

DANIEL C. JACOBS

EDUCATION

2011	PhD Astrophysics/Astronomy, University of Pennsylvania
2006	MSc Physics, Montana State University
2004	BS (Physics w/ Astrophysics option) New Mexico Institute of Mining and Technology

RESEARCH POSITIONS

2014-current	National Science Foundation - Astronomy and Astrophysics Postdoctoral Fellow, Arizona State University.
2011-2014	Postdoctoral Fellow. School of Earth and Space Exploration, Arizona State University
2009-2011	Research Assistant, University of Pennsylvania
2004-2009	Research Assistant and Project Manager, Space Science and Engineering Laboratory, Montana State University
2006-2007	Teaching Assistant, Department of Physics, Montana State University
2002-2004	Magdalena Ridge Observatory, Department of Physics, New Mexico Tech

PUBLICATIONS

Jacobs, Daniel C; Pober, Jonathan C; Parsons, Aaron R; Aguirre, James E; Ali, Zaki; Bowman, Judd; Bradley, Richard F; Carilli, Chris L; DeBoer, David R; Dexter, Matthew R; *Multi-redshift limits on the 21cm power spectrum from PAPER*, 2015, ApJ, vol. 801, i 1

Pober, J., Ali, Z., Parsons, McQuinn, M. A., Zheng, H., Liu, A., Aguirre J., Bradley, R., Bernardi, G., Carilli, C., Cheng, C., DeBoer, D., Dexter, M., Horrell, J., **Jacobs, D. C.**, Klima, P., MacMahon, D., Matthys, M., Moore, D., Razavi, N., Stefan, I., Walbrugh, W., Walker, A., *PAPER-64 Constraints On Reionization II: The Temperature Of The $z=8.4$ Intergalactic Medium*, arXiv:1503.00045, under review at ApJ

Ali, Z., Parsons, A., Zheng, H., Pober, J., Liu, A., Aguirre J., Bradley, R., Bernardi, G., Carilli, C., Cheng, C., DeBoer, D., Dexter, M., Horrell, J., **Jacobs, D. C.**, Klima, P., MacMahon, D., Matthys, M., Moore, D., Razavi, N., Stefan, I., Walbrugh, W., Walker, A., *PAPER-64 Constraints on Reionization: The 21cm Power Spectrum at $z=8.4$* , arXiv:1502.06016, under review at ApJ

PUBLICATIONS (CONTINUED)

Moore, D., Aguirre J., Parsons, A., Ali, Z., Bradley, R., Carilli, C., DeBoer, D., Dexter, M., Gugliucci, N., **Jacobs, D. C.**, Klima, P., Liu, A., MacMahon, D., Manley, J., Pober, J., Stefan, I., Walbrugh, W. *New Limits on Polarized Power Spectra at 126 and 164 MHz: Relevance to Epoch of Reionization Measurements*, 2015, arXiv:1502.05072 under review at ApJ

Nithyanandan Thyagarajan, **Jacobs, D. C.**, Bowman, J., N Barry, AP Beardsley, G Bernardi, F Briggs, RJ Cappallo, P Carroll, et. al. *Confirmation of Wide-field Signatures in Redshifted 21 cm Power Spectra*, 2015, ApJL vol 807, i. 2

Nithyanandan Thyagarajan, **Jacobs, D. C.**, Bowman, J., N Barry, AP Beardsley, G Bernardi, F Briggs, RJ Cappallo, P Carroll, et. al. *Foregrounds in wide-field redshifted 21 cm power spectra*, 2015, ApJ, vol. 804, i 1

B McKinley, R Yang, M Lpez-Caniego, F Briggs, N Hurley-Walker, RB Wayth, AR Offringa, R Crocker, **D Jacobs**, et. al. *Modelling of the spectral energy distribution of Fornax A: leptonic and hadronic production of high-energy emission from the radio lobes*, MNRAS, 2015, vol 446, i. 4

L Hindson, M Johnston-Hollitt, Natasha Hurley-Walker, K Buckley, John Morgan, E Carretti, KS Dwarakanath, M Bell, **D Jacobs**, et al. *The First Murchison Widefield Array low-frequency radio observations of cluster scale non-thermal emission: the case of Abell 3667* 2014, MNRAS, vol 445, i. 1

Pober, J. C. and Liu, A. and Dillon, J. S. and Aguirre, J. E. and Bowman, J. D. and Bradley, R. F. and Carilli, C. L. and DeBoer, D. R. and Hewitt, J. N. and **Jacobs, D. C.** and McQuinn, M. and Morales, M. F. and Parsons, A. R. and Tegmark, M. and Werthimer, D. J., *What Next-Generation 21 cm Power Spectrum Measurements Can Teach Us About the Epoch of Reionization*, 2014, ApJ, vol. 782, i. 2

Offringa, AR; McKinley, B; Hurley-Walker, N; Briggs, FH; Wayth, RB; Kaplan, DL; Bell, ME; Feng, L; Neben, AR; Hughes, JD; **Jacobs, D. C.**, et. al. *wsclean: an implementation of a fast, generic wide-field imager for radio astronomy*, Monthly Notices of the Royal Astronomical Society, 444, 1, 606-619, 2014, Oxford University Press

Hindson, L; Johnston-Hollitt, M; Hurley-Walker, N; Buckley, K; Morgan, J; Carretti, E; Dwarakanath, KS; Bell, M; Bernardi, G; Bhat, NDR; **Jacobs, D. C.** et. al., *The First Murchison Widefield Array low-frequency radio observations of cluster scale non-thermal emission: the case of Abell 3667*, Monthly Notices of the Royal Astronomical Society, 445, 1, 330-346, 2014, Oxford University Press

Hurley-Walker, Natasha; Morgan, John; Wayth, Randall B; Hancock, Paul J; Bell, Martin E; Bernardi, Gianni; Bhat, Ramesh; Briggs, Frank; Deshpande, Avinash A; Ewall-Wice, Aaron; **Jacobs, D.C.**, *The Murchison Widefield Array Commissioning Survey: A Low-Frequency Catalogue of 14,110 Compact Radio Sources over 6,100 Square Degrees*, arXiv preprint arXiv:1410.0790, 2014, Accepted to PASA

PUBLICATIONS (CONTINUED)

Daniel C Jacobs, Aaron R Parsons, James E Aguirre, Zaki Ali, Judd Bowman, Richard F Bradley, Christopher L Carilli, David R DeBoer, Matthew Dexter, Nicole E Gugliucci, Pat Klima, Dave HE MacMahon, Jason R Manley, David F Moore, Jonathan C Pober, Irina I Stefan, William P Walbrugh *A Flux Scale for Southern Hemisphere 21cm EoR Experiments*, 2013, ApJ, 776, 108

S. J. Tingay, D. L. Kaplan, B. McKinley, F. Briggs, R. B. Wayth, N. Hurley-Walker, J. Kennewell, C. Smith, K. Zhang, W. Arcus, N. D. R. Bhat, D. Emrich, D. Herne, N. Kudryavtseva, M. Lynch, S. M. Ord, M. Waterson, D. G. Barnes, M. Bell, B. M. Gaensler, E. Lenc, G. Bernardi, L. J. Greenhill, J. C. Kasper, J. D. Bowman, **D. Jacobs**, and 37 others *On the Detection and Tracking of Space Debris Using the Murchison Widefield Array. I. Simulations and Test Observations Demonstrate Feasibility*, 2013, AJ, 146, 103

Parsons, A. R. and Liu, A. and Aguirre, J. E. and Ali, Z. S. and Bradley, R. F. and Carilli, C. L. and DeBoer, D. R. and Dexter, M. R. and Gugliucci, N. E. and **Jacobs, D. C.** and Klima, P. and MacMahon, D. H. E. and Manley, J. R. and Moore, D. F. and Pober, J. C. and Stefan, I. I. and Walbrugh, W. P. *New Limits on 21cm EoR From PAPER-32 Consistent with an X-Ray Heated IGM at $z = 7.7$* , ApJ, 788, 2, 106

Daniel C Jacobs, Judd Bowman, James E Aguirre, *The precision and accuracy of early Epoch of Reionization foreground models: comparing MWA and PAPER 32-antenna source catalogs*, 2013, ApJ, vol 769, i. 1

Irina I Stefan, Chris L Carilli, David A Green, Zaki Ali, James E Aguirre, Richard F Bradley, David DeBoer, Matthew Dexter, Nicole E Gugliucci, DE Harris, **Daniel C Jacobs**, Pat Klima, David MacMahon, Jason Manley, David F Moore, Aaron R Parsons, Jonathan C Pober, William P Walbrugh *Imaging on PAPER: Centaurus A at 148 MHz*, 2013, MNRAS, vol 432, i. 2

David F Moore, James E Aguirre, Aaron R Parsons, **Daniel C Jacobs**, Jonathan C Pober, *The Effects of Polarized Foregrounds on 21 cm Epoch of Reionization Power Spectrum Measurements*, 2013, ApJ, vol 769, i. 2

Jonathan C Pober, Aaron R Parsons, James E Aguirre, Zaki Ali, Richard F Bradley, Chris L Carilli, Dave DeBoer, Matthew Dexter, Nicole E Gugliucci, **Daniel C Jacobs**, Patricia J Klima, Dave MacMahon, Jason Manley, David F Moore, Irina I Stefan, William P Walbrugh *Opening the 21 cm Epoch of Reionization Window: Measurements of Foreground Isolation with PAPER*, 2013, ApJL, vol 768, i. 2

Parsons, A., Pober, J., Aguirre, J., Carilli, C., **Jacobs, D.**, Moore, D.. *A Per-baseline, Delay-spectrum Technique for Accessing the 21cm Cosmic Reionization Signature*, 2012, ApJ, vol. 756 (2) pp. 165

Pober, J., Parsons, A., **Jacobs, D.**, Aguirre, J., Bradley, R., Carilli, C., Gugliucci, N., Moore, D., Parashare, C. *A Technique for Primary Beam Calibration of Drift-scanning, Wide-field Antenna Elements*. The Astronomical Journal (2012) vol. 143 pp. 53

PUBLICATIONS (CONTINUED)

Parsons, A, McQuinn, M, **Jacobs, D.**, Aguirre, J., & Pober, J., *A Sensitivity and Array-configuration Study for Measuring the Power Spectrum of 21 cm Emission from Reionization*. The Astrophysical Journal (2012) vol. 753 pp. 81

Jacobs, Daniel C., Aguirre, James E., Parsons, Aaron R., Pober, Jonathan C., Bradley, Richard F., Carilli, Chris L., Gugliucci, Nicole E., Manley, Jason R., van der Merwe, Carel, Moore, David F., & Parashare, Chaitali R. *New 145 MHz Source Measurements by PAPER in the Southern Sky* 2011, ApJL, 734, L34

Parsons, Aaron R.; Backer, Donald C.; Foster, Griffin S.; Wright, Melvyn C. H.; Bradley, Richard F.; Gugliucci, Nicole E.; Parashare, Chaitali R.; Benoit, Erin E.; Aguirre, James E.; **Jacobs, Daniel C.**; Carilli, Chris L.; Herne, David; Lynch, Mervyn J.; Manley, Jason R.; Werthimer, Daniel J. *The Precision Array for Probing the Epoch of Re-ionization: Eight Station Results*, 2010, AJ, 139, 1468,

Plowman J. E., **Jacobs D. C.**, Hellings R. W., Larson S. L., Tsuruta S., *Constraining the black hole mass spectrum with gravitational wave observations - I. The error kernel* 2010, MNRAS, 401, 2706

PRINCIPLE INVESTIGATOR

Amazon Web Services/Square Kilometer Array - Astrocompute (2015), "Processing MWA Epoch of Reionization data on AWS"

National Science Foundation - Astronomy and Astrophysics research Grants (AAG), 2014, AST-1410719, "COLLABORATIVE RESEARCH: Observing the Epoch of Reionization with the Murchison Widefield Array" (Note: Acting as PI, listed as co-PI.)

National Science Foundation - Advanced Technologies and Instrumentation (ATI) AST-1407646, 2014, "An External Calibrator for HI Observatories" (Note: Acting as PI, listed as co-PI)

National Science Foundation - Astronomy and Astrophysics Postdoctoral Fellowship (AAPF) AST-1401708, 2014, "Charting the history of reionization with the first 21cm observations"

TEACHING AND MENTORING

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| 2012-2015 | Planetarium Society Recruiting and training undergraduates to do portable planetarium shows in the community. |
| 2014,2015 | Camp SESE Portable planetarium demonstration and lectures |
| 2015 | Capstone Mentor School of Computer Science |
| 2015 | Capstone Mentor School of Computer Engineering |
| 2015 | Santa Fe Cosmology Summer School Invited Lecture on Epoch of Reionization Cosmology |
| 2014 | Capstone Mentor School of Computing, Informatics and Decision Systems |
| 2014 | Santa Fe Cosmology Summer School Invited Lecture on Epoch of Reionization Cosmology |
| 2013 | Galaxies and Cosmology, graduate Three lectures |

TEACHING AND MENTORING (CONTINUED)

2012	Introduction to Galactic and Extragalactic Astrophysics , undergraduate Two lectures
2008	Electricity and Magnetism , graduate Two lectures
2006-2009	Project Manager, Student Mentor Space Sciences and Engineering Lab. Montana State University. Helped 40+ students from under-represented and rural backgrounds to design, build, and fly their own space hardware. Three successful funding proposals, and two NASA launch manifests.
2006-2007	Teaching Assistant Montana State University, Led Physics by Inquiry laboratories using a research driven curriculum.

SYNERGISTIC ACTIVITIES AND AWARDS

PI	Amazon/SKA Astrocompute, 2015
Contributor	HERA-Mid-Scale Instrumentation Program, 2014-2016
Recipient	Distinguished Mentor, College of Liberal Arts and Sciences, 2014
Member	NRAO - CASA Users Committee 2014-
PI	NSF - Astronomy and Astrophysics research Grants (AAG) 2014-2016
PI	NSF - Advanced Technologies and Instrumentation (ATI) 2014-2016
Member	Murchison Widefield Array (MWA) 2011-present
Member	Precision Array for Probing the Epoch of Reionization (PAPER) 2008- present
Contributor	NSF - PAPER project; Rich Bradley & Aaron Parsons, PI, 2011
Contributor	Capital grant from Mt. Cuba Astronomical Foundation
Contributor	Airforce Nanosat competition, 2008
Lead	Explorer 1 [PRIME] NASA ELaNa Launch opportunity competition, 2008
Contributor	Airforce Nanosat competition, 2007
Recipient	APS travel grant 2010
Member	Space Science and Engineering Laboratory, Montana State University 2004 - 2009
Member	American Astronomical Society 2009 - present
Member	American Physical Society 2001 - present
Member	Sigma Pi Epsilon 2004 - present
Recipient	American Physical Society Marsh White Award, 2003

OUTREACH

2015	Phoenix ComicCon Panels "Adventures and Disasters in Science", "The Funding Game"
2015	Outreach with Star Lab Pascua Yaqi Boys and Girls Club, Mesa Prep Academy, Bio-science High School
2014	Science Friday "Probing the First Stars with Radio Arrays in the Deep Desert", Tempe Center for the Arts
2014	Phoenix ComicCon Panels "The Search for Extraterrestrial Life", "Adventures in Science", "Build Your Own Satellite!", "Wait Wait Don't Science Me - A ComicCon Science Quiz"
2013	Grand Awards Judge Intel Science and Engineering Fair
2013	Outreach with Star Lab Salt River Pima Maricopa Reservation
2013	Outreach with Radio Detectives School of Earth and Space Exploration Open House
2013	Outreach with Radio Detectives Pascua Yaqi Tribal Center

OUTREACH (CONTINUED)

2012	Public Lecture ASU Open Door Night
2012	Outreach with Radio Detectives School of Earth and Space Exploration Open House
2010	Astronomer in the Classroom , sponsored by the International Year of Astronomy
2004	Teaching Assistant , Montana State University, Physics Dept.
2003-2004	President NMT Physics Society and Demonstration Team, Led several significant hands-on outreach events: scale model medieval trebuchet (first place in Socorro parade, first place in Estancia launching competition), annual K-12 paper airplane contest, second annual children's rocket building and launching event.
2001-2003	Member NMT Physics Society and Demonstration Team. Performed entertaining and educational physics demonstrations for all ages.

LECTURES

- Invited lecture, The Epoch of Reionization, Santa Fe Cosmology Summer School, St. John's College, 2015
- Invited talk, Chasing our Cosmic Dawn: Opening the 21cm Cosmological Window on the Universe, CCAPP, The Ohio State U. 2015
- Invited talk, Chasing our Cosmic Dawn: Opening the 21cm Cosmological Window on the Universe, IAS, 2015
- Invited talk, Chasing our Cosmic Dawn: Opening the 21cm Cosmological Window on the Universe, Brown, 2015
- Invited talk, Chasing our Cosmic Dawn: Opening the 21cm Cosmological Window on the Universe, U. of IL, 2015
- Invited talk, Chasing our Cosmic Dawn: Opening the 21cm Cosmological Window on the Universe, UW Madison, 2015
- Multi-redshift 21 cm observations of the epoch of reionization, AAS, 2015
- Chasing our Cosmic Dawn with the Hydrogen Epoch of Reionization Array, NSF AAPF Fellow's Symposium, Seattle, 2015
- Invited talk, Early Science from Low Frequency Radio Telescopes, Tempe Az, 2014
- The Epoch of Reionization, Santa Fe Cosmology Summer School, St. John's College, 2014
- Development and Status of early pipelines for MWA and PAPER, Exascale Radio Astronomy, Monterey CA, 2014
- LoCo1: Testing Low frequency Astronomy in Space, Invited Speaker, URSI, 2014
- Shedding light on EoR Foregrounds with PAPER and MWA, Invited Speaker, URSI, 2014
- Detecting the Epoch of Reionization with Experimental Radio Arrays, Colloquium, University of Wisconsin, Milwaukee November 2013
- Methods for detecting the 3D percolation of photons in the early universe, Invited Talk, Biomedical Astronomical Signal Processing Frontiers Workshop, January, 2013
- Comparing MWA/PAPER Instrumental Performance, American Astronomical Society, January, 2013
- PAPER: Status and Recent Observations, NRAO New Worlds New Horizons, Santa Fe, NM February 2011
- The southern sky with PAPER, University of New Mexico, 2010
- The Epoch of Reionization with a Precision Array, Santa Fe Summer Cosmology school, 10 July 2010
- Catalog and Galactic Emissions with PAPER, Aspen Winter Conference. 4 Feb 2010

LECTURES (CONTINUED)

- Recent Results from the Precision Array for Probing the Epoch of Reionization (PAPER) Experiment in South Africa, American Astronomical Society, 2010
- Outreach to elementary schoolchildren via Astronomer in the Classroom sponsored by the International Year of Astronomy, 2009
- Public Lecture, Exploring the Epoch of Reionization, 2009, Philadelphia Franklin Museum
- A PAPER Low-Frequency, Wide-Bandwidth, All-Sky Radio Point Source Catalog, American Astronomical Society, 2009
- Explorer 1 [PRIME] Satellite Critical Design Review (successful), NASA Launch Services, 2009
- Global Positioning System on orbit, IEEE regional workshop, Big Sky, MT, 2006
- Explorer 1 [PRIME] A 50th anniversary reflight. Small Satellite Conference, Logan, UT 2005

STUDENTS MENTORED

- Kimberley Emig (graduate, School of Earth and Space Exploration(SESE), ASU)
- Piyanat Kittiwisit (graduate, SESE)
- Lauren Turner (undergraduate, SESE)
- Jacob Burba (undergraduate, Physics)
- Ben Stinnett (undergraduate, SESE)
- Michael Busch (undergraduate, SESE)
- David Nelson (undergraduate, SESE)
- Mason Denney (undergraduate, SESE, now at General Dynamics)
- Victoria Serrano (graduate, Electrical Engineering)
- Jose Chavez (undergraduate, SESE, now at Intel)
- Marc Leatham (undergraduate, SESE)
- Montana State Space Science and Engineering Lab (40+ undergraduates)
- School of Computing, Informatics and Decision Systems Capstone, ASU (10 students)

ABSTRACTS

- **D. Jacobs**, Poher, J. Parsons, A. & PAPER collaboration *Multi-redshift limits on the Epoch of Reionization 21cm power spectrum from PAPER* , AAS, 2015
- DeBoer, David; Bowman, JD; **Jacobs, D**; Parsons, A; Liu, A; Werthimer, D; Ali, Z; Carilli, CL; Chiang, C; Sievers, JL; ,*HERA: Chasing Our Cosmic Dawn*,Exascale Radio Astronomy,1,10304,2014
- **Jacobs, D** et al *Comparing MWA/PAPER instrumental performance*, American Astronomical Society, 2013
- **Jacobs, D** et al *A PAPER Southern Sky Catalog*, URSI, 2012
- **Jacobs,D.**; Poher, J.; *PAPER: status and recent observations*, NRAO New Science Conf., (<https://science.nrao.edu/newscience/program>) 2011
- **Jacobs, D.** *Update on PAPER: Deployments, foreground catalogs, and power spectrum*, Aspen 2010 Winter Conference (<http://wise-obs.tau.ac.il/~barkana/aspenP.html>), 2010
- Aguirre, J.; **Jacobs, D. (presenting)**; and the PAPER Team, *A PAPER Low-Frequency, Wide-Bandwidth, All-Sky Radio Point Source Catalog*, American Astronomical Society, 2009
- Backer, D.; **Jacobs, D (presenting)**, and the PAPER Team.; *Recent Results from the Precision Array for Probing the Epoch of Reionization (PAPER) Experiment in South Africa*, American Astronomical Society, 2010

ABSTRACTS (CONTINUED)

- **Jacobs, Danny C.**; Edwards, Brett; Stelly, Zak; Gorgievska, Ivana; Westpfahl, David J.; Klinglesmith, Daniel A., III; Creech-Eakman, Michelle J., *A new instrument for measuring atmospheric turbulence*, 2004, Proc. SPIE 5491,1290