

Curriculum Vitae

Sanchayeeta Borthakur

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I. EDUCATION

Ph.D. 2010 Astronomy University of Massachusetts, Amherst
M.S. 2007 Astronomy University of Massachusetts, Amherst
B.Sc. 2003 Physics St. Stephen's College, University of Delhi, India

II. PROFESSIONAL EXPERIENCE

2017 - Present	Assistant Professor	Arizona State University
2016 - 2017	Associate Research Scientist	Johns Hopkins University
2014 - 2014	Visiting Fellow	University of California, Berkeley
2010 - 2016	Assistant Research Scientist	Johns Hopkins University

III. HONORS AND AWARDS

2018 Elected Member of the International Astronomical Union
2009, 2008, 2006 NRAO Green Bank Telescope Student Support Fellowship

IV. RESEARCH INTEREST

Galaxy evolution and cosmology

- i. Galaxy population(s) responsible for reionization
- ii. The role and impact of starburst-driven feedback in galaxy growth and evolution
- iii. The cycling of matter and energy in and out of galaxies - the baryon cycle

V. PRESS COVERAGE AND OUTREACH

July 2017: "Where Did the First Light in the Universe Come From? Astrophysicists Now Know"
article in BigThink by Philip Perry

Oct 2014: *In the news: LA times, BBC News, Yahoo News, and Baltimore Sun*

LA Times: Leaky galaxy is a star factory that could shed light on early universe

Science News: 'Swiss cheese' galaxy resembles those that changed the youthful universe

Johns Hopkins University: Leaky, Star-Forming Galaxies Lead Johns Hopkins Researchers to Better Understand the Universe

Sep 2013: **Astronomy magazine**, featured in the Astroconfidential section, "What are we learning about the size of galaxies?"

May, 2013: **Nature**, Vol 497, Issue 7448, featured in Research Highlights, "Baby star wind travels far"

April, 2013: **European Space Agency**, “Entire galaxies feel the heat from newborn stars”

June, 2006: **American Astronomical Society**, “Astronomers say star fuel may be caught in cosmic web”

VI. TEACHING AND MENTORING AT ASU

Courses Taught at ASU

- Fall 2017: AST 498 - Astrophysics Seminar and AST 591 - Astrophysics
- Spring 2018: AST 523 - Stars/Interstellar Medium III
- Fall 2018: Pre-tenure teaching relief
- Spring 2019: AST 112 - Intro Stars, Galaxies & Cosmology
- Fall 2019: AST 494/598 - Gas Cycle and Galaxy Evolution
- Fall 2019: AST 112 - Intro Stars, Galaxies & Cosmology
- AST 523 - Stars/Interstellar Medium III

Student Mentees

- Edward Buie II – (Fall 2018 onwards) Ph.D. dissertation advisor. Expected to graduate in 2022
- Tyler McCabe – (Fall 2018 onwards) Ph.D. dissertation advisor. Expected to graduate in 2024
- Chris Dupuis – (Fall 2018 onwards) Ph.D. dissertation advisor. Expected to graduate in 2024
- Mansi Padave – (Fall 2018 onwards) Ph.D. dissertation advisor. Expected to graduate in 2024
- Rashmeet Nayyar – (Spring 2019 onwards) CIDSE student pursuing Masters/Ph.D. Co-advised with Prof. Siddharth Srivastava. Expected to graduate in 2024
- Adrian Sinclair – (Fall 2017- Spring 2019) Second-year project
- Emily Lunde – (Fall 2018- Spring 2020) Second-year project
- Martin Flores* – (Spring 2018 onwards) NASA space grant fellowship mentor. Expected to graduate in Spring 2020
- Junehyoung Jeon* – (Fall 2018 onwards) Undergraduate research experience. Expected to graduate in Spring 2022
- Adrian Hernandez* – (Fall 2018) Undergraduate research experience
- Shane Butchell* – (Fall 2018) Undergraduate research experience
- Teresa Ashcraft – Member of Ph.D. dissertation committee. Graduated in summer of 2018
- Tianxing Jiang – Member of Ph.D. dissertation committee. Graduated in summer of 2018
- John Pharo – Member of Ph.D. dissertation committee. Graduated in summer of 2019
- Bhavin Joshi – Member of Ph.D. dissertation committee. Expected to graduate in 2020
- Brent Smith – Member of Ph.D. dissertation committee. Expected to graduate in 2020

(undergraduate students are marked with an *)

Postdoctoral Mentees at ASU

- Hansung Gim – (Fall 2018 onwards) Postdoctoral fellow leading the VLA-Disk program
- Jacqueline Monkiewicz – (Fall 2019 onwards) NSF postdoctoral fellow to ASU

VII. Interdisciplinary Collaborations

- Susan Beiner— Professor at the Herberger Institute for Design and the Arts. Collaborating with her for her ceramics class to bring-in astronomy to the art students for them to explore the subject through their designs.
- Siddharth Srivastava— Assistant Professor in the School of Computing, Informatics, and Decision Systems Engineering. Collaboration to use state-of-the-art machine learning techniques for absorption-line detection and identification.

VIII. Publications

Notes: The authors are listed in the order of their contribution.

Student authors that were supervised by Borthakur are underlined.

Peer-reviewed and published in international journals

1. Jones, M. G., Verdes-Montenegro, L., Damas-Segovia, A., **Borthakur, S.**, Yun, M. S., del Olmo, A., Perea, J., Román, J., Luna, S., Lopez Gutierrez, D., Williams, Barbara; Vogt, F. P. A., Garrido, J., Sanchez, S., Cannon, J., & Ramirez-Moreta, P. 2019, Evolution of compact groups from intermediate to final stages: A case study of the HII content of HCG 16, accepted for publication A&A, in press, arXiv:1910.03420
2. Wang, B., Heckman, T. M., Leitherer, C., Alexandroff, R., **Borthakur, S.**, & Overzier, Roderik A. 2019, A new technique for finding galaxies leaking Lyman-continuum radiation: [SII]-deficiency, in press, ApJ
3. Kauffmann, G., Nelson, D., **Borthakur, S.**, Heckman, T., Hernquist, L., Marinacci, F., Pakmor, R., Pillepich, A., 2019, The morphology and kinematics of the gaseous circumgalactic medium of Milky Way mass galaxies - II. Comparison of IllustrisTNG and Illustris simulation results, Monthly Notices of the Royal Astronomical Society, 486, 4686
4. **Borthakur, S.**, Momjian, E., Heckman, T. M., Catinella, B., Vogt, F., & Tumlinson, J., 2019, Discovery of a Damped Ly α System in a Low-z Galaxy Group: Possible Evidence for Gas Inflow and Starburst, Astrophysical Journal, 871, 239
5. Saintonge, A., Catinella, B., Tacconi, L., Kauffmann, G., Genzel, R., Cortese, L., Davé, R., Fletcher, T., Graciá-Carpio, Kramer, C., Heckman, T. M., Janowiecki, S., Lutz, K., Rosario, D., Schiminovich, D., Schuster, K., Wang, J., Wuyts, S., **Borthakur, S.**, Lamperti, I., Roberts-Borsani, G. W., 2017, xCOLD GASS: The Complete IRAM 30 m Legacy Survey of Molecular Gas for Galaxy Evolution Studies, Astrophysical Journal Supplement, 233, 22
6. Ferretti, R., Amanullah, R., Goobar, A., Petrushevska, T., **Borthakur, S.**, Bulla, M., Fox, O., Freeland, E., Fremling, C., Hangard, L., & Hayes, M., 2017, Probing gas and dust in the tidal tail of NGC 5221 with the type Ia supernova iPTF16abc, Astronomy & Astrophysics , 606, 111
7. Heckman, T. M., **Borthakur, S.**, Wild, V., Schiminovich, D., & Bordoloi, R., 2017, Observations of the Impact of Starburst-Driven Winds on the Properties of the Circum-Galactic Medium, Astrophysical Journal, 846, 151

8. Vogt, F. P. A., Pérez, E., Dopita, M. A., Verdes-Montenegro, L. & **Borthakur, S.**, 2017, Evidence for azimuthal variations of the oxygen abundance gradient tracing the spiral structure of the galaxy HCG 91c, *Astronomy & Astrophysics*, 601, 61
9. **Borthakur, S.**, Heckman, T. M., Tumlinson, J., Bordoloi, R., Kauffmann, G., Catinella, B., Schiminovich, D., Davé, R., Moran, S., & Saintonge, A., 2016, The Properties of the Circumgalactic Medium in Red and Blue Galaxies: Results from the COS-GASS+COS-Halos Surveys, *Astrophysical Journal*, 833, 259
10. **Borthakur, S.**, 2016, Distribution of Cold Atomic Gas in Galaxies: Results from the GBT HI Absorption Survey Probing Inner Halos of Low-z Galaxies, *Astrophysical Journal*, 829, 128
11. Kauffmann, G., **Borthakur, S.** and Nelson, D., The morphology and kinematics of neutral hydrogen in the vicinity of $z=0$ galaxies with Milky Way masses - a study with the Illustris simulation, 2016, *Monthly Notices of the Royal Astronomical Society*, 462, 3751
12. **Borthakur, S.**, Heckman, T. M., Tumlinson, J., Bordoloi, R., Thom, C., Catinella, B., Schiminovich, D., Davé, R., Kauffmann, G., Moran, S., & Saintonge, A., 2015, Connection Between the Circumgalactic Medium and the Interstellar Medium of Galaxies: Results from the COS-GASS Survey, *Astrophysical Journal*, 813, 46
13. **Borthakur, S.**, Yun, M. S. Verdes-Montenegro, L., Heckman, T. M., Zhu, G., & Braatz, J. A., 2015, Distribution of Faint Atomic Gas In Hickson Compact Groups, *Astrophysical Journal*, 812, 78
14. Heckman, T. M. & **Borthakur, S.** 2015, The Implications of Extreme Outflows from Extreme Starbursts, *Astrophysical Journal*, 822, 9
15. Vogt, F. P. A., Owen, C. I., Verdes-Montenegro, L., & **Borthakur, S.**, 2015, Advanced Data Visualization in Astrophysics: the X3D Pathway, *Astrophysical Journal*, 818, 115
16. Heckman, T. M., Alexandroff, R. M., **Borthakur, S.**, Overzier, R., & Leitherer, C., 2015, The Systematic Properties of the Warm Phase of Starburst-Driven Galactic Winds, *Astrophysical Journal*, 809, 147
17. Alexandroff, R. M., Heckman, T. M., **Borthakur, S.**, Overzier, R., & Leitherer, C., 2015, Indirect Evidence for Escaping Lyman Continuum Photons in Local Lyman Break Galaxy Analogs, *Astrophysical Journal*, 810, 104
18. Vogt, F. P. A., Dopita, M. A., **Borthakur, S.**, Verdes-Montenegro, L., Heckman, T. M., Yun, M. S., & Chambers, K. C., 2015, Galaxy Interactions in Compact Groups II: abundance and kinematic anomalies as evidence of infalling gas clouds at the disk-halo interface of HCG 91c?, *Monthly Notices of the Royal Astronomical Society*, 450, 2593
19. **Borthakur, S.**, Heckman, T. M., Leitherer, C., & Overzier, R. A., 2014, Local Clues to the Reionization of the Universe, *Science*, 346, 216
20. **Borthakur, S.**, Momjian, E., Heckman, T. M., York, D. G., Bowen, D. V., Yun, M. S., & Tripp, T. M., 2014, Small-scale Properties of Atomic Gas in Extended Disks of Galaxies, *Astrophysical Journal*, 795, 98

21. **Borthakur, S.**, Heckman, T., Strickland, D., Wild, V., Schiminovich, D., 2013, The Impact of Starbursts on the Circumgalactic Medium, *Astrophysical Journal*, 768, 18
22. **Borthakur, S.**, Tripp, T. M., Yun, M. S., Bowen, D. V., Meiring, J. D., York, D. G., & Momjian, E. 2011, A GBT Survey for HI 21 cm Absorption in the Disks and Halos of Low-Redshift Galaxies, *Astrophysical Journal*, 727, 52
23. Heckman, T. M., **Borthakur, S.**, Overzier, R., Kauffmann, G., Basu-Zych, A., Leitherer, C., Sembach, K., Martin, D. C., Rich, R. M., Schiminovich, D., & Seibert, M. 2011, Extreme Feedback and the Epoch of Reionization: Clues in the Local Universe, *Astrophysical Journal*, 730, 5
24. **Borthakur, S.**, Tripp, T. M., Yun, M. S., Momjian, E., Meiring, J. D., Bowen, D. V., & York, D. G., 2010, Using 21cm HI Absorbers in Small Impact Parameter Galaxy-QSO Pairs to Detect Low Redshift Damped Lyman α Candidates *Astrophysical Journal*, 713, 131
25. **Borthakur, S.**, Yun, M. S., Verdes-Montenegro, L. 2010, Detection of Diffuse Neutral Intragroup Medium in Hickson Compact Groups, *Astrophysical Journal*, 710, 385
26. Rasmussen, J., Ponman, T. J., Verdes-Montenegro, L., Yun, M. S., & **Borthakur, S.** 2008, Galaxy evolution in Hickson compact groups: the role of ram-pressure stripping and strangulation, *Monthly Notices of the Royal Astronomical Society*, 388, 1245
27. Verdes-Montenegro, L., Yun, M. S., **Borthakur, S.**, Rasmussen, J., & Ponman, T. 2007, Cold and hot gas in the most HI deficient compact groups, *New Astronomy Review*, 51, 87

Conference Proceedings:

27. Verdes-Montenegro, L., Vogt, F., Aubery, C., Duret, L., Garrido, J., Sanchez, S., Yun, M. S., **Borthakur, S.**, Hess, K., Cluver, M., Del Olmo, A., & Perea, J., 2017, Disentangling the intragroup HI in Compact Groups of galaxies by means of X3D visualization, *Proceedings of the International Astronomical Union, IAU Symposium*, 321, 241
28. **Borthakur, S.**, Yun, M. S., & Verdes-Montenegro, L., 2008, Detection and nature of cold intragroup gas in compact group environments, in a conference at Arecibo Observatory, PR, AIPC, 1035, 201B
29. Goncalves, T. S., Basu-Zych, A., **Borthakur, S.**, Baker, A., Sheth, K., Overzier, R., & Martin, D. C., 2013, Molecular gas and star formation in extreme starbursts at low redshift, *IAU*, 292, 157
30. Verdes-Montenegro, L. V., Yun, M. S., **Borthakur, S.**, Del Olmo, A., & Perea, J., 2010, What is the origin of a diffuse IGM in compact groups?, at the Proceedings of the ISKAF2010 Science Meeting. June 10 -14 2010.
31. Rasmussen, J., Ponman, T. J., Verdes-Montenegro, L., Yun, M. S., & **Borthakur, S.** 2009, The evolution of galaxy disks in dense environments - Lessons from compact group, *IAUS*, 254P, 56 (arXiv:0809.0329)

32. Verdes-Montenegro, L., Rasmussen, J., Ponman, T., Yun, M. S., & **Borthakur, S.**, 2007, Intra-group Gas in Differently Evolved Compact Groups of Galaxies, IAUS, 235, 221
33. Verdes-Montenegro, L., Yun, M. S., **Borthakur, S.** et al., 2007, SM of Galaxies in Extremely Different Environments: Isolated vs Compact Groups, ggnu.conf, 349

IX. SELECTED CONFERENCE AND COLLOQUIA TALKS (2017-Onwards)

[1.] *What is the relationship between galaxies' HI reservoirs and their ionized circumgalactic media at $z \sim 0$?* —**Invited** talk in a conference titled "The Circumgalactic Medium" in Berlin, October 2019

[2.] *What is the relationship between galaxies' HI reservoirs and their ionized circumgalactic media at $z \sim 0$?* —**Invited** talk in a conference titled "Nine Billion ears of Neutral Gas Evolution" at ESO headquarters July 2019

[3.] *The Unique Nature of UV Astrophysics with HST* – **Invited** talk at the Special HST Session titled "A Hubble Space Telescope for the 2020s: Capabilities and Opportunities", at 233rd AAS Meeting, Seattle, WA, January 2019

[4.] *Role of Starburst-Driven Winds in Shaping the Circumgalactic Medium* – Contributed talk at the conference titled "Cosmic baryon cycle", in Carlsbad, CA, September 2019

[5.] *Physics of star-formation and Clues to reionization of the Universe* – **Colloquium** at NMSU, Oct 2018

[6.] *The Connection Between the CGM and the ISM: Clues from HI Disk-CGM Interface* – **Invited Talk** at conference titled "the Circumgalactic Medium workshop" at the Northwestern University, August, 2018

[7.] *A unique DLA in a group medium* – Contributed talk at the conference titled "Wolfe Symposium 2018" at Esalen Institute, March 2018

[8.] *Understanding How Galaxies Reionized the Universe* – **Colloquium** at Arizona State University, January 2018

[9.] *What does the Circumgalactic Medium tell us about the Galaxy Color Dichotomy?* – Contributed talk at the conference "From Black Hole to Environment: galaxy evolution across multiple wavelengths" Australian National University, August 2017

[10.] *What does the Circumgalactic Medium tell us about the Galaxy Color Dichotomy?* – University of Arizona, Tucson September 2017