MALS)

2018–Present Member, Cosmic Ultraviolet Baryon Survey (CUBS)

2016–Present Member, Continuum Halos in Nearby Galaxies – an EVLA Survey (CHANG-ES)

PROFESSIONAL SOCIETIES

2012–Present Member, American Astronomical Society

2012–Present Member, Phi Beta Kappa Society

PROFESSIONAL REFERENCES

Ellen G. Zweibel

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Hsiao-Wen Chen

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