

# Justin Spilker

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**Education**      **University of Arizona**      *Ph.D., Astronomy and Astrophysics (Expected June 2017)*  
Thesis: Gas, Dust, and Quenching of Dusty Galaxies in the Early Universe  
Advisor: Daniel P. Marrone

**Iowa State University**      *Bachelor of Science, Physics, May 2011*  
Minors: Astronomy, Spanish      *Magna Cum Laude*

**Research Experience**      **PhD Graduate Research Assistant**, advised by Dr. Daniel Marrone      *2011 - present*  
*University of Arizona*  
• Studying star-forming conditions in high-redshift lensed starburst galaxies

**Summer REU Student**, advised by Dr. Mark Lacy      *Summer 2010*  
*National Radio Astronomy Observatory, Charlottesville, VA*  
• Developed simulations for high-redshift galaxy surveys using ALMA

**Undergraduate Research**, advised by Dr. Lee Anne Willson, Dr. Massimo Marengo  
*Iowa State University Department of Physics and Astronomy*      *2009 - 2011*  
• Tracked long-term variability in atmospheres of brown dwarf stars

**Honors & Awards**

- 2015 - TRIF Imaging Fellowship Award (~\$10,000)
- 2013 - University of Arizona College of Sciences Departmental Service Award
- 2011 - University of Arizona College of Sciences Fellowship
- 2011 - *Magna Cum Laude*, Iowa State University
- 2011 - Chambliss Undergraduate Astronomy Achievement Award, AAS
- 2011 - Hammer Senior Undergraduate Scholarship, Iowa State University
- 2010 - Phi Beta Kappa Honor Society Initiate
- 2008 - Award for Competitive Excellence, Iowa State University
- 2007 - National Merit Scholarship

**Outreach, Teaching, & Departmental Service**

- 2016 - University of Arizona Teaching Assistant, Introductory Astronomy
- 2015 - University of Arizona Teaching Assistant, Stellar Astrophysics
- 2013 - University of Arizona Teaching Assistant, Introductory Astronomy
- 2013 - Graduate Representative, Arizona Astronomy Committee on Mentoring
- 2012 - Steward Observatory Graduate Student Council President
- 2012 - Undergraduate Kepler Research Mentor
- 2012 - Advanced Astronomy Camp Counselor
- 2012 - Meteor Crater Solar Eclipse Outreach Project
- 2010 - Undergraduate Physics Teaching Assistant, Iowa State University
- 2010 - Undergraduate Physics Mentor, Iowa State University
- 2010 - Planetarium Show Presenter, Iowa State University
- 2008 - Iowa State University Physics & Astronomy Club
- 2007 - Iowa State University Honors Program

**Observing Experience**

ALMA (350um – 3mm interferometry), VLA (7mm interferometry), APEX (870um single dish), ATCA (7mm, 4cm interferometry), Magellan-Baade (IMACS imaging & spectroscopy), SMA (1mm interferometry), ARO SMT (1mm single dish, VLBI), ARO 12m (3mm single dish), ISU Fick 0.6m (imaging)

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## Publications First-Author and Top Tier Author Refereed Journal Articles

7. *Low Gas Fractions Connect Compact Star-Forming Galaxies to their  $z \sim 2$  Quiescent Descendants*  
**J. Spilker** et al., 2016, *Astrophysical Journal in press*, arXiv:1607.01785
6. *ALMA Imaging and Gravitational Lens Models of South Pole Telescope-Selected Dusty, Star-Forming Galaxies at High Redshifts*  
**J. Spilker**, D.P. Marrone, et al., 2016, *Astrophysical Journal*, 826, 112.
5. *A Survey of the Cold Molecular Gas in Gravitationally Lensed Star-Forming Galaxies at  $z=2-6$*   
M. Aravena, **J. Spilker**, et al., 2016, *MNRAS*, 457, 4406.
4. *Stellar Masses and Star Formation Rates of Lensed, Dusty, Star-Forming Galaxies from the SPT Survey*  
J. Ma, A.H. Gonzalez, **J. Spilker**, et al., 2015, *Astrophysical Journal*, 812, 88.
3. *Sub-kiloparsec Imaging of Cool Molecular Gas in Two Strongly Lensed Dusty, Star-Forming Galaxies*  
**J. Spilker**, M. Aravena, D.P. Marrone, et al., 2015, *Astrophysical Journal*, 811, 124.
2. *The Rest-Frame Submillimeter Spectrum of High-Redshift, Dusty, Star-Forming Galaxies*  
**J. Spilker**, D.P. Marrone, et al., 2014, *Astrophysical Journal*, 785, 149.
1. *ALMA Observations of SPT-Discovered, Strongly Lensed, Dusty, Star-Forming Galaxies*  
Y. Hezaveh, D.P. Marrone, C.D. Fassnacht, **J. Spilker**, et al., 2013, *Astrophysical Journal*, 767, 132.

## Other Refereed Journal Articles

10. *Persistent Asymmetric Structure of Sagittarius A\* on Event Horizon Scales*  
V. Fish et al., including **J. Spilker**, 2016, *Astrophysical Journal*, 820, 90.
9. *The Redshift Distribution of Dusty Star Forming Galaxies from the SPT Survey*  
M. Strandet et al., including **J. Spilker**, 2016, *Astrophysical Journal*, 822, 80.
8. *An ALMA View of the Interstellar Medium of the  $z=4.77$  Lensed Starburst SPT-S J213242-5802.9*  
M. Béthermin et al., including **J. Spilker**, 2016, *A&A*, 586, 7.
7. *Probing Star Formation in the Dense Environments of  $z \sim 1$  Lensing Halos Aligned with Dusty Star-Forming Galaxies Detected with the South Pole Telescope*  
N. Welikala et al., including **J. Spilker**, 2016, *MNRAS*, 455, 1629
6. *The Nature of the [CII] Emission in Dusty Star-Forming Galaxies From the SPT Survey*  
B. Gullberg et al., including **J. Spilker**, 2015, *MNRAS*, 449, 2883.
5. *SPT0538-50: Physical Conditions in the Interstellar Medium of a Strongly Lensed Dusty Star-forming Galaxy at  $z = 2.8$*   
M. Bothwell et al., including **J. Spilker**, 2013, *Astrophysical Journal*, 779, 67.
4. *Extragalactic Millimeter-wave Point-source Catalog, Number Counts, and Statistics from 771deg<sup>2</sup> of the SPT-SZ survey*  
L. Mocanu et al., including **J. Spilker**, 2013, *Astrophysical Journal*, 779, 61.
3. *Large gas reservoirs and free-free emission in two lensed star-forming galaxies at  $z=2.7$*   
M. Aravena et al., including **J. Spilker**, 2013, *MNRAS*, 433, 498.
2. *Dusty starburst galaxies in the early universe as revealed by gravitational lensing*  
J.D. Vieira et al., including **J. Spilker**, 2013, *Nature*, 495, 344.
1. *ALMA Redshifts of Millimeter-Selected Galaxies from the SPT Survey: The Redshift Distribution of Dusty Star-Forming Galaxies*  
A. Weiss et al., including **J. Spilker**, 2013, *The Astrophysical Journal*, 767, 88.

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## Scientific Conferences, Department Seminars

### Contributed Conference Talks

6. *Resolving the Most Intensely Star-Forming Galaxies in the Universe*. Contributed talk presented at A Half Decade of ALMA: Cosmic Dawns Transformed, Indian Wells, CA, 20-23 September 2016.
5. *Gas, Dust and Quenching of Dusty Galaxies in the Early Universe*. Contributed talk presented at American Astronomical Society Meeting #227, Kissimmee, FL, 4-8 January 2016.
4. *High-Resolution Imaging of Gas and Dust in the Early Universe*. Contributed talk presented at South by High-Redshift, Austin, TX, 1-3 April 2015.
3. *Recent Highlights from the South Pole Telescope Sample of High-Redshift Dusty Star-Forming Galaxies*. Contributed talk presented at The Formation and Growth of Galaxies in the Young Universe, Obergurgl, Austria, 26-30 April 2014.
2. *The Star-Forming Conditions in SPT-selected Dusty Star-forming Galaxies*. Poster presented at Infrared and Submillimeter Probes of Gas in Galaxies, IPAC / Pasadena, CA, 17-20 March 2013.
1. *Emission Line Searches for High-Redshift Galaxies with ALMA*. Poster presented at American Astronomical Society Meeting #217, Seattle, WA, 9-13 January 2011.

### Departmental Seminars and Other Talks

4. *Gas, Dust, and Quenching of Dusty Galaxies in the Early Universe*. Harvard-Smithsonian Center for Astrophysics lunch talk, 12/11/15.
3. *Gas, Dust, and Quenching of Dusty Galaxies in the Early Universe*. UC-Berkeley Radio Astronomy Laboratory talk, 12/7/15.
2. *Gas, Dust, and Quenching of Dusty Galaxies in the Early Universe*. UC-Santa Cruz FLASH lunch talk, 12/4/15.
1. *Gas, Dust, and Quenching of Dusty Galaxies in the Early Universe*. NRAO Charlottesville TUNA lunch talk, 11/9/15.

## Telescope Time Awarded as PI

- ALMA, Cycles 3 and 4 (Highest priority) – *Shut it Down: Probing Molecular Feedback in  $z=4-5$  Dusty Star-Forming Galaxies*.
- ALMA, Cycle 4 – *Constraining Quenching Processes in Galaxies Significantly Below the Main Sequence at  $z \sim 0.7$*
- VLA, 2015B and 2016A – *Probing the Gas Reservoirs of the Progenitors of Early Quiescent Galaxies*