

Ashley R. Bemis, Ph.D

CONTACT INFORMATION	bemis@strw.leidenuniv.nl Huygens, Room 11.22 Niels Bohrweg 2 2333 CA Leiden The Netherlands
EMPLOYMENT	LEIDEN OBSERVATORY , University of Leiden, Leiden, The Netherlands ALLEGRO FELLOW , start: November 1, 2020
EDUCATION	MCMASTER UNIVERSITY , Hamilton, ON, Canada Ph.D., Astrophysics, 2020 Thesis: <i>Dense Gas and Star Formation in Nearby Galaxies</i> Supervisor: Christine Wilson BONN UNIVERSITY & MAX PLANCK INSTITÜT FÜR RADIOASTRONOMIE , Bonn, Germany M.Sc., Astrophysics, 2013 Thesis: <i>Methanol as a Probe of Physical Conditions in Star Forming Regions</i> Supervisor: Karl Menten, Co-supervisor: Friedrich Wyrowski UNIVERSITY OF MASSACHUSETTS, AMHERST , Amherst, MA, USA B.Sc. with Honors, Physics & Astronomy, 2011 Thesis: <i>The Role of Convergent Gas Streams in Producing Star Formation</i> Supervisor: Mark Heyer, Co-supervisor: Gopal Narayanan
TEACHING EXPERIENCE	MCMASTER UNIVERSITY Guest Lecturer, <i>Physics 2MN3: Media Numeracy</i> 2019 Teaching Assistant, <i>Physics 2MN3: Media Numeracy</i> 2019 Teaching Assistant, <i>ArtSci 2D06: Physics</i> 2015 - 2019 Teaching Assistant, <i>Astron 2B03: Big Questions</i> 2015 - 2018 Teaching Assistant, <i>Physics 1A03: Introductory Physics</i> 2017 - 2018 Teaching Assistant, <i>Physics 1AA3: Introduction to Modern Physics</i> 2016 GUIDED DISCOVERIES Science Instructor, <i>AstroCamp</i> , Idyllwild, CA, USA 2014 UNIVERSITY OF MASSACHUSETTS, AMHERST Teaching Assistant, <i>Astron 103: Observational Astronomy</i> 2010 Tutor, <i>Astronomy Help Desk</i> 2009
OUTREACH	MCMASTER UNIVERSITY Presenter, <i>William J McCallion Planetarium</i> 2015 - 2020 Member, <i>McMaster Sidewalk Astronomy</i> 2015 - 2020 Member, <i>Promoting Inclusivity in Physics & Astronomy</i> ¹ 2015 - 2020 Visiting Speaker Liason, <i>Promoting Inclusivity in Physics & Astronomy</i> 2018 - 2020 Volunteer, <i>Girls in Science Day, McMaster University</i> 2015 - 2019 ARGELANDER INSTITUTE FOR ASTRONOMY Outreach Student Assistant, <i>SFB 956</i> 2012 UNIVERSITY OF MASSACHUSETTS, AMHERST President, <i>Five College Astronomy Club</i> 2010 - 2011 Member, <i>Five College Astronomy Club</i> 2008 - 2011 Presenter, <i>Orchard Hill Observatory</i> 2009 - 2011

¹Formerly *Graduate Women in Physics & Astronomy*

SCHOLARSHIPS,
AWARDS, AND
HONORS

MCMMASTER UNIVERSITY

Ontario Trillium Scholarship - Doctoral, \$160,000 (4 yr) 2015 - 2019
Best Poster, The Laws of Star Formation Conference, Cambridge, UK 2018

BONN UNIVERSITY

Bonn International Graduate School Scholarship, €1,200 2011 - 2012

UNIVERSITY OF MASSACHUSETTS, AMHERST

Commencement Speaker, College of Natural Sciences, Astronomy Dept. 2011
William F. Field Alumni Scholarship, \$750 2010
Incentive Award, \$20,000 (4 yr) 2007 - 2011
Member of Commonwealth College, Honors College 2007 - 2011

SUCCESSFUL
OBSERVING
PROGRAMS

PI, Bemis A. R., Wilson C. D., *The Submillimeter Array*, 2018B-S022,
“INVESTIGATING DENSE GAS AND STAR FORMATION IN THE ANTENNAE” 2018B

PI, Bemis A. R., Wilson C. D., *James Clerk Maxwell Telescope*, HARP, M18AP063,
4 hours “CONSTRAINING THE RELATIONSHIP BETWEEN HCN(4-3) LUMINOSITY AND
DENSE GAS MASS BY MAPPING CLUMPS AND CORES IN GALACTIC GMCs” 2018A

PI, Bemis A. R., Wilson C. D., Rosolowsky E., Kirk H., *James Clerk Maxwell
Telescope*, RxA3m, M18AP061 “MULTI-LINE ANALYSIS OF DENSE GAS IN CYGNUS X” 2018A

PI, Bemis A. R., Wilson C. D., *James Clerk Maxwell Telescope*, RxA3m, M17BP036,
51.5 hours: “MULTI-LINE ANALYSIS OF DENSE GAS IN AQUILA.” 2017B

PI, Bemis A. R., Wilson C. D., Rosolowsky E., Kirk H., Gao Y., Jiang X.-J., *James
Clerk Maxwell Telescope*, HARP, M17AP070, 36 hours. : “CONSTRAINING THE
RELATIONSHIP BETWEEN HCN(4-3) LUMINOSITY AND DENSE GAS MASS BY
MAPPING CLUMPS AND CORES IN THE AQUILA RIFT AND CYGNUS X REGIONS.” 2017A

PI, Bemis A. R., Wilson C. D., Rosolowsky E., Nguyen-Luong Q., Gao Y., Jiang
X.-J., *James Clerk Maxwell Telescope*, HARP,, M16BP010, 75 hours: “CONSTRAINING
THE RELATIONSHIP BETWEEN HCN(4-3) LUMINOSITY AND DENSE GAS MASS BY
MAPPING CORES IN THE AQUILA RIFT.” 2016B

REFEREED
PUBLICATIONS

5. Wilson, C.D., Elmegreen, B. G., **Bemis, A. R.**, Brunetti, N., 2019, *The Kennicutt -
Schmidt Law and Gas Scale Height in Luminous and Ultraluminous Infrared Galaxies*,
201, ApJ, 882, 5

4. Finn, M.K., Johnson, K.E., Brogan, C.L., Wilson, C.D., Indebetouw, R., Harris,
W.E., Kamenetzky, J., **Bemis, A.R.**, 2019, *New Insights into the Physical Conditions
and Internal Structure of a Candidate Proto - globular Cluster*, ApJ, 874, 120

3. **Bemis, A.R.**, Wilson, C.D., 2019 *Kiloparsec-Scale Variations in the Star Formation
Efficiency of Dense Gas: The Antennae Galaxies (NGC 4038/39)*, AJ, 157, 131

2. Tan, Q.-H., Gao, Y., Zhang, Z.-Y., Greve, T.R., Jiang, X.-J., Wilson, C.D., Yang,
C.-T., **Bemis, A.R.**, Chung, A., Matsushita, S. et al., 2018, *The MALATANG Survey:
The $L_{GAS} - L_{IR}$ Correlation on Sub-kiloparsec Scale in Six Nearby Star-forming
Galaxies as Traced by HCN $J = 4 \rightarrow 3$ and HCO⁺ $J = 4 \rightarrow 3$* , ApJ, 860, 165

1. Narayanan, G., Snell, R., **Bemis, A.R.**, 2012, *Molecular outflows identified in the
FCRAO CO survey of the Taurus Molecular Cloud*, MNRAS, 425, 2641

PUBLICATIONS IN PREPARATION	<p>5. THESIS CHAPTER III, SUBMISSION POST-DEFENCE: Bemis, A.R., Wilson, C.D., 2020. <i>Does the HCN/CO Ratio Track the Dense Gas Fraction? I. A comparison to analytical models of star formation.</i></p> <p>4. THESIS CHAPTER IV, SUBMISSION POST-DEFENCE: Bemis, A.R., Wilson, C.D., 2020. <i>Does the HCN/CO Ratio Track the Dense Gas Fraction? I. A radiative transfer perspective.</i></p> <p>3. Bemis, A.R., Wilson, C.D., 2020, in prep. <i>Variations in HCN, HCO⁺, and CO emission at sub-kpc scales in nearby galaxies.</i></p> <p>2. Bemis, A.R., Wilson, C.D., 2020, in prep. <i>Constraining the $L_{\text{HCN}} - M_{\text{Dense}}$ Relationship using Galactic Sources</i></p> <p>1. Wilson, C. D., Bemis, A.R., & Klimi, O., 2020, in prep., <i>A strong correlation of CN and HCN in galaxies: a new tracer of dense gas</i></p>	
CONTRIBUTED TALKS	<p>4. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Star Formation and Dense Gas in Extreme Environments with ALMA.</i> Views on the Interstellar Medium in Galaxies in the ALMA Era, Bologna, Italy</p> <p>3. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Investigating Dense Gas and Star Formation in the Antennae Galaxies (NGC 4038/39) using ALMA.</i> Star Formation in Different Environments: From Local Clouds to Distant Galaxies, ICISE, Quy Nhon, Vietnam</p> <p>2. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Investigating Dense Gas and Star Formation in the Antennae Galaxies (NGC 4038/39) using ALMA.</i> Canadian Astronomical Society Annual General Meeting, Winnipeg, MB, Canada</p> <p>1. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Investigating Dense Gas and Star Formation in the Antennae Galaxies (NGC 4038/39) using ALMA.</i> Great Lakes Cosmology Workshop, Hamilton, ON, Canada</p>	2019 2017 2016 2016
INVITED TALKS	<p>Bemis, A.R., Wilson, C.D., <i>Connecting Observations of Molecular Line Ratios to Theories of Star Formation</i>, AAS 236, Virtual Meeting</p>	2020
SEMINARS	<p>1. Bemis, A.R., Wilson, C.D. <i>Investigating Dense Gas and Star Formation at Different Scales: from Milky Way Molecular Clouds to the GMCs of the Antennae Galaxies (NGC 4038/39).</i>, Seminar, East Asian Observatory, Hilo, HI, USA</p>	2017
CONFERENCE POSTERS	<p>4. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Star Formation and Dense Gas in Extreme Environments with ALMA.</i> The Laws of Star Formation Conference, Cambridge, UK</p> <p>3. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Investigating Dense Gas and Star Formation in the Antennae Galaxies (NGC 4038/39) using ALMA.</i> Molecular Gas in Galaxies Workshop, Charlottesville, VA</p> <p>2. Bemis, A.R., Wilson, C.D., Schirm, M. <i>Investigating Dense Gas and Star Formation in the Antennae Galaxies (NGC 4038/39) using ALMA.</i> Half a Decade of ALMA Conference, Palm Springs, CA</p> <p>1. Bemis, A.R., Leroy, A., Friesen, R. <i>The Effect of Environment on Star Formation in Giant Molecular Clouds in NGC 2403</i> 217th Meeting of the American Astronomical Society, Seattle, WA</p>	2018 2016 2016 2011
OBSERVING EXPERIENCE	<p>JCMT: Mapping the Dense Molecular Gas in the Strongest Star-forming Galaxies (MALATANG) JCMT Large Program.</p> <p>JCMT: PI Project M17AP070</p> <p>JCMT, PI Project M17BP036</p> <p>JCMT: PI Project M18AP061</p>	Winter 2015 Summer 2017 Fall 2017 Spring 2018
RELEVANT WORK	<p>Scientific Data Analyst I, North American ALMA Science Center, National Radio Astronomy Observatory, Charlottesville, VA</p>	2015