

R. Ali Vanderveld

CONTACT INFORMATION

Kavli Institute for Cosmological Physics
The University of Chicago
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CURRENT RESEARCH INTERESTS

Testing gravity on cosmological scales
Optimizing next-generation dark energy surveys
Dark energy theories and their observational constraints
Gravitational lensing phenomenology
Cosmological distance measurements and their systematics

EDUCATION

Cornell University, Ithaca, NY, USA
Ph.D. Physics August 2007
Thesis: “Systematic Effects of Local Large Scale Structure on the Measured Expansion History of the Universe”
Advisors: Éanna É. Flanagan and Ira M. Wasserman

M.S. Physics May 2005

University of Illinois Honors Program, Urbana-Champaign, IL, USA
B.S. Physics with Mathematics minor, with High Distinction May 2001
Academic advisor: Jeremiah D. Sullivan
Research advisor: Karin A. Dahmen

WORK EXPERIENCE

University of Chicago Kavli Institute for Cosmological Physics
KICP Postdoctoral Fellow September 2010 - present

Pomona College
Visiting Assistant Professor January 2010 - May 2010

Caltech and NASA Jet Propulsion Laboratory: with Jason Rhodes
Caltech Postdoctoral Scholar at JPL August 2007 - August 2010

Cornell University: with Éanna Flanagan and Ira Wasserman
Graduate student January 2002 - June 2007

Pratt and Whitney Aircraft Engines, East Hartford, CT
Test facilities mechanical design engineer May 2001 - August 2001

University of Illinois at Urbana-Champaign: with Karin Dahmen
Undergraduate research assistant December 1999 - May 2001

SELECTED AWARDS

Kavli Institute for Cosmological Physics Postdoctoral Fellowship 2010
AAUW American Dissertation Fellowship 2006
APS Topical Group in Gravity Best Student Presentation, Eastern Gravity Meeting 2006
Cornell NASA Space Grant Fellowships 2001, 2005
National Science Foundation Graduate Research Fellowship 2001-2004

GE Faculty of the Future Award	2001
UIUC Excellence in Teaching Awards	2000, 2001
Lorella Jones Fellowship: UIUC outstanding undergraduate research	2000
UIUC James Scholar	1998-2001
UIUC Chancellor's Scholar	1998-2001
James Newton Matthews Scholarship	1998-2001

PROFESSIONAL
ACTIVITIES

Referee, Physical Review Letters, Physical Review D, Astrophysical Journal Letters, Monthly Notices of the Royal Astronomical Society, Physics Letters B, General Relativity and Gravitation
 Committee Chair, KICP Friday Seminar Series, September 2011 - June 2012
 Member, Dark Energy Survey (DES) collaboration
 Member, Euclid Consortium and US Euclid team
 Founding member, High Altitude Lensing Observatory (HALO) collaboration
 Conference co-organizer, 10th Eastern Gravity Meeting, Cornell University, June, 2007
 Member, American Physical Society

PUBLICATIONS

“Neutrino physics from future weak lensing surveys,” **R. Ali Vanderveld** and Wayne Hu, Physical Review D submitted. arXiv:1212.3608 [astro-ph.CO].

“Space-quality data from balloon-borne telescopes: The High Altitude Lensing Observatory (HALO),” Jason Rhodes, . . . , **R. Ali Vanderveld** et al., Astroparticle Physics **38**, 31. arXiv:1205.2957v1 [astro-ph.IM].

“Testing dark energy paradigms with weak gravitational lensing,” **R. Ali Vanderveld**, Michael J. Mortonson, Wayne Hu, and Tim Eifler, Physical Review D **85**, 103518 (2012). arXiv:1203.3195v1 [astro-ph.CO].

“Luminosity distance in Swiss cheese cosmology with randomized voids. II. Magnification probability distributions,” Éanna É. Flanagan, Naresh Kumar, Ira Wasserman, and **R. Ali Vanderveld**, Physical Review D **85**, 023510 (2012). arXiv:1109.1873v1 [gr-qc].

“Second-order weak lensing from modified gravity,” **R. Ali Vanderveld**, Robert R. Caldwell, and Jason Rhodes, Physical Review D **84**, 123510 (2011). arXiv:1109.3189v1 [astro-ph.CO].

“Lossy Compression of Weak-Lensing Data,” **R. Ali Vanderveld**, Gary M. Bernstein, Chris Stoughton, Jason Rhodes, Richard Massey, David Johnston, and Benjamin M. Dobke, Publications of the Astronomical Society of the Pacific **123**, 996 (2011). arXiv:1106.5805v1 [astro-ph.IM].

“Astronomical image simulation for telescope and survey development,” Benjamin M. Dobke, David E. Johnston, Richard Massey, F. William High, Matt Ferry, Jason Rhodes, and **R. Ali Vanderveld**, Publications of the Astronomical Society of the Pacific **122**, 947 (2010). arXiv:1008.4112v2 [astro-ph.IM].

“Noise and bias in square-root compression schemes,” Gary M. Bernstein, Chris Bebek, Jason Rhodes, Chris Stoughton, **R. Ali Vanderveld**, and Penshu Yeh, Publications of the Astronomical Society of the Pacific **122**, 336 (2010). arXiv:0910.4571v2 [astro-ph.IM].

“Lemaître-Tomlan-Bondi cosmological models, smoothness, and positivity of the central deceleration parameter,” **R. Ali Vanderveld**, Éanna É. Flanagan, and Ira Wasserman. arXiv:0904.4319v2 [astro-ph.CO].

“Luminosity distance in “Swiss cheese” cosmology with randomized voids: I. Single void size,” **R. Ali Vanderveld**, Éanna É. Flanagan, and Ira Wasserman, *Physical Review D* **78**, 083511 (2008). arXiv:0808.1080 [astro-ph].

“Quantifying parameter errors due to the peculiar velocities of type Ia supernovae,” **R. Ali Vanderveld**, *Astrophysical Journal* **689**, 49 (2008). arXiv:0801.4041 [astro-ph].

“Systematic corrections to the measured cosmological constant as a result of local inhomogeneity,” **R. Ali Vanderveld**, Éanna É. Flanagan, and Ira Wasserman, *Physical Review D* **76**, 083504 (2007). arXiv:0706.1931 [astro-ph].

“Mimicking dark energy with Lemaître-Tolman-Bondi models: Weak central singularities and critical points,” **R. Ali Vanderveld**, Éanna É. Flanagan, and Ira Wasserman, *Physical Review D* **74**, 023506 (2006). astro-ph/0602476.

“Spherical gravitational collapse of annihilating dark matter and the minimum mass of cold dark matter black holes,” **R. Ali Vanderveld** and Ira Wasserman, *Journal of Cosmology and Astroparticle Physics*, November (2005). astro-ph/0505497.

“Subloops, Barkhausen noise, and disorder induced critical behavior,” John H. Carpenter, Karin A. Dahmen, James P. Sethna, Gary Friedman, Sharon Loverde, and **Ali Vanderveld**, *Journal of Applied Physics* **89**, 6799 (2001).

RESEARCH
GRANTS

Co-I, “Testing General Relativity on Cosmological Scales with Weak Gravitational Lensing”
JPL Strategic University Research Partnership (PI: Jason Rhodes), \$100K 2009 - 2010

Co-I, “Science with the Euclid Mission”
NASA US Euclid Team (PI: Jason Rhodes), \$40M 2013 - 2028

CONFERENCE
TALKS

“Testing the concordance cosmology with weak gravitational lensing,” Euclid Mission Conference, Copenhagen, Denmark, May 18th, 2012.

“HALO: The High Altitude Lensing Observatory,” CCAPP Symposium, The Ohio State University, April 6th, 2011.

“Gravitational Lensing with the High Altitude Lensing Observatory,” Tenth Great Lakes Cosmology Workshop, University of Chicago, June 16th, 2010.

“Constraining Modified Gravity with Weak Lensing,” Cosmology on the Beach, Playa del Carmen, Mexico, January 12, 2010.

“Testing Gravity on Cosmological Scales with Weak Lensing,” Cosmo 09, CERN, September 7th, 2009.

“Supernova Lensing by Voids,” Theoretical Astrophysics in Southern California meeting, UC Irvine, October 24th, 2008.

“The Impact of Supernova Peculiar Velocities on Cosmology Past and Future,” Cosmo 08, Madison, WI, August 26th, 2008.

“Data Compression and Weak Lensing”, Supernova Acceleration Probe Collaboration Meeting, Fermilab, May 17th, 2008.

“A Radically Conservative Idea: Could Cosmic Acceleration be due to Inhomogeneity?,” Supernova

Acceleration Probe Collaboration Meeting, Fermilab, May 16th, 2008.

“Sqrt Lossy Data Compression: How Does it Affect WL Measurement?,” Supernova Acceleration Probe Collaboration Meeting, Stanford Linear Acceleration Center, January 25th, 2008.

“Errors in the Measured Cosmological Constant from Local Inhomogeneity,” 7th Theoretical Astrophysics in Southern California meeting, UCLA, November 1st, 2007.

“Errors in the Inferred Cosmological Constant Resulting from Large Scale Structure,” 10th Eastern Gravity Meeting, Cornell, June 1st, 2007.

“Systematic Corrections to the Measured Cosmological Constant due to Local Inhomogeneity,” Origins of Dark Energy Conference, Origins Institute, Hamilton, Ontario, May 17th, 2007.

“Systematic Corrections to the Deceleration Parameter due to Local Cosmological Inhomogeneity,” American Physical Society Meeting, Jacksonville, FL, April 17th, 2007.

“Singular Behavior in Lemaître-Tolman-Bondi Cosmological Models and the Difficulties in Using Them as Realistic Models of the Universe,” American Physical Society Meeting, Dallas, TX, April 22nd, 2006.

“Singular Behavior in Lemaître-Tolman-Bondi Cosmological Models,” 9th Eastern Gravity Meeting, MIT, March 25th, 2006.

“Observational Constraints on the Matter Couplings of K-essence Theories,” 5th Syracuse-Cornell Theory Meeting, Syracuse, NY, December 5th, 2005.

INVITED
SEMINARS

CITA seminar, University of Toronto, February 4, 2013.

Caltech Astronomy Tea Talk, December 10, 2012.

JPL Astrophysics Colloquium, December 6, 2012.

Stanford University Cosmology Seminar, October 29, 2012.

Institute for Advanced Study, October 22, 2012.

Columbia University ISCAP Seminar, October 18, 2012.

Northwestern University, October 16, 2012.

Case Western Reserve University Particle/Astrophysics Seminar, March 20, 2012.

Joint Tufts/CfA/MIT Cosmology Seminar, Harvard University, March 22, 2011.

Mindshare LA, October 21, 2010.

University of Portsmouth, July 27, 2010.

Lafayette College, December 3, 2009.

CITA seminar, University of Toronto, October 29, 2009.

Perimeter Institute, October 27, 2009.

Fermilab Particle Astrophysics Seminar, October 19th, 2009.

KICP Seminar, University of Chicago, October 16th, 2009.

Berkeley Cosmology Group Seminar, University of California Berkeley, September 29th, 2009.

DE2008 Cosmophysics Workshop, KEK in Tsukuba, Japan, December 8th, 2008.

Hobart and William Smith Colleges, December 3rd, 2008.

Cornell University, May 9th, 2008.

Cal State LA Physics Colloquium, February 14th, 2008.

Berkeley Cosmology Group Seminar, Berkeley National Laboratory, January 4th, 2007.

TEACHING AND
OUTREACH

University of Chicago

Expanding Your Horizons workshop leader Spring 2013

Astronomy Conversations at the Adler Planetarium April 2011 - present

Pomona College

Physics 41: General Physics with Laboratory January 2010 - May 2010

Caltech and NASA Jet Propulsion Laboratory

Research advisor for Rachael Nelson, Loyola Marymount undergraduate October 2009 - May 2010

Worked with Eugene Shvarts, Cal State LA undergraduate May 2009 - August 2009

Adopt-a-Physicist April 2009

Answered questions from high school physics classes on online message boards.

Research advisor for Anson Lam, Caltech undergraduate September 2008 - December 2008

Summer Undergraduate Research Fellowship (SURF) program Summer 2008 and 2009

Worked closely with undergraduates during summer research at JPL:

- Mentored Rachael Nelson, Loyola Marymount undergraduate
- Mentored Anson Lam, Caltech undergraduate
- Worked with Aaron Marchant, Yale undergraduate

JPL Seminar Days

Chaired session for end of summer SURF talks for Division 32: Science.

Mission Lifecycle Tour April 2008

Met with female students from local colleges to discuss my work as a scientist at JPL.

Career Fair October 2007

Presented my job as a NASA scientist for area middle school students.

Cornell University

Ask a scientist! 2006
Answering children's questions about science for the Ithaca Journal.

TA Training August 2006
Based on past teaching reviews from students, chosen to lead a training workshop for new graduate teaching assistants in the Cornell physics department.

Physics 214: Optics, Waves and Particles Fall 2004, Summer 2005, and Spring 2006

Physics 525/Astronomy 511: Compact Objects Spring 2005

Physics 101: General Physics Fall 2005

Physics 317: Electricity and Magnetism Fall 2002

Focus for Teens Workshop July 2002
Wrote and presented a lecture on General Relativity for area high school students.

University of Illinois at Urbana-Champaign

Physics 111: Mechanics Fall 2000 and Spring 2001

High school math tutoring Fall 2000 and Spring 2001

Engineering Open House March 2000, 2001
Ran a recurring hands-on workshop for children on the physics of soap bubbles.

Physics 101: General Physics Fall 1999 and Spring 2000

REFERENCES

Wayne Hu
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Department of Physics & Astronomy
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NASA Jet Propulsion Laboratory
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Pasadena, CA, 91109
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