Claire E. Murray

Curriculum vitae

Space Telescope Science Institute
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Research Interests

Structure of the interstellar medium; the role of atomic and molecular gas in star formation; gas accretion and feedback in galaxies; the Magellanic System; radio (cm and mm) observations.

Professional Preparation

NSF Astronomy & Astrophysics Postdoctoral Fellow, Johns Hopkins University, 2018–present

Postdoctoral Fellow, Space Telescope Science Institute, 2017–2018

Ph.D. Astronomy (minor: Physics), University of Wisconsin–Madison, 2017
- Advisor: Prof. S. Stanimirović
- Thesis: *Unveiling the Diffuse, Neutral Interstellar Medium: Absorption Spectroscopy of Galactic HI*

M.S. Astronomy, University of Wisconsin–Madison, 2013

B.A. Physics, Carleton College, 2011, *Magna cum laude*

Honors, Awards & Grants

2017 Robert L. Brown Outstanding Doctoral Dissertation Award, NRAO

2016 Bautz Fellowship, UW–Madison

2015 Jansky Award for Outstanding Research in Physics & Astronomy, UW–Madison

2015 Chambliss Astronomy Achievement Award, American Astronomical Society

2013 Stebbins Award for Significant Astronomy Research Achievement, UW–Madison

2012, 2014, 2016 Graduate Research Fellowship, Wisconsin Space Grant Consortium

2012 National Science Foundation Graduate Research Fellowship

2011 Distinction in Physics & Astronomy Major, Carleton College

2010 Mike Ewers Award, Carleton College & Minnesota Space Grant Consortium

Observing Programs as Principal Investigator

Atacama Large Millimeter/submillimeter Array (ALMA) — *PI: 8 hours; Co-I: 24 hours*

2015 Searching for molecular gas in high-velocity clouds (Cycle 3, 8 hours)

Karl G. Jansky Very Large Array (VLA) — *PI: 109 hours; Co-I: 714 hours*

2017 Measuring Absorption by Cold Hydrogen (MACH) (86 hours)

2015 Completing 21-SPONGE (23 hours)

Australia Telescope Compact Array (ATCA) — *PI: 157 hours; Co-I: 97 hours*

2016 Hunting for molecules in high-velocity clouds (60 hours)

2015 The formation of dark molecular gas from HI in the Magellanic System (51 hours)

2014 Dark molecular gas in the Magellanic Clouds (46 hours)

Arecibo Observatory — *PI: 53 hours*

2012 High-sensitivity HI emission to complement 21-SPONGE (53 hours)

Selected Seminar & Conference Presentations

2018 Invited Talk, Caltech (Pasadena, CA, August)
2018 Talk, Olympian Symposium: Gas and stars from mili- to megaparsecs (Greece; May)
2018 Talk, OH What a Lovely Molecule: Hydroxyl and the dark ISM (NSW, Australia; April)
2017 Talk, PSI2: The ISM Beyond 3D (Orsay, France; July)
2017 Talk, ISM-SPP, The Physics of the ISM (Cologne, Germany; February)
2016 Invited talk, Galaxies & Cosmology Seminar, Harvard CfA (Cambridge, MA; November)
2016 Talk, Astronomy Department Lunch Seminar, UC–San Diego (San Diego, CA; October)
2016 Talk, Lunch Seminar, NRAO (Socorro, NM; October)
2016 Invited talk, UW–Milwaukee CGCA Seminar (Milwaukee, WI; September)
2016 Invited talk, ASKAP 2016: The Future of Radio Astronomy (Sydney, Australia; June)
2016 Invited talk, Star Formation, Diffuse Matter and Magnetic Fields (Madison WI; May)
2016 Invited talk, Jansky Award Seminar, UW–Madison (Madison WI; February)
2015 Talk, Feedback in the Magellanic Clouds, STScI (Baltimore, MD; October)
2015 Talk, Life Cycle of Gas in Galaxies (Dwingeloo, Netherlands; September)
2015 Talk, SKA Pathfinders HI Science Coord. Committee Meeting (Rutgers, NJ; March)
2014 Poster, Galactic and Extragalactic Star Formation (Marseille, France; September)
2014 Talk, Galactic Science with the SKA and Pathfinders, Lorentz Center (Leiden, DE; May)
2014 Invited talk, Stebbins Award Seminar, UW–Madison (Madison, WI; February)
2013 Talk, Phase Transitions in the Diffuse ISM, CSIRO (Sydney, Australia; November)
2013 Poster, The Phases of the ISM, MPIA (Heidelberg, Germany; July)
2012 Poster, Galactic Scale Star Formation, MPIA (Heidelberg, Germany; July)
2012 Poster, Gas Flows in Galaxies, STScI (Baltimore, MD; May)
2012 Talk, Midwest Magnetic Fields, UW–Madison (Madison, WI; April)

Teaching & Mentoring

Courses:

Teaching Assistant, *The Solar System*, UW–Madison (Spring 2016)

Lab Assistant, *Experiences in Astronomical Observing*, UW–Madison (Fall 2012)

Training:

Teaching in Science and Engineering: The College Classroom, UW–Madison (Fall 2016)

Students Mentored:

2017 E. Y. Liu, UW–Madison undergraduate; radio astronomy/ALMA
2016–2017 S. Worzalla, UW–Madison freshman Undergraduate Research Scholar; radio astronomy
2012–2013 N. Pingel, UW–Madison undergraduate; interferometric data reduction

2012–2013 A. Lawrence, UW–Madison undergraduate; interferometric data reduction
2013 J. Jencson, NRAO REU; interferometric data reduction
2012 J. Miller, NSF REU; spectral analysis and radiative transfer

Academic Service

2018 Organizer, Low-Density Universe Lunch (STScI)
2017–2018 Organizer, Friday Science Coffee (STScI)
2017–2018 Organizer, CoolSci/HotSci colloquium series (STScI)
2016–present Referee, *The Astrophysical Journal*, *Monthly Notices of the Royal Astronomical Society*
2016 Local Organizing Committee, *Star formation, diffuse matter and magnetic fields in the Galaxy*
2011–2017 Member, Women of Wisconsin Strengthening Astronomy (WOWSA)
2015 Graduate Student Mentor Committee, UW–Madison Department of Astronomy
2014 Graduate Admissions Committee, UW–Madison Department of Astronomy
2013 Science Lunch Seminar Organizer, UW–Madison Department of Astronomy
2013 Chair, Prospective Graduate Student Coordination Committee, UW–Madison Astronomy
2011 Student Departmental Advisor, Carleton College Department of Physics & Astronomy

Public Outreach

2016 Invited talk, UW Space Place "Great Eye in the Desert: Astronomy with the VLA" (June 2016)
2016 Wisconsin State Journal *Blue Sky Science* feature, "Is there life on other planets?" (January 2016)
2011–2017 *Universe in the Park*, presenter of public talks and telescope shows
2011–2017 Volunteer, public observing at Washburn Observatory, UW–Madison
2012-2014 Leader, WOWSA delegation to "Expanding Your Horizons"
2010–2011 Volunteer, *Northfield Students Teaching Astronomy (NSTAr)*, Carleton College
2010 Volunteer, *Young Astronomer's Summer Experience (YASE)*, Carleton College
2008–2011 Volunteer, public observing at Goodsell Observatory, Carleton College

Refereed Publications

Summary: 16 total; 6 first-author; 6 second- or third-author

First-author publications:

6. **C. E. Murray**, S. Stanimirović, C.-G. Kim, W. M. Goss, C. Heiles, J. M. Dickey, B. L. Babler, *The 21-SPONGE HI Absorption Line Survey II: The temperature of Galactic HI*. 2018, The Astrophysical Journal, *in press*.

5. **C. E. Murray**, J. E. G. Peek, M.-Y. Lee, S. Stanimirović, *Optically thick HI does not dominate dark gas in the local ISM*. 2018, The Astrophysical Journal, 862, 131-138.

4. **C. E. Murray**, S. Stanimirović, C.-G. Kim, E. C. Ostriker, R. R. Lindner, C. Heiles, J. M. Dickey, B. L. Babler, *Recovering interstellar clouds with HI spectral lines: A comparison between synthetic observations and 21-SPONGE*. 2017, The Astrophysical Journal, 837, 55-73.

3. **C. E. Murray**, S. Stanimirović, N. M. McClure-Griffiths, M. E. Putman, H. S. Liszt, T. Wong, P. Richter, J. R. Dawson, J. M. Dickey, R. R. Lindner, B. L. Babler, J. R. Allison. *First Detection of HCO^+ Absorption in the Magellanic System*. 2015, The Astrophysical Journal, 808, 41-47.

2. **C. E. Murray**, S. Stanimirović, W. M. Goss, C. Heiles, J. M. Dickey, R. R. Lindner, B. L. Babler, P. Hennebelle. *The 21-SPONGE Survey I: Techniques and Initial Results*. 2015, The Astrophysical Journal, 804, 89-110.

1. **C. E. Murray**, R. R. Lindner, S. Stanimirović, W. M. Goss , C. Heiles, J. M. Dickey, P. Hennebelle, N. M. Pingel, A. Lawrence, J. Jencson, B. L. Babler. *Excitation temperature of the warm neutral medium as a new probe of the Ly-α radiation field*. 2014, The Astrophysical Journal, 781, L41-L47.

Other publications:

10. H. Nguyen, J. R. Dawson, M.-A. Miville-Deschênes, N. Tang, D. Li, C. Heiles, **C. E. Murray**, [6 authors] *Dust-Gas Scaling Relations and OH Abundance in the Galactic ISM*. 2018, The Astrophysical Journal, *in press*.

9. H. Dénes, N. M. McClure-Griffiths, J. M. Dickey, J. R. Dawson, **C. E. Murray**. *Calibrating the HISA temperature: Measuring the temperature of the Riegel-Crutcher cloud*. 2018, Monthly Notices of the Royal Astronomical Society, *in press*.

8. D. Li, N. Tang, H. Nguyen, [6 authors], **C. E. Murray**, [8 authors]. *Where is OH and Does It Trace the Dark Molecular Gas (DMG)?* 2018, The Astrophysical Journal Supplement Series, 235, 1.

7. B. Burkhart, M.-Y. Lee, **C. E. Murray**, S. Stanimirović. *The Lognormal Probability Distribution Function of the Perseus Molecular Cloud: A Comparison of HI and Dust*. 2015, The Astrophysical Journal, 811 L28-L33.

6. M.-Y. Lee, S. Stanimirović, **C. E. Murray**, C. Heiles, J. Miller. *Cold and Warm Atomic Gas Around the Perseus Molecular Cloud II: The Impact of High Optical Depth on the H I Column Density Distribution*. 2015, The Astrophysical Journal, 809, 56-74.

5. R. R. Lindner, C. Vera-Ciro, **C. E. Murray**, S. Stanimirović, B. Babler, C. Heiles, P. Hennebelle, W. M. Goss, J. M. Dickey. *Autonomous Gaussian Decomposition*. 2015, The Astronomical Journal, 149, 138-152.

4. N. M. McClure-Griffiths, S. Stanimirović, **C. E. Murray**, D. Li, J. M. Dickey, E. Vazquez-Semadeni, J. E. G. Peek, M. Putman, S. E. Clark, M.-A. Miville-Deschenes, J. Bland-Hawthorn, L. Staveley-Smith, *Galactic and Magellanic Evolution with the SKA*. 2015, Proceedings of Advancing Astrophysics with the Square Kilometer Array (AASKA14), 130.

3. S. Stanimirović, **C. E. Murray**, M.-Y. Lee, C. Heiles, J. Miller. *Cold and Warm Atomic Gas Around the Perseus Molecular Cloud I: Basic Properties*. 2014, The Astrophysical Journal, 793, 132-148.

2. N. M. Pingel, S. Stanimirović, J. E. G. Peek, [10 authors], **C. E. Murray**, [2 authors]. *Characterizing the Turbulent Properties of the Starless Molecular Cloud MBM16*. 2013, The Astrophysical Journal, 779, 36-44.

1. L. Sjouwerman, **C. E. Murray**, Y. Philstrom, V. L. Fish, E. D. Araya. *Discovery of the First Methanol (CH3OH) Maser in the Andromeda Galaxy*. 2010, The Astrophysical Journal, 724, L158-L160.

Technical Reports

3. **C. E. Murray**, W. M. Goss, S. Stanimirović. *Techniques for Galactic HI calibration from 21-SPONGE.* NRAO VLA Memo #197, Jul 2016.

2. **C. E. Murray**, W. M. Goss, S. Stanimirović. *High-Sensitivity Bandpass Calibration: Combining Observations in Time*. NRAO VLA Memo #176, Jan 2014.

1. **C. E. Murray**, W. M. Goss, S. Stanimirović. *Bandpass Stability: A 59 kHz Ripple*. NRAO VLA Memo #171, Sep 2013.

Meeting Abstracts

6. **C. E. Murray**, J. E. G. Peek. *Improving Galactic foregrounds with dusty, multiphase gas from GALFA-HI*. 2018, American Astronomical Society Meeting Abstracts, 231, #247.29

5. **C. E. Murray**, S. Stanimirović, *the 21-SPONGE team*. *Deciphering Galactic Hydrogen with 21-SPONGE*. 2017, American Astronomical Society Meeting Abstracts, 229, #204.02

4. **C. E. Murray**, S. Stanimirović, R. Lindner, *the 21-SPONGE team*. *21-SPONGE Detects Unexpectedly Warm Neutral Medium*. 2015, American Astronomical Society Meeting Abstracts, 225, #141.09

3. J. Miller, M.-Y. Lee, **C. E. Murray**, S. Stanimirović, C. Heiles. *Cold Atomic Hydrogen in the Perseus Molecular Cloud*. 2012, American Astronomical Society Meeting Abstracts, 221, #349.12

2. **C. E. Murray**, L. Sjouwerman, Y. Pihlstrom. *Discovery of the First Methanol Maser in M31*. 2011, American Astronomical Society Meeting Abstracts, 217, #246.07

1. C. Blaha, T. Johnson, R. Cawthon, M. Dixon, **C. E. Murray**, P. Massey, P. Hodge. *Hα Survey of Emission Line Regions in M33 and Local Group Dwarf Galaxies*. 2011, American Astronomical Society Meeting Abstracts, 217, #251.12