

Rachel Mandelbaum

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Research Interests

- Weak gravitational lensing
- Cosmology
- Galaxy and cluster formation and evolution
- Data processing and analysis algorithms for large surveys

Appointments

Assistant Professor, 9/2011- (on leave)
Department of Physics
Carnegie Mellon University

Visiting Associate Research Scholar, 9/2011-
Associate Research Scholar, 11/2009-8/2011
Department of Astrophysical Sciences
Princeton University

Member (9/2006-10/2009) and Hubble Fellow (9/2006-8/2009)
Astrophysics, School of Natural Sciences
Institute for Advanced Study

Education

Physics Ph.D. program, 2001-2006
Princeton University, Princeton, NJ, USA
Advisor: Uroš Seljak

A.B. in Physics with highest honors, June 2000
Princeton University, Princeton, NJ USA

Fellowships and Awards

AAS Annie Jump Cannon Prize (2011)
Hubble Fellowship (2006-2009)
Centennial Fellowship, Princeton University (2001-2006)
National Science Foundation Graduate Research Fellowship (2002-2005), awarded in 2000
Kusaka Memorial Prize, Dept. of Physics, Princeton University, June 2000
Admitted to Phi Beta Kappa and Sigma Xi, June 2000

Research and Teaching Positions

Princeton University Dept. of Physics
Assistant in Instruction

Princeton, NJ, USA
Spring 2006

Physics 102 (introductory electricity and magnetism) lab

Princeton University Dept. of Physics
Assistant in Research
Thesis research

Princeton, NJ, USA
Fall 2001-Spring 2006

Princeton University Dept. of Physics
Senior Thesis

Princeton, NJ, USA
Fall 1999-Spring 2000

Title: *CP violation in B meson decays*, advisor: Prof. Daniel Marlow

Publications

Submitted to refereed journals

R. Mandelbaum, C. M. Hirata, A. Leauthaud, R. J. Massey, J. Rhodes, 2011, preprint (arXiv:1107.4629), submitted to MNRAS.

R. Nakajima, **R. Mandelbaum**, U. Seljak, J. D. Cohn, R. Reyes, R. Cool, 2011, preprint (arXiv:1107.1395), submitted to MNRAS.

K. L. Masters et al., *The Morphology of Galaxies in the Baryon Oscillation Spectroscopic Survey*, 2011, preprint (arXiv:1106.3331), accepted for publication in MNRAS.

R. Reyes, **R. Mandelbaum**, et al. 2011, *Calibrated Tully-Fisher relations for improved estimates of disk rotation velocities*, 2011, preprint (arXiv:1106.1650) - accepted for publication in MNRAS.

Published in refereed journals

B. Joachimi, **R. Mandelbaum**, F. B. Abdalla, S. L. Bridle, *Constraints on intrinsic alignment contamination of weak lensing surveys using the MegaZ-LRG sample*, 2011, A&A, 527, 26.

R. Mandelbaum, C. Blake, S. Bridle, F. B. Abdalla, et al., *The WiggleZ Dark Energy Survey: Direct constraints on blue galaxy intrinsic alignments at intermediate redshifts*, 2011, MNRAS, 410, 844.

A. E. Schulz, **R. Mandelbaum**, N. Padmanabhan, *Testing adiabatic contraction with SDSS elliptical galaxies*, 2010, MNRAS, 408, 1463.

R. Mandelbaum, U. Seljak, T. Baldauf, R. E. Smith, *Precision cluster mass determination from weak lensing*, 2010, MNRAS, 405, 2078.

T. Baldauf, R. E. Smith, U. Seljak, **R. Mandelbaum**, *An algorithm for the direct reconstruction of the dark matter correlation function from weak lensing and galaxy clustering*,

2010, PRD, 81, 3531.

R. Reyes, **R. Mandelbaum**, et al., *Confirmation of general relativity on large scales from weak lensing and galaxy velocities*, 2010, Nature, 464, 256.

R. Mandelbaum, G. van de Ven, C. R. Keeton, *Galaxy density profiles and shapes – II. selection biases in strong lensing surveys*, 2009, MNRAS, 398, 635.

G. van de Ven, **R. Mandelbaum**, C. R. Keeton, *Galaxy density profiles and shapes – I. simulation pipeline for lensing by realistic galaxy models*, 2009, MNRAS, 398, 607.

R. Mandelbaum, C. Li, G. Kauffmann, S. D. M. White, *Halo masses for optically-selected and for radio-loud AGN from clustering and galaxy-galaxy lensing*, 2009, MNRAS, 393, 377.

R. Reyes, **R. Mandelbaum** et al., *Improved optical mass tracer for galaxy clusters calibrated using weak lensing measurements*, 2008, MNRAS, 390, 1157.

R. Mandelbaum, U. Seljak, C. M. Hirata, *A halo mass - concentration relation from weak lensing*, 2008, JCAP, 8, 6.

R. Mandelbaum, U. Seljak, C. M. Hirata et al., *Precision photometric redshift calibration for galaxy-galaxy weak lensing*, 2008, MNRAS, 386, 781.

C. M. Hirata, **R. Mandelbaum**, et al., *Intrinsic galaxy alignments from the 2SLAQ and SDSS surveys: luminosity and redshift scalings and implications for weak lensing surveys*, 2007, MNRAS, 381, 1197.

R. Mandelbaum, U. Seljak, R. J. Cool, M. Blanton, C. M. Hirata, J. Brinkmann, *Density profiles of galaxy groups and clusters from SDSS galaxy-galaxy weak lensing*, 2006, MNRAS, 372, 758.

R. Mandelbaum, C. Hirata, T. Broderick, U. Seljak, J. Brinkmann, *Ellipticity of dark matter halos with galaxy-galaxy weak lensing*, 2006, MNRAS, 370, 1008.

R. Mandelbaum, U. Seljak, G. Kauffmann, C. Hirata, J. Brinkmann, *Galaxy halo masses and satellite fractions from galaxy-galaxy lensing in the SDSS: stellar mass, luminosity, morphology and environment dependencies*, 2006, MNRAS, 368, 715.

R. Mandelbaum, C. Hirata, M. Ishak, U. Seljak, J. Brinkmann, *Detection of large-scale intrinsic ellipticity-density correlation from the Sloan Digital Sky Survey and implications for weak lensing surveys*, 2006, MNRAS, 367, 611.

R. Mandelbaum, A. Tasitsiomi, U. Seljak, A. Kravtsov, R. Wechsler, *Galaxy-galaxy lensing: dissipationless simulations versus the halo model*, 2005, MNRAS, 362, 1451.

R. Mandelbaum, et al., *Systematic errors in weak lensing: application to SDSS galaxy-galaxy weak lensing*, 2005, MNRAS 361, 1287.

U. Seljak, A. Makarov, **R. Mandelbaum**, et al., *SDSS galaxy bias from halo mass-bias relation and its cosmological implications*, 2005, Phys. Rev. D 71, 043511.

C. Hirata, **R. Mandelbaum**, et al., *Galaxy-galaxy weak lensing in the Sloan Digital Sky Survey: intrinsic alignments and shear calibration errors*, 2004, MNRAS 353, 529.

R. Mandelbaum, P. McDonald, U. Seljak, R. Cen, *Precision cosmology from the Lyman- α forest*, 2003, MNRAS 344, 776.

Large group efforts

SDSS-III collaboration (Aihara et al.), *The Eighth Data Release of the Sloan Digital Sky Survey: First Data from SDSS-III*, 2011, ApJS, 193, 29.

D. J. Eisenstein et al., *SDSS-III: Massive Spectroscopic Surveys of the Distant Universe, the Milky Way Galaxy, and Extra-Solar Planetary Systems*, 2011, preprint (arXiv:1101.1529)

T. Kitching et al., *Gravitational Lensing Accuracy Testing 2010 (GREAT10) Challenge Handbook*, 2010, preprint (arXiv:1009.0779), submitted to Annals of Applied Statistics.

S. Bridle et al., *Results of the GREAT08 Challenge: An image analysis competition for cosmological lensing*, 2010, MNRAS, 405, 2044.

H. Zhan et al., *Exploring Dark Energy with Next-Generation Photometric Redshift Surveys*, 2010, Science White Paper no. 332 for Astro2010: the Astronomy and Astrophysics Decadal Survey.

P. J. Marshall et al., *Dark Matter Structures in the Universe: Prospects for Optical Astronomy in the Next Decade*, 2010, Science White Paper no. 194 for Astro2010: the Astronomy and Astrophysics Decadal Survey.

N. Zakamska et al., *Challenges Facing Young Astrophysicists*, 2010, Position Paper no. 69 for Astro2010: the Astronomy and Astrophysics Decadal Survey.

The LSST Science Collaborations, *LSST Science Book, version 2.0*, 2009, arXiv:0912.0201.

S. Bridle et al., *Handbook for the GREAT08 Challenge: An image analysis competition for cosmological lensing*, 2009, Annals of Applied Statistics, Vol. 3, No. 1, 6-37 (arXiv:0802.1214).

K. N. Abazajian et al., *The Seventh Data Release of the Sloan Digital Sky Survey*, 2009, ApJS, 182, 543.

J. K. Adelman-McCarthy et al., *The Sixth Data Release of the Sloan Digital Sky Survey*, 2008, ApJS, 175, 297.

J. K. Adelman-McCarthy et al., *The Fifth Data Release of the Sloan Digital Sky Survey*, 2007, ApJS, 172, 634.

R. Massey et al., *The Shear TEsting Programme 2: Factors affecting high precision weak lensing analyses*, 2007, MNRAS, 376, 13.

J. Adelman-McCarthy et al., *The fourth data release of the Sloan Digital Sky Survey*, 2006, ApJS, 162, 38.

Invited talks

- Plenary talk at SDSS-III collaboration meeting, Aug. 2011
- Plenary talk at “Unraveling the Nature of the Universe with current and future Data Sets,” CCAPP (Ohio State Univ.), spring 2011
- U. of Arizona astronomy colloquium, spring 2011
- MIT astronomy colloquium, spring 2011
- LBNL cosmology seminar, spring 2011
- UC Berkeley astronomy seminar, spring 2011
- Princeton University Wednesday lunch talk, spring 2011
- UC San Diego astrophysics seminar, fall 2010
- UC Santa Cruz astronomy seminar, fall 2010
- Rutgers University astrophysics seminar, fall 2010
- Invited panelist at “Observational Pursuit of Dark Energy after Astro2010”, fall 2010
- New York University physics department seminar, spring 2010
- Science Opportunities with Wide-Field Surveys, Princeton, Nov 2009
- Caltech astronomy colloquium, spring 2009
- University of Michigan astronomy department colloquium, spring 2009
- Princeton University Astrophysics departmental Wednesday lunch talk, Dec. 2008
- University of Texas at Austin astronomy department colloquium, Sept. 2008
- Heidelberg Joint Astronomical Colloquium Series, fall 2007
- Plenary talk on galaxy-galaxy weak lensing science, SDSS collaboration meeting, 2007
- Large Scale Structure with SDSS session at the 2006 AAS meeting (Calgary)
- Harvard-Smithsonian Center for Astrophysics, November 2005
- University of Chicago (KICP), November 2005
- California Institute of Technology, September 2005
- University of California at Davis and at Berkeley, September 2005
- CITA, May 2005

Other professional activities, education, and outreach

- Co-organizer of upcoming workshop (summer 2012) at the Aspen Center for Physics on weak lensing.
- Served on the Hubble Space Telescope cycle 19 cosmology panel
- Reviewer for MNRAS, ApJ, A&A.
- Participant in weak lensing community challenges: STEP2 (blind analysis of simulations), GREAT08 and GREAT10 (design of simulations for blind lensing analysis).
- Participating member of LSST science council committee on weak lensing .
- Co-organizer of workshop “Intrinsic alignments and cosmic shear,” UCL, March-April 2008.
- Co-advising undergraduate and graduate student projects in Princeton University astrophysics department, 2007-present.
- Assisting in the design of an elementary-level Montessori curriculum describing the early universe, from the Big Bang until the formation of earth, 2007-2009.