

Robert Caldwell

Contact Information:

Address: Dartmouth College
 Department of Physics & Astronomy
 Hanover, NH 03755
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Education:

A.B., Washington University in St. Louis, Physics, French, 1987
 M.S., University of Wisconsin–Madison, Physics, 1989
 Ph.D., University of Wisconsin–Milwaukee, Physics, 1992

Research & Professional Experience:

2010-present Professor, Dartmouth College
 2005-2010 Associate Professor, Dartmouth College
 2000-2005 Assistant Professor, Dartmouth College
 1998-2000 Postdoctoral Fellow, Princeton University, Physics
 1996-8 Postdoctoral Fellow, University of Pennsylvania, Physics & Astronomy
 1994-6 Postdoctoral Fellow, Cambridge University, DAMTP
 1992-4 Postdoctoral Fellow, Fermilab Theoretical Astrophysics

Awards & Honors:

Fellow of the American Physical Society (since 2008)
 Outstanding Referee, American Physical Society (recognized in 2014)
 John M. Manley Huntington Award for Newly Promoted Faculty, Dartmouth (2010)

External Funding:

*Department of Energy, High Energy Physics 390K, 4/16-3/19 (Caldwell, PI)
 Department of Energy, High Energy Physics 525K, 7/13-3/16 (Caldwell, PI)
 Templeton Foundation, 250K, 1/13-12/14 (Caldwell, Co-PI)
 National Science Foundation, Theoretical Physics, 150K, 9/11-8/14 (Caldwell, Co-PI)
 NASA Jet Propulsion Laboratory SURP, 40K, 4/11-3/12 (Caldwell, PI)
 NASA Jet Propulsion Laboratory SURP, 53K, 9/09-8/10 (Caldwell, PI)
 National Science Foundation CAREER, 590K, 9/04-8/11 (Caldwell, PI)
 Research Corporation, 35K, 7/02-6/03 (Caldwell, PI)
 National Science Foundation, Theoretical Physics, 259K, 9/01-8/04 (Caldwell, PI)

Fellowships and Visiting Positions:

Visiting Associate in Physics, California Institute of Technology (2003/5-8/10-11)
 Member, Kavli Institute for Theoretical Physics, UCSB (2002)
 Visiting Researcher, Institut d'Astrophysique de Paris, France (2000/1)
 Rosenbaum Fellow, Newton Institute, Cambridge, UK (1999)

Impact: *GoogleScholar, March 2016*

*h-index=43, i10-index=70, i100-index=25, total citations =13,000

PhD Advisor:

Bruce Allen (University of Wisconsin–Milwaukee)

Postdoctoral Advisors:

Rocky Kolb, Joshua Frieman (Fermi National Accelerator Laboratory);

Paul Shellard, Stephen Hawking (Cambridge University);

Paul Steinhardt (University of Pennsylvania and Princeton University)

Graduate Advisees:

Peng Peng Yu (PhD, 2007), Ryan Michney (MS, 2007), Scott Daniel (PhD, 2009), Deanne Dorak (MS, 2011), Leonardo Motta (PhD, 2012), Jannis Bielefeld (PhD, 2015), Dhrubo Jyoti (PhD expected 2017), Chris Devulder (PhD expected 2018), Giovanni Vizcardo (PhD expected 2018)

Recent Collaborators: (*since 2011*)

Jannis Bielefeld (Dartmouth), Tate Deskins (Kenyon), Olivier Dore (JPL), John Giblin (Kenyon), Vera Gluscevic (Caltech), Steve Gubser (Princeton), Marc Kamionkowski (Johns Hopkins), Paul Lasky (Monash), Eric Linder (UC Berkeley), Nina Maksimova (Dartmouth), Chiara Mingarelli (Caltech), Leonardo Motta (Dartmouth), Jason Rhodes (JPL), Michael Romalis (Princeton), Tristan Smith (Swarthmore), Eric Thrane (Monash), Ali Vanderveld (JPL), Kimmy Wu (Stanford)

Professional Activities: (*since 2011*)

Judge: Buchalter Cosmology Prize, 2014-present

Editor: Division Associate Editor, Physical Review Letters (2007-2013)

Reviewer: NSF, NASA, DOE, and foreign science agencies

Member: American Association for the Advancement of Science,
American Physical Society (Astrophysics, Gravitation, Particles & Fields, and
Physics Education)

Publications:

1. * P. Lasky, et al., “Gravitational-wave cosmology across 29 decades in frequency,” *Phys. Rev. X* **6**, 011035 (2016).
2. * J. Bielefeld and R. R. Caldwell, “Cosmological consequences of classical flavor-space locked gauge field radiation,” *Phys. Rev. D* **91**, 124004 (2015).
3. * J. Bielefeld and R. R. Caldwell, “Chiral Imprint of a Cosmic Gauge Field on Primordial Gravitational Waves,” *Phys. Rev. D* **91**, 123501 (2015).
4. J. Bielefeld, R. R. Caldwell, and E. Linder, “Dark energy scaling from dark matter to acceleration,” *Phys. Rev. D* **90**, 043015 (2014).
5. R. R. Caldwell and N. A. Maksimova, “Spectral distortion in a radially inhomogeneous cosmology,” *Phys. Rev. D* **88**, 103502 (2013).
6. J. T. Deskins, J. T. Giblin, and R. R. Caldwell, “Gauge field preheating at the end of inflation,” *Phys. Rev. D* **88**, 063530 (2013).
7. J. Bielefeld, W. L. K. Wu, R. R. Caldwell, and O. Dore, “Freezing out early dark energy,” *Phys. Rev. D* **88**, 103004 (2013).
8. R. R. Caldwell and S. S. Gubser, “Brief History of Curvature,” *Phys. Rev. D* **87**, 063523 (2013).

9. L. Motta and R. R. Caldwell, “Non-Gaussian features of primordial magnetic fields in power-law inflation,” *Phys. Rev. D* **85**, 103532 (2012).
10. R. R. Caldwell, L. Motta and M. Kamionkowski, “Correlation of inflation-produced magnetic fields with scalar fluctuations,” *Phys. Rev. D* **84**, 123525 (2011).
11. R. A. Vanderveld, R. R. Caldwell and J. Rhodes, “Second-order weak lensing from modified gravity,” *Phys. Rev. D* **84**, 123510 (2011).
12. R. R. Caldwell, V. Gluscevic and M. Kamionkowski, “Cross-Correlation of Cosmological Birefringence with CMB Temperature,” *Phys. Rev. D* **84**, 043504 (2011).
13. A.R. Cooray, D.E. Holz, R. R. Caldwell, “Measuring dark energy spatial inhomogeneity with supernova data,” *JCAP* **1011**, 015 (2010).
14. S. F. Daniel, E. V. Linder, T. L. Smith, R. R. Caldwell, A. Cooray, A. Leauthaud and L. Lombriser, “Testing general relativity with current cosmological data,” *Phys. Rev. D* **81**, 123508 (2010).
15. D. G. Figueroa, R. R. Caldwell and M. Kamionkowski, “Non-Gaussianity from self-ordering scalar fields,” *Phys. Rev. D* **81**, 123504 (2010).
16. R. R. Caldwell and M.P. Kamionkowski, “The physics of cosmic acceleration,” *Ann. Rev. Part. Nuc. Sci.* **59**, 397 (2009).
17. S.F. Daniel, R. R. Caldwell, A. Cooray, P. Serra and A. Melchiorri, “A multi-parameter investigation of gravitational slip,” *Phys. Rev. D* **80**, 023532 (2009).
18. P. Serra, A. Cooray, S.F. Daniel, R. R. Caldwell and A. Melchiorri, “Lensed cosmic microwave background constraints on post-general relativity parameters,” *Phys. Rev. D* **79**, 101301 (2009).
19. P.P. Yu and R. R. Caldwell, “Observer dependence of the quasi-local energy and momentum in Schwarzschild space-time,” *Gen. Rel. Grav.* **41**, 559 (2009).
20. R. R. Caldwell and A. Stebbins, “A test of the Copernican principle,” *Phys. Rev. Lett.* **100**, 191302 (2008).
21. S.F. Daniel, R. R. Caldwell, A. Cooray and A. Melchiorri, “Large scale structure as a probe of gravitational slip,” *Phys. Rev. D* **77**, 103513 (2008).
22. R. R. Caldwell and D. Grin, “Lower limit to the scale of an effective theory of gravitation,” *Phys. Rev. Lett.* **100**, 031301, (2008).
23. T. Smith, A. Erickcek, R. R. Caldwell, and M. Kamionkowski, “The effects of Chern-Simons gravity on bodies orbiting the Earth,” *Phys. Rev. D* **77**, 024015 (2008).
24. S.F. Daniel and R. R. Caldwell, “Consequences of a cosmic scalar with kinetic coupling to curvature,” *Class. Quant. Grav.* **24**, 5573 (2007).
25. R. R. Caldwell, A. Cooray, and A. Melchiorri, “Constraints on a new post-general relativity cosmological parameter,” *Phys. Rev. D* **76**, 023507 (2007).
26. R.J. Michney and R. R. Caldwell, “Anisotropy of the cosmic neutrino background,” *J. Cosmol. Astropart. Phys.* **014**, 0701 (2007).
27. A. Cooray and R. R. Caldwell, “Large-scale bulk motions complicate the Hubble diagram,” *Phys. Rev. D* **73**, 103002 (2006).
28. R. R. Caldwell and P.P. Yu, “Long-lived quintessential scalar hair,” *Class. Quantum Grav.* **23**, 7257 (2006).
29. R. R. Caldwell, W. Komp, L. Parker, and D. Vanzella, “A sudden gravitational transition,” *Phys. Rev. D* **73**, 023513 (2006).

30. R. R. Caldwell and E.V. Linder, "Limits of quintessence," *Phys. Rev. Lett.* **95**, 141301 (2005).
31. R. R. Caldwell and M. Doran, "Dark-energy evolution across the cosmological-constant boundary," *Phys. Rev.* **D72**, 043527 (2005).
32. A. Cooray, M. Kamionkowski and R. R. Caldwell, "Cosmic shear of the microwave background: the curl diagnostic," *Phys. Rev.* **D71**, 123527 (2005).
33. K. Sigurdson, M. Doran, A. Kurylov, R. R. Caldwell, and M. Kamionkowski, "Dark-matter electric and magnetic dipole moments," *Phys. Rev.* **D70**, 83501 (2004).
34. R. R. Caldwell and M. Kamionkowski, "Expansion, geometry, and gravity," *J. Cosmol. Astropart. Phys.* **09**, 009 (2004).
35. R. R. Caldwell and M. Doran, "Cosmic microwave background and supernova constraints on quintessence: concordance regions and target models," *Phys. Rev.* **D69**, 103517 (2004).
36. R. R. Caldwell, M. Kamionkowski, and N.N. Weinberg "Phantom energy and cosmic doomsday," *Phys. Rev. Lett.* **91**, 071301 (2003).
37. R. R. Caldwell, M. Doran, C.M. Mueller, G. Schaefer, C. Wetterich, "Early quintessence in light of WMAP," *ApJ* **591**, L75-78 (2003).
38. S. DeDeo, R. R. Caldwell, and P.J. Steinhardt, "Effects of the sound speed of quintessence on the microwave background and large scale structure," *Phys. Rev.* **D67**, 103509 (2003); *Phys. Rev.* **D67**, 129902E (2003).
39. P. Schuecker, R. R. Caldwell, H. Bohringer, C.A. Collins, L. Guzzo, and N.N. Weinberg, "Observational constraints on general relativistic energy conditions, cosmic matter density and dark energy from x-ray clusters of galaxies and type-Ia supernovae," *Astron. Astrophys.* **402**, 53 (2003).
40. R. R. Caldwell, "A Phantom Menace? Cosmological consequences of a dark energy component with super-negative equation of state" *Phys. Lett.* **B 545**, 23 (2002).
41. R. Dave, R. R. Caldwell, and P.J. Steinhardt, "Sensitivity of the CMB anisotropy to initial conditions in Quintessence Cosmology," *Phys. Rev.* **D66**, 023516 (2002).
42. J.K. Erickson, R. R. Caldwell, P.J. Steinhardt, C. Armendariz-Picon, and V. Mukhanov, "Measuring the sound speed of quintessence," *Phys. Rev. Lett.* **88**, 121301 (2002).
43. L. Boyle, R. R. Caldwell, and M. Kamionkowski, "Spintessence! New models for dark matter and dark energy," *Phys. Lett.* **B 545**, 17 (2002).
44. A.D. Miller, et al., "The QMAP and MAT/TOCO experiments for measuring anisotropy in the cosmic microwave background," *ApJS* **140**, 115 (2002).
45. J.L. Puchalla, R. R. Caldwell, K.L. Cruz, M.J. Devlin, W.B. Dorwart, T. Herbig, A.D. Miller, M.R. Nolta, L.A. Page, E. Torbet, H.T. Tran, "Millimeter-Wavelength Galactic Observations with the Mobile Anisotropy Telescope," *AJ* **123**, 1978 (2002).
46. R. R. Caldwell and D. Langlois, "Shortcuts in the fifth dimension," *Phys. Lett.* **B 511**, 129 (2001).
47. R. R. Caldwell, R. Juszkiewicz, P.J. Steinhardt, and F.R. Bouchet, "A simple method for computing the non-linear correlation function with implications for stable clustering," *ApJ* **547**, L93-96 (2001).
48. L. Wang, R. R. Caldwell, J. P. Ostriker, and P. J. Steinhardt, "Cosmic concordance and quintessence," *ApJ* **530**, 17-35 (2000).

49. A.D. Miller, R. R. Caldwell, M.J. Devlin, W.B. Dorwart, T. Herbig, M.R. Nolte, L.A. Page, J. Puchalla, E. Torbet, H.T. Tran, "A measurement of the angular power spectrum of the CMB from $\ell=100$ to 400," *ApJ* **524**, L1-4 (1999).
50. C.-P. Ma, R. R. Caldwell, P. Bode, and L. Wang, "The mass power spectrum in quintessence cosmological models," *ApJ* **521**, L1-4 (1999).
51. P.P. Avelino, R. R. Caldwell, and C.J.A.P. Martins, "Cosmological consequences of string-forming open inflation models," *Phys. Rev.* **D 59**, 123509 (1999).
52. R. R. Caldwell, M. Kamionkowski, and L. Wadley, "The first space-based gravitational-wave detectors," *Phys. Rev.* **D 59**, 027101 (1999).
53. G. Huey, L. Wang, R. Dave, R. R. Caldwell, and P.J. Steinhardt, "Resolving the cosmological missing energy problem," *Phys. Rev.* **D 59**, 063005 (1999).
54. R. R. Caldwell and P.J. Steinhardt, "The imprint of gravitational waves in models dominated by a dynamical cosmic scalar field," *Phys. Rev.* **D 57**, 6057 (1998).
55. R. R. Caldwell, R. Dave, and P.J. Steinhardt, "Cosmological imprint of an energy component with general equation of state," *Phys. Rev. Lett.* **80**, 1582 (1998).
56. B. Allen, R. R. Caldwell, S. Dodelson, L. Knox, E.P.S. Shellard, and A. Stebbins, "CMB Anisotropy induced by cosmic strings on angular scales greater than 15-minutes," *Phys. Rev. Lett.* **79**, 2624 (1997).
57. P. P. Avelino, R. R. Caldwell, and C.J.A.P. Martins, "Cosmic strings in an open universe: quantitative evolution and observational consequences," *Phys. Rev.* **D 56**, 4568 (1997).
58. R. R. Caldwell, R. A. Battye, and E.P.S. Shellard, "Relic gravitational waves from cosmic strings: updated constraints and opportunities for detection," *Phys. Rev.* **D 54**, 7146 (1996).
59. B. Allen, R. R. Caldwell, E.P.S. Shellard, A. Stebbins, and S. Veeraraghaven, "Large angular scale CMB anisotropy induced by cosmic strings," *Phys. Rev. Lett.* **77**, 3061 (1996).
60. R. R. Caldwell, "On the evolution of scalar metric perturbations in an inflationary cosmology," *Class. Q. Grav.* **13**, 2437 (1996).
61. R. R. Caldwell, H.A. Chamblin, and G.W. Gibbons, "Pair creation of black holes by domain walls," *Phys. Rev.* **D 53**, 7103 (1996).
62. P.P. Avelino and R. R. Caldwell, "Entropy perturbations from cosmic strings," *Phys. Rev.* **D 53**, R5339 (1996).
63. R. R. Caldwell and P. Casper, "Formation of black holes from collapsed cosmic string loops," *Phys. Rev.* **D 53**, 3002 (1996).
64. A. Stebbins and R. R. Caldwell, "No very large scale structure in an open universe," *Phys. Rev.* **D 52**, 3248 (1995).
65. B. Allen, R. R. Caldwell, and S. Koranda, "CBR Temperature fluctuations induced by gravitational waves in a spatially-closed inflationary universe," *Phys. Rev.* **D 51**, 1553 (1995).
66. R. R. Caldwell, "Green's functions for gravitational waves in FRW spacetimes," *Phys. Rev.* **D 48**, 4688 (1993).
67. R. R. Caldwell and E. Gates, "Constraints on cosmic strings due to black holes formed from collapsed cosmic string loops," *Phys. Rev.* **D 48**, 2581 (1993).

68. R. R. Caldwell and B. Allen, “Cosmological constraints on cosmic string gravitational radiation,” *Phys. Rev.* **D 45**, 3447 (1992).
69. R. R. Caldwell and J.L. Friedman, “Evidence against a strange ground state for baryons,” *Physics Lett.* **B 264**, 143 (1991).
70. B. Allen and R. R. Caldwell, “Small scale structure on a cosmic string network,” *Phys. Rev.* **D 43**, 3173 (1991).
71. B. Allen and R. R. Caldwell, “Kinky structure on strings,” *Phys. Rev.* **D 43**, R2457 (1991).
72. B. Allen and R. R. Caldwell, “Generation of structure on a cosmic string network,” *Phys. Rev. Lett.* **65**, 1705 (1990).

Conference Proceedings:

1. * R. R. Caldwell, “Cosmic Parity Violation due to a Flavor-Space Locked Gauge Field,” *Int. J. Mod. Phys. D*, *in press* (2016).
2. R. R. Caldwell, “Dark Energy Models,” in “TASI 2012: Searching for New Physics at Small and Large Scales,” eds. E. Pierpaoli and M. Schmaltz, World Scientific (2013).
3. R. R. Caldwell, “Gravitational Screening: Geometry and Superposition,” *AIP Conf. Proc.* 1514, pp. 169-178 (2013).
4. R. R. Caldwell, “A Gravitational Puzzle,” *Phil. Trans. R. Soc.* **A369** 4998 (2011).
5. R. R. Caldwell, “Dark energy phenomena as gigaparsec voids: constraints due to spectral distortion,” in “Proceedings, 4th Mexican Meeting on Mathematical and Experimental Physics,” eds. A. Macias, M. Maceda, *AIP Conf. Proc.* 1318 (2010).
6. R. R. Caldwell “Perspectives on Dark Energy,” *Space Science Reviews* **148**, 347 (2009); DOI 10.1007/s11214-009-9552-3.
7. P. Serra, A. Cooray, S. F. Daniel, R. Caldwell and A. Melchiorri, “Lensed cosmic microwave background constraints on post-general relativity parameters,” *Nucl. Phys. Proc. Suppl.* **194**, 320 (2009).
8. R. Caldwell and L. Dias Da Motta, “Electro- and magnetostatics of a cosmic pseudoscalar field coupled to electromagnetism,” *Nucl. Phys. Proc. Suppl.* **194**, 202 (2009).
9. R. R. Caldwell, “The Imprint of Dark Energy,” in *CosPA 2003: Cosmology and Particle Astrophysics*, ed. W.-Y. Pauchy Hwang (World Scientific, Singapore, 2004).
10. R. R. Caldwell *et al.*, “Cosmological Parameters, Dark Energy, and Large Scale Structure,” in *Snowmass 2001: The Future of Particle Physics*, 2001.
11. R. R. Caldwell, “An Introduction to Quintessence,” in *Dark Matter 2000: Sources and detection of dark matter and dark energy in the universe*, ed. D. B. Cline, 74-91 (2000).
12. R. R. Caldwell, “An Introduction to Quintessence,” *Brazilian Journal of Physics*, vol. 30, no. 2, 215-229, June (2000).
13. R. R. Caldwell, R. Dave, and P.J. Steinhardt, “Quintessential Cosmology: Novel Models of Cosmological Structure Formation,” *Astrophysics and Space Science*, vol. 261, 303-310 (1999).
14. P. P. Avelino, R. R. Caldwell, and C.J.A.P. Martins, “The Promise of Structure Formation with Cosmic Strings in an Open Universe,” *Astrophysics and Space Science*, vol. 261, 319-320 (1999).
15. R. R. Caldwell and P.J. Steinhardt, “Introduction to Quintessence” in *Cosmic Microwave Background and Large Scale Structure of the Universe*, eds. Y.-I. Byun and K.-W. Ng (Astronomical Society of the Pacific, 1998).

16. R. R. Caldwell, R. Dave, and P. J. Steinhardt, "Quintessential Cosmology" in *The Non-Sleeping Universe*, eds. Alain Blanchard and M. Teresa V.T. Lago (1998).
17. R.A. Battye, R. R. Caldwell, and E.P.S. Shellard, "Gravitational waves from cosmic strings" in *Topological Defects in Cosmology*, eds. F. Melchiorri and M. Signore (1996).
18. B. Allen, R. R. Caldwell, E.P.S. Shellard, A. Stebbins and S. Veeraraghavan, "CMB Anisotropy due to cosmic strings: large angular scale," in *Proceedings of the 18th Texas Symposium*, eds. A. Olinto, J. Frieman and D. Schramm (1996).
19. B. Allen, R. R. Caldwell, E.P.S. Shellard, A. Stebbins and S. Veeraraghavan, "Cosmic strings confront COBE," in *Birth of the Universe and Fundamental Physics*, ed. Franco Occhionero (Springer-Verlag, Berlin, 1995).
20. B. Allen, R. R. Caldwell, E.P.S. Shellard, A. Stebbins and S. Veeraraghavan, "Cosmic microwave radiation anisotropy induced by cosmic strings," in *CMB Anisotropies: Two Years After COBE*, ed. Lawrence Krauss (World Scientific, Singapore, 1994).
21. R. R. Caldwell, "The current status of observational constraints on cosmic strings," in *Proceedings of the 5th Canadian Conference on General Relativity and Relativistic Astrophysics*, eds. R. McLenaghan and R. Mann (World Scientific, Singapore, 1993).
22. B. Allen and R. R. Caldwell, "Formation of kinks," in *Proceedings of the 1990 Florida Conference on Non-Linear Problems in Astrophysics*, eds. J. Buchler, S. Detweiler, and J. Ipser (New York Academy of Sciences, 1991).
23. B. Allen and R. R. Caldwell, "Kinky strings: Evolution of kinks as small-scale structure on a cosmic string network," in *Proceedings of the 1990 Banff Summer School on Gravitation*, eds. R. Mann and P. Wesson (World Scientific, Singapore, 1991).

Scientific Talks (Colloquia, Seminars, Conferences, Etc): (*since 2011*)

- * Johns Hopkins, Physics seminar
- * Keene State College, Physics seminar
- * University of Minnesota, Physics seminar
- * American Physical Society, New England section, Dartmouth College, Plenary lecture
- * Brown University, Physics colloquium
- * Galileo Galilei Institute, Florence, Italy, Cosmology workshop
- * Johns Hopkins University, Cosmology workshop
- * University of Chicago, Cosmology workshop
- * American Physical Society, Division of Particles and Fields, Baltimore
- Dartmouth College, Physics colloquium
- Brandeis University, Physics seminar
- Princeton University, Physics seminar
- Eotvos University, Budapest, Hungary, Cosmology workshop
- "Les Houches" Summer School of Theoretical Physics, France (2 lectures)
- UNESCO International Center for Theoretical Physics, Trieste, Italy (3 lectures)
- University of Tokyo, Physics seminar
- University of Tokyo, Cosmology workshop
- Ewha University, Seoul, Korea, Physics seminar
- Arizona State University, Beyond Center, workshop, Invited Speaker
- ICTP-SAIFR, Sao Paolo, Brazil, Cosmology Winter School (5 lectures)
- University of Colorado, Boulder, Colorado, Public Lecture
- Theoretical Advanced Studies Institute, Boulder, Colorado (4 lectures)

University of Heidelberg, Germany, Festschrift, Invited Speaker
 University of Szczecin, Poland, Cosmology workshop, Invited Speaker
 Fermi National Accelerator Laboratory, Illinois, Physics workshop
 University of Heidelberg, Germany, Cosmology conference
 University of Copenhagen, Denmark, Cosmology conference
 Kavli Royal Society Centre, UK, Cosmology workshop, Invited Speaker

Recent Media References / Interviews / Sound Bytes: (*since 2011*)

1. * “When will the universe end?” by Jacob Aron, *New Scientist*, Feb. 25, 2016.
2. * Interview on “The Briefing” with Mike Mastanduno, *Sirius XM 121*, Feb. 20, 2016.
3. * “How will the universe end?” by Adam Becker, *BBC*, Jun. 2, 2015.
4. “This is the way the world ends,” *Salon*, Mar. 9, 2014.
5. “To bake matter, first preheat universe,” by Lisa Grossman, *New Scientist*, Jun. 22, 2013.
6. “Will dark energy freeze or rip the universe?” by Kelly Oakes, *Astronomy Now*, Jan. 2013.
7. “Phoenix universe could rebuild itself after cosmic rip,” by Lisa Grossman, *New Scientist*, Oct. 17, 2012.
8. “Wie alles enden wird,” by Klaus Bachmann, *GEO Magazine (Germany)*, Feb. 2011.
9. “How to survive the end of the Universe,” by Andrew Grant, *Discover*, Dec. 2011.
10. “Cosmic acceleration discovery wins Nobel Prize,” by Devin Powell, *Science News*, Oct. 22, 2011.
11. “New study gives dark energy a boost,” by Ron Cowen, *Science News*, Mar. 16, 2011.
12. “Ultracold atoms could reveal the dark sector,” by Hamish Johnston, *Physics World*, Feb. 14, 2011.

Undergraduate Research Supervision: (*since 2011*)

Laura Bergsten, Lucas Bezerra, Matthew Digman, Connie Jiang, Nina Maksimova, Martin Moon, Saba Nejad, Stefanie Ostrowski, Alice Park

Dartmouth Courses Taught: (*since 2011*)

P13 Introductory Physics I: Mechanics (W12, F12, F15)
 P14 Introductory Physics II: E & M (W11, 14)
 P19 Relativistic and Quantum Physics (S15)
 P77 Introduction to General Relativity (F11, F13, F15)
 P92 Physics of the Early Universe (W13, W15)
 P256 Instruction in Teaching for Graduate Students (F/W 11/12-13/14,15/16)