

Michelle Amanda Berg

michelle.berg@austin.utexas.edu
2515 Speedway Austin, TX 78712

SUMMARY

Research Interests: I am an astrophysicist interested in understanding galaxy evolution through the gas dynamics and metallicity content of the circumgalactic medium and its connection to the galaxy. I am also interested in galaxy quenching and how the environment (groups and clusters) plays a role in this process.

Skills: Expert in UV/optical spectral analysis; observing experience with Keck/HIRES and KCWI, Magellan/MIKE, and the Green Bank Telescope; Python and IDL coding languages; proficient in Cloudy, DESI redrock, SExtractor, kcorrect, and pPXF software tools.

EDUCATION

University of Notre Dame	Notre Dame, IN
Ph.D., Physics	January 2022
Dissertation: The Role of Dense Circumgalactic Gas in Shaping Galaxies	
M.S., Physics	January 2018
Florida Institute of Technology	Melbourne, FL
B.S., Physics and Astronomy & Astrophysics	May 2014
<i>summa cum laude</i>	

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow	September 2021 – Present
Department of Astronomy, University of Texas at Austin	
Advisor: John Chisholm	

GRANTS & FELLOWSHIPS

Future Investigators in NASA Earth and Space Science and Technology (FINESST) NASA SMD	
• Received funding of \$90,000 for 2 years	September 2019 – August 2021
NASA/STScI Hubble Cycle 29 GO-16645, Co-I (PI: Howk, ND)	2022
NASA/STScI Hubble Cycle 29 GO-16730, Co-I (PI: Lehner, ND)	2022
NASA/STScI Hubble Cycle 29 GO-16733, Co-I (PI: Rigby, STScI)	2022
Keck Principal Investigator Data Award PID30/2019A_N051, Co-I (PI: Howk, ND)	2019
NASA/STScI Hubble Cycle 25 GO-15075, Co-I (PI: Howk, ND)	2018
NASA/STScI Hubble Cycle 25 GO-15313, Co-I (PI: Lehner, ND)	2018
Graduate School Notebaert Professional Development Fund of \$1000	Spring 2017
Graduate Student Union Conference Presentation Grant of \$350	Spring 2017

TIME GRANTED ON SPACE- AND GROUND-BASED TELESCOPES

Hubble Space Telescope, Cycle 29 GO-16645, 24 orbits, Co-I (PI: Howk, ND)	2021
Hubble Space Telescope, Cycle 29 GO-16730, 137 orbits, Co-I (PI: Lehner, ND)	2021

Hubble Space Telescope, Cycle 29 GO-16733, 10 orbits, Co-I (PI: Rigby, STScI)	2021
Gemini 8.1-m telescope, GN-2020B-FT-103, 3.6 hours, Co-I (PI: Howk, ND)	2020
Green Bank Telescope, NRAO GBT20A-105, 20 hours, Co-I (PI: Galaz, U. Católica)	2020
Green Bank Telescope, NRAO GBT19A-326, 32 hours, Co-I (PI: Galaz, U. Católica)	2019
Keck 10-m telescope, NASA NExScI PID30/2019A_N051, 1 night, Co-I (PI: Howk, ND)	2019
Magellan 6.5-m telescope, Chilean National TAC CN2019A-23, 1 night, Co-I (PI: Tejos, U. Católica-Valparaíso)	2019
Green Bank Telescope, NRAO GBT18B-296, 175 hours, Co-I (PI: Howk, ND)	2018
Green Bank Telescope, NRAO GBT18A-291, 27 hours, Co-I (PI: Galaz, U. Católica)	2018
Green Bank Telescope, NRAO GBT18A-246, 176 hours, Co-I (PI: Lockman, NRAO)	2018
Green Bank Telescope, NRAO GBT17B-155, 57 hours, Co-I (PI: Howk, ND)	2017
Hubble Space Telescope, Cycle 25 GO-15075, 45 orbits, Co-I (PI: Howk, ND)	2017
Hubble Space Telescope, Cycle 25 GO-15313, 29 orbits, Co-I (PI: Lehner, ND)	2017
Green Bank Telescope, NRAO GBT16B-139, 72 hours, Co-I (PI: Lockman, NRAO)	2016
Green Bank Telescope, NRAO GBT16A-433, 12 hours, Co-I (PI: Lehner, ND)	2016

RESEARCH EXPERIENCE

University of Notre Dame

Graduate Research Assistant, Physics

August 2016 – January 2022

Advisors: Chris Howk and Nicolas Lehner, Doctoral Thesis

- Determined the HI covering factor in the circumgalactic medium (CGM) for a sample of 21 luminous red galaxies (LRGs) using QSO absorption line spectroscopy. Estimated the metallicity of the detected Lyman limit systems.
- Identified and characterized the host galaxies associated with a sample of 19 Lyman limit systems with measured metallicities using IFU observations. Explored the connections between the CGM and host galaxy properties.
- Determined the metallicity distribution function in the inner CGM of a sample of 55 LRGs using QSO absorption line spectroscopy.

NSF-REU, Physics

May – August 2013

Advisor: Justin Crepp

- Drafted the first mechanical design of the “iLocator” spectrograph that will be used with the Large Binocular Telescope to search for exoplanets in the Y-band of the infrared spectrum using the 3D CAD software *SolidWorks*.

Florida Institute of Technology

Undergraduate Research Assistant, Physics and Space Sciences

January 2013 – May 2014

Advisor: Daniel Batcheldor

- Analyzed doubly ionized oxygen [OIII] emission from active galactic nuclei (AGN) to determine constraints for outflow rates in galaxy models using IRAF and Graphical Astronomy and Image Analysis software to reduce the spectra.

Advisor: Daniel Batcheldor

- Measured and analyzed AGN light curves to determine how their brightness changes on small timescales using IRAF.

REFEREED PUBLICATIONS

“Project AMIGA: The Circumgalactic Medium of Andromeda,” Lehner, N., et al. **including Berg, M.A.**, *The Astrophysical Journal*, 900, 9 (2020)

“The Red Dead Redemption Survey of Circumgalactic Gas About Massive Galaxies. I. Mass and Metallicity of the Cool Phase,” **Berg, M.A.**, et al., *The Astrophysical Journal*, 883, 5 (2019)

“Think Global, Act Local: The Influence of Environment Age and Host Mass on Type Ia Supernova Light Curves,” Rose, B.M., Garnavich, P.M., & **Berg, M.A.**, *The Astrophysical Journal*, 874, 32 (2019)

“Quantifying the AGN-driven Outflows in ULIRGs (QUADROS) II: Evidence for Compact Outflow Regions from HST [OIII] Imaging Observations,” Tadhunter, C., et al. **including Berg, M.A.**, *Monthly Notices of the Royal Astronomical Society*, 478, 1558 (2018)

“Project AMIGA: A Minimal Covering Factor for Optically Thick Circumgalactic Gas Around the Andromeda Galaxy,” Howk, J.C., Wotta, C.B., **Berg, M.A.**, et al., *The Astrophysical Journal*, 846, 141 (2017)

“Optical Monitoring of Three Active Galactic Nuclei,” **Berg, M.A.**, Twadelle, K.F., & Batcheldor, D., *Journal of the Southeastern Association for Research in Astronomy*, 7, 13 (2012)

“Reverberation Mapping of AGN Dusty Tori with Spitzer and IRAC,” Twadelle, K.F., **Berg, M.A.**, & Batcheldor, D., *Journal of the Southeastern Association for Research in Astronomy*, 7, 17 (2012)

INVITED PRESENTATIONS

“Bimodal Absorption System Imaging Campaign: IFU Survey Results,” 2022 Arthur M. Wolfe Symposium in Astrophysics, University of California, Santa Cruz, March 21-25, 2022

“Revealing the Stellar Continuum Below the LyC Limit with the Sunburst Arc,” 2022 Galaxy Evolution Workshop, University of Texas at Austin, January 13, 2022

- Workshop Discussion Section Lead

“The Bimodal Absorption System Imaging Campaign: Origin of the Metal-poor Gas at $z < 1$,” Astrophysics Brown Bag Lunch Talk, Massachusetts Institute of Technology, March 29, 2021

“The Role of Dense Circumgalactic Gas in Shaping Galaxies,” CGI Seminar, University of California, Santa Cruz, November 9, 2020

PRESENTATIONS

“The Role of Dense Circumgalactic Gas in Shaping Galaxies,” Galaxies and Cosmology Seminar, University of Texas at Austin, September 20, 2021

“The Circumgalactic Medium and its Effect on Galaxy Evolution,” 237th meeting of the American Astronomical Society, January 11-15, 2021

“Galaxies with Accretion Signatures at $z < 1$,” Astrophysics Seminar, University of Notre Dame, October 27, 2020

"The Galaxies Associated With the Bimodal Metallicity Distribution," 235th meeting of the American Astronomical Society, Honolulu, HI, January 4-8, 2020

"New Results from the RDR and BASIC Programs," What Matter(s) Between Galaxies conference, Abbazia di Spineto, Italy, June 3-7, 2019

"The Red Dead Redemption Survey: Cool Gas in the Halos of Massive Galaxies," Astrophysics Seminar, University of Notre Dame, March 19, 2019

"Unexpected Detection of a Cool Gas Reservoir in the Hot Halos of LRGs," Intergalactic Interconnections conference, Aix Marseille Université, France, July 9-13, 2018

"A First Look at the Origin of the Bimodal Metallicity Distribution of the Dense $z < 1$ CGM Gas with HST/ACS and VLT/MUSE Observations," What Matter(s) Around Galaxies conference, Durham University, UK, June 19-23, 2017

POSTER PRESENTATIONS

"VLT/MUSE and HST/ACS Observations of $z < 1$ Galaxies: Origin of the Bimodal Metallicity Distribution of the Lyman Limit Systems," Space Telescope Science Institute 2017 Spring Symposium

"Green Bank Telescope Observations of HI in the Circumgalactic Medium of M31," Denny, L., et al. **including Berg, M.**, *American Astronomical Society, meeting #231*. Abstract (2018)

"iLocator: A Diffraction-Limited Doppler Spectrometer for the Large Binocular Telescope," Crepp, J.R., et al. **including Berg, M.**, *American Astronomical Society, meeting #223*. Abstract (2014)

"Reverberation Mapping of AGN Dusty Tori in the Infrared," Twadelle, K., **Berg, M.**, & Batcheldor, D., *American Astronomical Society, meeting #221*. Abstract (2013)

TEACHING EXPERIENCE

University of Notre Dame

Teaching Assistant, Physics

August 2014 – May 2016

- Physics I and II for Engineers Tutorials: Fall 2014, Spring 2015, 2016
Guided ~25 students through 1-3 problems in a group setting to reinforce topics from the lectures for a 50-minute class period, graded their work, and graded exams.
- Observatory: Fall 2014, Spring 2015, 2016
Set up 8" telescopes, helped students in Descriptive Astronomy (~60) and Elementary Cosmology (~100) complete projects, and graded exams.
- Modern Observational Techniques: Fall 2015
Attended lectures, created homework solutions, and facilitated the observatory project using the 0.8m telescope for ~15 students.

Physics Practicum

Fall 2019

- Delivered 3 lectures for the 75-minute class Physics of Astrophysics to ~10 students with an observer. Received peer-evaluations from professors and reflected on teaching and lecture goals. Topics covered: ionization equilibrium, thermal equilibrium, and emission line diagnostics.

AWARDS & HONORS

Florida Institute of Technology

Northrop Grumman Student Design Showcase President's Cup Award Spring 2014

- Awarded for the best project and presentation for the College of Science

Northrop Grumman Student Design Showcase Best in Show Spring 2014

- Awarded for the best project and presentation for the Department of Physics and Space Sciences

Outstanding Student Award in Astronomy/Astrophysics Spring 2013

- Selected by faculty members and awarded to students for accomplishments in several categories including academic standing, research projects, memberships and honor societies

Outstanding Student Award in Physics Spring 2013

Distinguished Student Scholar Spring 2013, 2014

- Awarded to students with a GPA of 3.8 or higher

ACADEMIC SERVICE & OUTREACH

University of Texas at Austin

TAURUS program mentor Summer 2022

Postdoc faculty-hire interviewer Spring 2022

University of Notre Dame

greeNDot Bystander Training Spring 2021

Student member on Faculty Colloquium Committee Fall 2020 – Spring 2021

Student faculty-hire interviewer Spring 2017, 2020, 2021

Summertime Stargazing volunteer Summer 2018

Student panel for external departmental review Fall 2016

Astronomy Star Party volunteer Fall 2014

PROFESSIONAL MEMBERSHIPS, AFFILIATIONS, & ORGANIZATIONS

American Astronomical Society 2019 – Present

Graduate Physics Society 2014 – 2022

Sigma Pi Sigma Physics Honor Society Inducted 2013

Phi Kappa Phi Honor Society Inducted 2012

Phi Eta Sigma Freshman National Honor Society Inducted 2011

REFERENCES

Dr. J. Christopher Howk

University of Notre Dame
Professor, Physics
Graduate Research Advisor

Dr. Nicolas Lehner

University of Notre Dame
Research Professor, Physics
Graduate Research Co-Advisor

Dr. Joseph Burchett

New Mexico State University
Assistant Professor, Astronomy
Collaborator

Dr. John O'Meara

W. M. Keck Observatory
Chief Scientist
Collaborator