

Joseph A. Muñoz

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RESEARCH INTERESTS:

Cosmology, ISM of high-z galaxies, first galaxies, reionization, relics in the Local Group

CURRENT POSITION:

Postdoctoral Scholar, UCSB, with Peng Oh 2013–15

EDUCATION:

Ph.D., Harvard University, ASTRONOMY 2010

Advisor: Abraham Loeb

Thesis title: *Galaxies within Hierarchical Structure Formation*

A.M., Harvard University, ASTRONOMY 2007

A.B., Princeton University, ASTROPHYSICAL SCIENCES, *magna cum laude* 2005

Advisor: Paul Steinhardt and Neta Bahcall

HONORS AND AWARDS:

NSF Graduate Research Fellowship 2005–08

Sigma Xi Book Award, Princeton (one graduating senior in astrophysics) 2005

Sigma Xi Inductee, Princeton Chapter (selected by the faculty) 2005

PREVIOUS RESEARCH POSITIONS:

Postdoctoral Scholar, UCLA, with Steven Furlanetto 2010–13

Graduate Student Researcher, Harvard, with Abraham Loeb 2005–10

Senior Independent Work, Princeton, with Paul Steinhardt and Neta Bahcall 2004–05

REU Summer Research Intern, Princeton, with Edward Jenkins 2004

Junior Independent Work, Princeton, with J. Richard Gott 2004

Junior Independent Work, Princeton, with David Spergel 2003

REU Summer Research Intern, Princeton, with Jonathan Tan 2003

Research Assistant, Princeton, with Gillian Knapp 2002

REU Summer Research Intern, University of Florida, with Andrey Korytov 2002

Research Assistant, Princeton, with Lyman Page 2001–02

MENTORING:

Lauren Holzbauer, graduate student, UCLA, with Steven Furlanetto 2012–

Adam Greenberg, first-year graduate student, UCLA 2013

Fred Davies, graduate student, UCLA, with Steven Furlanetto 2013–

Ethan Nadler, undergraduate student, UCSB 2014–

TEACHING POSITIONS:

Teaching Fellow , Harvard, Ay 202b: Cosmology (grad)	2010
Designed and graded problem sets and final exam; ran Q&A and review sessions.	
Teaching Fellow , Harvard, Ay 202a: Galaxies and Dynamics (grad)	2009
Helped organize curriculum; ran sessions for and graded problem sets and exams.	
Teaching Fellow , Harvard, Science A-47: Cosmic Connections (non-majors)	2006, 07
Designed and taught weekly one hour section; ran the in-lecture Pearson Response System (PRS); led problem sessions and exam reviews; graded problem set and exams	
Teaching Assistant , Princeton, AST 203: The Universe (non-majors)	2004, 05
Ran problem set and review sessions and graded problem sets and exams.	

GRANTS:

PI : UC High Performance AstroComputing Center, small travel grant	2013-4
“The Proximity Effect of Galaxies on the Column Density Distribution of Absorbers During Hydrogen Reionization”	
CO-I : <i>HST</i> Cycle 20, GO 12905, 18 Orbits, PI: M. Trenti	2012
“Unveiling the structure of the farthest galaxy protocluster: WFC3 imaging of a $z \sim 8$ galaxy overdensity”	

WORK IN MANUSCRIPT STAGE:

2. J. A. Muñoz , F. Davies, P. Oh, S. Furlanetto, to be submitted to <i>MNRAS</i>	2014
“The Flatness and Sudden Evolution of the Meta-Galactic Ionizing Background”	
1. L. Holzbauer, J. A. Muñoz , S. Furlanetto, to be submitted to <i>MNRAS</i>	2014
“Fluctuations in the High-Redshift Near-Infrared Background”	

FIRST AUTHOR PUBLICATIONS:

12. J. A. Muñoz , M. Peebles, submitted to <i>MNRAS</i> , astro-ph/1404.1915	2014
“A Framework for Empirical Galaxy Phenomenology: The Scatter in Galactic Ages and Stellar Metallicities”	
11. J. A. Muñoz , S. Furlanetto, <i>MNRAS</i> , 438, 2483	2014
“Extreme Galaxies During Reionization: Testing ISM and Disk Models”	
10. J. A. Muñoz , S. Furlanetto, <i>MNRAS</i> , 435, 2676	2013
“Molecular Cloud Properties and CO Line Emission in $z \geq 6$ Galaxies”	
9. J. A. Muñoz , S. Furlanetto, <i>MNRAS</i> , 426, 3477	2012
“Faint AGN in $z \geq 6$ Lyman-break Galaxies Powered by Cold Accretion and Rapid Angular Momentum Transport”	
8. J. A. Muñoz , <i>JCAP</i> , 04, 015	2012
“The Evolution of the Galaxy Luminosity Function from $z=6-10$ in the Context of Hierarchical Structure Formation”	
7. J. A. Muñoz , A. Loeb, <i>ApJ</i> , 729, 99	2011
“Constraining the Minimum Mass of High-Redshift Galaxies and Their Contribution to the Ionization State of the IGM”	

6. **J. A. Muñoz**, H. Trac, A. Loeb, *MNRAS*, 405, 2001 2010
 “High-redshift Pencil-beam Statistics”
5. **J. A. Muñoz**, P. Madau, A. Loeb, J. Diemand, *MNRAS*, 400,1593 2009
 “Probing the Epoch of Reionization with Milky Way Satellites”
4. **J. A. Muñoz**, A. Loeb, *MNRAS*, 391, 1341 2008
 “The Density Contrast of the Shapley Supercluster”
3. **J. A. Muñoz**, A. Loeb, *MNRAS*, 386, 2323 2008
 “Light-Cone Distortion of the Clustering and Abundance of Massive Galaxies at High-Redshifts”
2. **J. A. Muñoz**, A. Loeb, *MNRAS*, 385, 2175 2008
 “Verifying the Identity of High-Redshift Massive Galaxies Through the Clustering of Lower Mass Galaxies Around Them”
1. **J. A. Muñoz**, J. Tan, *ApJ*, 625, 256 2005
 “The Variability of Gamma-Ray Bursts that Create Afterglows”

OTHER REFEREED PUBLICATIONS:

2. K. Finlator, **J. A. Muñoz**, et al., *MNRAS*, 438, 2483 2014
 “The Host Halos of OI Absorbers in the Reionization Epoch”
1. M. Trenti et al. (incl. **J. A. Muñoz**), *ApJ*, 746, 55 2012
 “A Protocluster of Galaxies at Redshift $z \sim 8$ ”

PROFESSIONAL ACTIVITIES, AFFILIATIONS, AND OUTREACH:

- Referee:** *MNRAS*, *ApJ*, *JCAP*
- Student Representative for the Harvard Junior Faculty Search** 2008
 Led student discussions, collated opinions, and reported to faculty
- Project ASTRO Astronomer** 2007–09
 Taught level-appropriate astronomy to Deyne Meadow’s 4th-grade class at the Haggerty School, Cambridge, MA
- Member of Sigma Xi**, Princeton Chapter
- Member of American Astronomical Society**

SEMINARS & COLLOQUIA:

- Caltech**, Astronomy Tea Talk 2013
- CCAPP/OSU**, CCAPP Seminar 2013
- UC Riverside**, Astronomy Seminar 2012
- Georgia Tech**, Center for Relativistic Astrophysics Seminar 2012
- UC Santa Barbara**, Astro Lunch Talk 2011
- Carnegie Observatories**, Lunch Talk 2011
- UNLV**, Astronomy Colloquium 2011
- Harvard University**, Institute for Theory and Computation Luncheon 2009

CONFERENCE PRESENTATIONS:

10. *The Properties of Gas in Galaxies at $z > 6$* (invited talk)
Cosmic Dawn @ Ringberg, June 2013, Ringberg Castle, Germany
9. *Modeling X-Ray and CO Line Emission from $z \approx 6$ Galaxies* (contr. talk)
221th AAS Meeting, 2013, Long Beach, CA, USA
8. *Analytic Modeling of $z \approx 6$ Galaxy Formation* (contr. talk)
The Baryon Cycle, 2012, Irvine, CA, USA
7. *Analytic Modeling of Galaxies at $z \approx 6$: Star Formation and Black Hole Growth* (contr. talk)
First Stars IV: From Hayashi to the Future, 2012, Kyoto, Japan
6. *The Galaxy Formation Theory Perspective on the High- z LF for Reionization* (contr. talk)
EOR:2012, 2012, Strasbourg, France
5. *The Sources that Reionized the Universe and their Relics in the Local Group* (contr. talk)
Theoretical Astrophysics in Southern California, 2010, Pasadena, CA
4. *Galaxy Clustering within Hierarchical Structure Formation* (dissertation talk)
215th AAS Meeting, 2010, Washington, DC, USA
3. *Probing Reionization with Milky Way Satellites* (contr. talk)
Reionization @ Ringberg, 2009, Ringberg Castle, Germany
2. *Abundance and Clustering of the Most Massive Galaxies at $z > 6$* (contr. talk)
Far Away: Light in the Young Universe at Redshift Beyond Three, 2008, Paris, France
1. *The Density Contrast of the Shapley Supercluster* (poster)
The Warm & Hot Universe, 2008, Columbia University, New York, NY, USA

PROFESSIONAL REFERENCES:

Peng Oh

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Steven Furlanetto

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