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BIOGRAPHICAL INFORMATION	<i>Date of Birth:</i> 26 January 1980	<i>Citizenship:</i> British
RESEARCH INTERESTS	Theoretical cosmology, cosmic microwave background, reionization, cosmological 21 cm line, large scale structure, inflation, dark energy, neutrino mass	
RESEARCH EXPERIENCE	<p>Imperial College, London, UK <i>Lecturer in Astrostatistics</i> October, 2011 - Present Research in cosmology, the epoch of reionization, and astrostatistics.</p> <p>Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts, USA <i>Hubble-ITC Fellow</i> September, 2007 - August 2011 Post-doctoral research in cosmology, the epoch of reionization, and the theory of the 21 cm line.</p> <p>California Institute of Technology, Pasadena, California, USA <i>Graduate Student</i> September, 2002 - June 2007 Ph.D. research in cosmology, CMB B-modes, and the early Universe.</p> <p>Cambridge University, Cambridge, UK <i>Part III Research project</i> December, 2001 - August, 2002 Master's level research into bound fermionic states around black holes, using a gauge theory of gravity. Advisor: Anthony Lasenby.</p> <p>California Institute of Technology, Pasadena, California, USA <i>Summer Undergraduate Research Fellowship</i> July, 2001 - September, 2001 Undergraduate level research into complex quintessence models for dark energy. Advisor: Marc Kamionkowski.</p>	
EDUCATION	<p>California Institute of Technology, Pasadena, California, USA Ph.D., Physics, June 2007.</p> <ul style="list-style-type: none"> • Advisor: Marc Kamionkowski • Thesis: Extracting the cosmic history from diffuse backgrounds <p>Cambridge University, Pembroke College, Cambridge, Cambridgeshire, UK M.A. (Cantab), Natural Sciences, March, 2004. M.Sci., Natural Sciences, June, 2002. B.A., Natural Sciences, June, 2002.</p>	
HONORS AND AWARDS		

Hubble Fellowship, 2007 - Harvard College Observatory.
 Cambridge University, graduated with double First in Physics, 2002.
 Foundress Prize, Pembroke College, Cambridge University, 2001.
 Foundation scholar, Pembroke College, Cambridge University, 2000.
 College scholar, Pembroke College, Cambridge University, 1999.

MENTORING Catherine Watkinson, PhD candidate, Imperial, 2011-present
 Urbano Franca, PhD candidate, Valencia/Harvard, 2009-present.

TEACHING EXPERIENCE **Imperial College London, UK.**
Lecturer
Academic tutor: First year undergraduate physics. Oct 2011-Jul 2012
Guest lecturer: Cosmology MSci course Spring term 2012
MSc project supervisor: Jasmina Music, Jared Phau. Imperial MSc candidates 2011-2012

Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts, USA
Guest lecturer
 Ay 202a. Galaxies and dynamics. “Gravitational lensing” Fall term 2009

California Institute of Technology, Pasadena, California, USA
Teaching Assistant **October, 2002 - March, 2005**
 Duties included small group teaching, leading problem sessions, office hours, and grading.
 Ph 125. Quantum Mechanics. Fall and Spring term 2005
 Ph 236. General Relativity. Winter term 2004
 Ph 125. Quantum Mechanics. Fall term 2004
 Ph 5, 6, and 7. Sophomore Physics Lab. Fall, Winter and Spring terms 2003-4
 Ph 6, and 7. Sophomore Physics Lab. Winter and Spring terms 2002-3
 Ph 3. Freshman Physics Lab. Fall term 2002

OBSERVING EXPERIENCE Submillimetre Array (SMA) - five nights. Oct 2010.

RESEARCH GRANTS “Optimal Statistics for Redshifted 21 cm Observations of the Reionization Epoch ”, NSF-AST (collaborator / US\$ 341,224, 2 PIs, 2011-2014)
 “Probing the end of the dark ages and the epoch of reionization with the 21 cm line”, Hubble Fellowship. HST-HF-01211.01-A, NASA/STScI (PI / US\$ 320,487, 0 Co-Is, 2007-2010)

PARTICIPATION IN PROJECTS *Square Kilometer Array (SKA)* - Science Working Group (2011-present)
Dark Ages Radio Explorer (DARE) PI: J. Burns - Co-I and Science Working Group (2010-present)
Lunar University Network for Astrophysics Research (LUNAR) - Collaborator (2009-present)
Cosmic Inflation Probe (CIP) PI: G. Melnick - Science Working Group (2008-2010)

PROFESSIONAL ACTIVITIES SOC “The Epoch of Reionization” Apr 2012. Strasbourg, France.
 PhD opponent - Martina Friedrich (Advisor: G. Mellema), Stockholm University. March 2012.

SOC “LUNAR Workshop: Robotic science from the Moon” Oct 2010, Boulder, CO.

CfA-ITC postdoctoral fellowship selection committee 2009

Co-organiser of CfA-ITC seminar series 2008-9

Member: RAS (2012-present), AAS (2006-present), APS (2010-2011), Beckington Astronomical Society (1998-present)

Referee: Physics Review D, Physics Review Letters, Astrophysics Journal, Monthly Notices of the Royal Astronomical Society, Physics Letters B, Astronomy and Astrophysics, Journal of Cosmology and Astroparticle Physics, The Harvard Undergraduate Research Journal,

Reviewer: ANR, GMRT-TAC, RAS Penston prize, Royal Society URF, NSF-AAG

PUBLIC OUTREACH Science consultant: “Instant Egghead Guide: the Universe” by JR Minkel.

Science week: Cambridge Explore’s the Universe: Ask an Astronomer 2009, 2010

INVITED
CONFERENCE
PRESENTATIONS

“Recent developments in EoR science and the DRM”. PrepSKA WP2. Manchester, Oct 2011.

“Prospects for future 21 cm arrays”. PPC2011. CERN, Geneva, Jun 2011.

“Constraining the epoch of reionization and the dawn of structure with atomic and molecular lines”. Hydrogen Cosmology. ITAMP, Cambridge, MA, May 2011.

“Constraining the dawn of structure with the 21 cm line. AAS 217 HERA special session. Seattle, Jan 2011.

“HI Science through cosmic time”. AAVP2010: Realising the Aperture Array Programme for SKA. Cavendish, Cambridge, UK, Dec 2010.

“Lessons from constraining the global 21 cm spectrum in the presence of foregrounds”. The First Billion Years. Keck Institute of Space Studies, Pasadena CA, Aug 2010.

“Pre-reionization 21 cm signatures”. Astrophysics and Cosmology with the 21 cm background, Aspen, June 2010.

“Atomic physics and the 21 cm line”. DAMOP2010, Houston TX, May 2010.

“Paths to astrophysics with SKA”. SKA2010, Manchester, UK, March 2010. Invited plenary talk.

“21 cm signal throughout cosmic history”. Sackler conference on 21 cm cosmology, Cambridge MA, May 2008.

“Atomic physics and the cosmological 21 cm signal”. Atomic and Molecular Physics of the Early Universe, ITAMP, Cambridge MA, March 2008.

CONTRIBUTED
CONFERENCE
PRESENTATIONS

“Observational and theoretical constraints on reionization”. Reionization and Dark Ages with SKA workshop, Stockholm. Jan 2012.

“Extracting the astrophysics of the first sources from the 21 cm global signal”. New Horizons for High Redshifts, Cambridge, UK. Jul 2011.

“The global 21 cm signal”. Robotic science from the moon, Boulder, CO. Oct 2010.

“Extracting science from the global 21 cm signal”. Astrophysics and Cosmology with the 21 cm background, Aspen. June 2010.

“Constraining reionization using 21 cm experiments in combination with CMB and Lyman alpha forest data”. The High Redshift Universe. Aspen. Jan 2010.

“Constraining reionization using 21 cm experiments in combination with CMB and Lyman alpha forest data”. Reionization with Multi-frequency datasets. Stockholm, Sweden. August 2009.

“21 cm cosmology”. Fingerprints of Inflation. Aspen. June, 2009.

“Lyman series photons and the 21 cm signal”. Reionization@Ringberg. Ringberg Castle, Germany. March 2009.

“Cosmology from high redshift 21 cm observations”. Foundations of modern cosmology. GGI, Florence Italy. January, 2009.

“Neutrino mass from cosmological 21 cm observations”. Neutrino Oscillation Workshop 2008, Otranto Italy, September 2008.

“Probing the First Sources with the Redshifted 21 cm Line”. 209th Meeting of the American Astronomical Society. Seattle, January, 2007.

“Radiation fields from the first stars and the redshifted 21 cm line”. Radiation Backgrounds from the First Stars, Galaxies and Black Holes. Maryland, October, 2006.

“Radiation fields from the first stars and the redshifted 21 cm line”. The first stars and evolution of the early Universe. INT Seattle, August, 2006.

“Descending from on high: Lyman series cascades and spin-kinetic temperature coupling in the 21 cm line”. Reionizing the Universe 2005. Groningen, Netherlands, July 2005.

“Tensor modes and the cosmic microwave background” (poster). 2nd Advanced Chilean Winter School. Santiago, Chile, November 2004.

SEMINAR PRESENTATIONS

2011: Copenhagen-NBI, Durham, Edinburgh, UCL.

2011: Brown, Cambridge - IoA, CCAPP-OSU, Imperial, ITAMP-CfA, Leiden, Perimeter, Princeton, Waterloo.

2010: Berkeley, Cambridge - Kavli, Carnegie Mellon, CITA, Chicago, Oxford, Yale.

2009: CfA. *2008*: UT Austin. *2006*: KIPAC, Berkeley, Columbia ISCAP, Harvard ITC.

COMPUTER SKILLS

- Languages: C, C++, Fortran 77 & 90, HTML, Perl, IDL.
- Cosmology: CMBFAST, CAMB, COSMOMC, HEALPIX.
- Operating Systems: Unix/Linux, Windows, Mac OSX.

ACADEMIC REFERENCES

Marc Kamionkowski,
Robinson Professor of Theoretical Physics and Astrophysics
California Institute of Technology,

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Pasadena,
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email: richard.easther@yale.edu

[22] **Jonathan R. Pritchard** and Abraham Loeb. “21 cm cosmology”. Reports on Progress in Physics, in press (2011) [arXiv:1109.6012].

[21] Geraint J. A. Harker, **Jonathan R. Pritchard**, Jack O. Burns, Judd D. Bowman. “An MCMC approach to extracting the global 21-cm signal during the cosmic dawn from sky-averaged radio observations”. MNRAS, 419, 1070 (2011) [arXiv:1107.3154].

[20] Jack O. Burns, T. J. W. Lazio, S. D. Bale, J. D. Bowman, R. F. Bradley, C. L. Carilli, S. R. Furlanetto, G. J. A. Harker, A. Loeb, **J. R. Pritchard**. “Probing the First Stars and Black Holes in the Early Universe with the Dark Ages Radio Explorer (DARE)”. Advances in Space Research, 49, 433 (2011) [arXiv:1106.5194].

[19] Adam Lidz, Steven R. Furlanetto, S. Peng Oh, James Aguirre, Tzu-Ching Chang, Olivier Dore, **Jonathan R. Pritchard**. “Intensity Mapping with Carbon Monoxide Emission Lines and the Redshifted 21 cm Line” ApJ, 741, 70 (2011) [arXiv:1104.4800].

[18] K. N. Abazajian, E. Calabrese, A. Cooray, F. De Bernardis, S. Dodelson, A. Friedland, G. M. Fuller, S. Hannestad, B. G. Keating, E. V. Linder, C. Lunardini, A. Melchiorri, R. Miquel, E. Pierpaoli, **J. Pritchard**, P. Serra, M. Takada, Y. Y. Y. Wong. “Cosmological and Astrophysical Neutrino Mass Measurements”. Astroparticle Physics, 35, 177 (2011) [arXiv:1103.5083].

[17] Mirabel, I.F., Dijkstra, M., Laurent, P., Loeb, A. and **Pritchard, J.R.** “Stellar black holes at the dawn of the universe”. A&A, **528**, 149 (2011) [arXiv:1102.1891].

[16] Santos, M.G., Silva, M.B., **Pritchard, J.R.**, Cen, R. and Cooray, A. “Probing the first galaxies with SKA” A&A, **527**, 93 (2011) [arXiv:1009.0950]

[15] Adshead, A., Easther, R., **Pritchard, J.**, and Loeb, A., “Inflation and the Scale Dependent Spectral Index: Prospects and Strategies”. JCAP, **2**, 21 (2011)[arXiv:1007.3748]

[14] **Pritchard, J.R.** and Loeb, A., “Constraining the unexplored period between reionization and the dark ages with observations of the global 21 cm signal”, PRD, **82**, 023006 (2010) [arXiv:1005.4057]

[13] **Pritchard, J.R.**, Loeb, A., and Wyithe, J.S.B., “Constraining reionization using 21 cm observations with CMB and Lyman-alpha forest data”, MNRAS, **408**, 57 (2010) [arXiv:0908.3891]

[12] Gordon, C. and **Pritchard J.R.**, “Forecasted 21 cm constraints on compensated isocurvature perturbations”, PRD, **80**, 063535 (2009) [arXiv:0907.5400]

[11] Colombo, L.P.L., Pierpaoli, E., and **Pritchard, J.R.** “Cosmological parameters after WMAP5: forecasts for Planck and future galaxy surveys”, MNRAS, **398**, 1621 (2009) [arXiv:0811.2622]

[10] Dijkstra, M., Lidz, A., **Pritchard, J.R.**, Greenhill, L.J., Mitchell, D.A., Ord, S.M., and Wayth, R.B. “On the detectability of the Hydrogen 3-cm Fine structure line from the EoR”, MNRAS, **390**, 1430 (2008) [arXiv:0809.4279]

[9] **Pritchard, J.R.** and Pierpaoli, E. “Constraining massive neutrinos using cosmological 21 cm observations”, PRD, **78**, 065009 (2008). [arXiv:0805.1920]

[8] **Pritchard, J.R.** and Loeb, A. “Evolution of the 21 cm signal throughout cosmic history”, PRD, **78**, 103511 (2008). [arXiv:0802.2102]

[7] Santos, M.G., Amblard, A., **Pritchard, J.**, Trac, H., Cen, R., Cooray, A. “Cosmic reionization and the 21 cm signal: simulations and analytical models”, ApJ, **689**, 1 (2008). [arXiv:0708.2424]

[6] **Pritchard, J.R.** and Furlanetto, S.R. “21 cm fluctuations from inhomogeneous X-ray heating before reionization”, MNRAS, **376**, 1680 (2007). [astro-ph/0607234]

[5] Furlanetto, S.R. and **Pritchard, J.R.** “The scattering of Lyman-series photons in the IGM”, MNRAS, **372**, 1093 (2006). [astro-ph/0605680]

[4] **Pritchard, J.R.**, Furlanetto, S.R. and Kamionkowski, M. “Galaxy surveys, inhomogeneous reionization, and dark energy”, MNRAS, **374**, 159 (2007). [astro-ph/0604358]

[3] **Pritchard, J.R.** and Furlanetto, S.R. “Descending from on high: Lyman series cascades and spin-kinetic temperature coupling in the 21 cm line”, MNRAS, **367**, 1057 (2006). [astro-ph/0508381]

[2] **Pritchard, J.R.** and Kamionkowski, M. “Cosmic microwave background fluctuations from gravitational waves: an analytic approach”, Annals of Physics, **318**, 2 (2005). [astro-ph/0412581]

[1] Lasenby, L., Doran, C., **Pritchard, J.**, Caceres, A. “Bound states and decay times of fermions in a Schwarzschild black hole background”, PRD, **72**, 105014 (2005). [gr-qc/0209090]

UNREFEREED
PUBLICATIONS

[viii] SKA Science Working Group. “The Square Kilometer Array Design Reference Mission: SKA Phase 1” (2011).

[vii] Pritchard, J. and Loeb, A. “Hydrogen was not ionized abruptly”, Nature news and views, **468**, 772 (2010).

[vi] Pritchard, J.R. and Pierpaoli, E. “Neutrino mass from cosmological 21 cm observations”, Nucl. Phys. Proc. Suppl. **188**, 31 (2009).

[v] Melnick, G.J. *et al.*, “Inflation and the Power of a High-z galaxy survey”, Astro 2010 white paper no. 204 (2009). [<http://www8.nationalacademies.org/astro2010/DetailFileDisplay.aspx?id=72>]

[iv] Furlanetto, S.R. *et al.*, “Astrophysics from the Highly-Redshifted 21 cm Line”, Astro 2010 white paper no. 83 (2009). [arXiv:0902.3011]

[iii] Furlanetto, S.R. *et al.*, “Cosmology from the Highly-Redshifted 21 cm Line”, Astro 2010 white paper no. 82 (2009). [arXiv:0902.3259]

[ii] Burns, J. *et al.*, “Science from the Moon: The NASA/NLSI Lunar University Network for Astrophysics Research (LUNAR), Planetary Sciences Decadal Review white paper (2009). [arXiv:0909.1509]

[i] Amin, M.A. *at al.*, “A pedagogical primer on preheating”, Les Houches Summer School Proceedings (2006).