

Charles D. Hoyle, Jr.

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Education:

2001: Ph.D. in Experimental Physics, University of Washington, Seattle, WA
Thesis Title: "Sub-millimeter Tests of the Gravitational Inverse-Square Law"
Thesis Advisor: Prof. Eric Adelberger
1997: M.Sc. in Physics, University of Washington, Seattle, WA
1996: B.A. in Physics (honors), University of Colorado, Boulder, CO

Relevant Experience:

06/2010 – Present Affiliate Assistant Professor of Physics, University of Washington
01/2007 – Present Associate Professor of Physics, Humboldt State University
05/2004 – 11/2006 Post-Doctoral Fellow, APOLLO project and Eöt-Wash Group, U. of Washington
03/2002 – 03/2004 Post-Doctoral Fellow, LISA Group, University of Trento, Italy
04/1997 – 02/2002 Research Assistant, Eöt-Wash Group, University of Washington
09/1996 – 04/1997 Teaching Assistant, University of Washington
05/1995 – 07/1996 Undergraduate Research Assistant, Exp. Nuclear Phys., University of Colorado

Teaching and Outreach Experience (courses taught are in bold)

08/2011 – Present **Physics 310 and Physics 324**, Humboldt State University
01/2011 – 05/2011 **Physics 304 and Physics 107**, Humboldt State University
08/2010 – 12/2010 **Physics 111 and Physics 304**, Humboldt State University
01/2010 – 05/2010 **Physics 315 and Physics 320**, Humboldt State University
08/2009 – 12/2009 **Physics 110 and Physics 111**, Humboldt State University
01/2009 – 05/2009 **Physics 107, Physics 315, and Physics 324**, Humboldt State University
08/2008 – 12/2008 **Physics 111 and Physics 304**, Humboldt State University
01/2008 – 05/2008 **Physics 106 and Physics 107**, Humboldt State University
08/2007 – 12/2007 **Physics 304 and Physics 315**, Humboldt State University
01/2007 – 05/2007 **Physics 107 and Physics 315**, Humboldt State University
01/2006 – 03/2006 **Physics 123**, University of Washington
06/2005 Career Day speaker at the Albert Einstein Middle School in Shoreline, WA.
09/2004 – 12/2004 **Physics 122**, University of Washington
08/2004 Leader of a site visit to LIGO with 15 REU students from the U. of Washington.
09/1996 – 04/1997 Teaching Assistant, University of Washington – responsible for freshman laboratory and recitation sections coordinated with the Physics Education Group.

Fellowships and Awards:

- Research Corporation Cottrell College Science Award (2007)
- Gravity Research Foundation Essay Award (2006)
- Henderson Prize for Outstanding Doctoral Dissertation, University of Washington (2002)
- Incoming Graduate Student Fellowship, University of Washington (1996)
- Graduation with Honors, University of Colorado (1996)
- Dean's List, University of Colorado (1994-1996)

Memberships in Honor Societies:

- Phi Beta Kappa
- Sigma Pi Sigma Physics Honor Society

Grants and Other Funds Received	Amount
• National Science Foundation award #1065697 (08/2011 – 07/2013)	\$117,157
• Cottrell College Science Award CC6839, Research Corporation (06/2007 – 06/2010)	\$43,720
• Internal Start-up, Research, and Travel Grants, Humboldt State University (01/2007 – present)	\$40,660

Invited Talks:

1. “Testing Gravity from the Dark Energy Scale to the Moon and Beyond,” Web-based Colloquium for the University of the Virgin Islands (April, 2011)
2. “Testing Gravity from the Dark Energy Scale to the Moon and Beyond,” Humboldt State University Natural History Museum, Arcata, CA (May, 2009)
3. “Testing Gravity from the Dark Energy Scale to the Moon and Beyond,” California State University Fresno, Fresno, CA (February, 2009)
4. “Testing Gravity from the Dark Energy Scale to the Moon and Beyond,” University of Trento, Trento, Italy (May, 2006)
5. “Testing Gravity from the Dark Energy Scale to the Moon and Beyond,” Humboldt State University, Arcata, CA (November, 2005)
6. “The Gravity of Gravity,” Fall Research Symposium, University of Washington, Seattle, WA (October, 2005)
7. “Two Examples of the Modern Torsion Pendulum in Gravitational Physics,” University of Ljubljana (seminar), Ljubljana, Slovenia (December, 2003)
8. “The Experimental Search for Large Extra Dimensions,” The First Gunnar Nordström Symposium on Theoretical Physics, Helsinki, Finland (August, 2003)
9. “Sub-millimeter Tests of the Gravitational Inverse-Square Law,” University of Trento, Trento, Italy (October, 2001)
10. “Sub-millimeter Test of the Gravitational Inverse-Square Law,” Snowmass 2001: The Future of Particle Physics, Snowmass, CO (July, 2001)

Contributed Talks:

1. “The APOLLO Lunar Laser Ranging Experiment,” 21st Pacific Coast Gravity Meeting, Eugene, OR (March, 2005)
2. “Current Status of the Eöt-Wash Short-Range Gravity Experiment,” 21st Pacific Coast Gravity Meeting, Eugene, OR (March, 2005)
3. “Torsion Pendulum Tests of a Prototype LISA Capacitive Sensor: First Results,” 10th Marcel Grossmann Meeting on General Relativity, Rio de Janeiro, Brazil (July, 2003)
4. “Sub-millimeter Test of the Gravitational Inverse-Square Law,” APS April Meeting, Washington, D.C. (April, 2001)

Publication Bibliography

C.D. Hoyle, Jr.

Peer-reviewed Publications:

1. “Experimental Short-Range Gravitational Tests of the Weak Equivalence Principle and the Inverse-Square Law Using Novel Torsion Pendulums,” David W. Shook and C.D. Hoyle, Jr. (faculty Advisor), accepted for publication in the *Proceedings of the National Conference on Undergraduate Research (NCUR)*, (2011) 8 pages
2. “Sub-millimeter Positioning and Sensing for Short-Range Gravity Tests,” Bret A. Comnes and C.D. Hoyle, Jr. (faculty Advisor), accepted for publication in the *Proceedings of the National Conference on Undergraduate Research (NCUR)*, (2011) 8 pages
3. “Long-term degradation of optical devices on the Moon,” T. W. Murphy, Jr., E. G. Adelberger, J. B. R. Battat, C. D. Hoyle, R. J. McMillan, E. L. Michelsen, R. Samad, C. W. Stubbs, and H. E. Swanson, *Icarus*, **208**, 31-35 (2010)
4. “Testing Gravity below the 50-micron Distance Scale,” David W. Shook and C.D. Hoyle, Jr. (faculty Advisor), *Proceedings of the National Conference on Undergraduate Research (NCUR)*, (2010) 8 pages
5. “High-precision electrolytic capacitance tilt sensor,” Holly Edmundson and C.D. Hoyle, Jr. (faculty Advisor), *Proceedings of the National Conference on Undergraduate Research (NCUR)*, (2009) 8 pages
6. “Precision optical system for short-range tests of gravity,” Nathan F. Rasmussen and C.D. Hoyle, Jr. (faculty Advisor), *Proceedings of the National Conference on Undergraduate Research (NCUR)*, (2009) 8 pages
7. “The Apache Point Observatory Lunar Laser-ranging Operation: Instrument Description and First Detections,” T.W. Murphy, Jr., E.G. Adelberger, J.B.R. Battat, L.N. Carey, C.D. Hoyle, P. LeBlanc, E. L. Michelsen, K. Nordtvedt, A.E. Orin, J.D. Strasburg, C.W. Stubbs, H.E. Swanson, and E. Williams, *Publications of the Astronomical Society of the Pacific*, **120**, 20–37 (2008)
8. “Extra-dimensions, dark energy, and the gravitational inverse-square law,” Liam J. Furniss and C.D. Hoyle, Jr. (faculty Advisor), *Proceedings of the National Conference on Undergraduate Research (NCUR)*, 21–28, (2008)
9. “Particle-physics implications of a recent test of the gravitational inverse-square law,” E. G. Adelberger, B. R. Heckel, S. Hoedl, C. D. Hoyle, D. J. Kapner, and A. Upadhye, *Phys. Rev. Lett.* **98**, 131104 (2007) **(SPIRES topcite 50+)** 4 pages
10. “Tests of the Gravitational Inverse-Square Law below the Dark-Energy Length Scale,” D.J. Kapner, T.S. Cook, E.G. Adelberger, J.H. Gundlach, B.R. Heckel, C.D. Hoyle, and H.E. Swanson, *Phys. Rev. Lett.* **98**, 021101 (2007) **(SPIRES topcite 100+)** 4 pages
11. “Analytic Expressions for Gravitational Inner Multipole Moments of Elementary Solids and for the Force between Two Rectangular Solids,” E.G. Adelberger, Nathan A. Collins, and C.D. Hoyle, *Class. Quant. Grav.* **23**, 125-136 (2006)
12. “4-Mass Torsion Pendulum for Ground Testing of LISA Displacement Sensors,” L. Carbone, A. Cavalleri, R. Dolesi, C.D. Hoyle, M. Hueller, S. Vitale, and W.J. Weber, *Proceedings of the 10th Marcel Grossmann Meeting on General Relativity*, edited by M. Novello, S. Perez-Bergliaffa and R. Ruffini, World Scientific, Singapore (2006) (4 pages, principal author)
13. “Characterization of Disturbance Sources for LISA: Torsion Pendulum Results,” L. Carbone, A. Cavalleri, R. Dolesi, C. D. Hoyle, M. Hueller, S. Vitale, and W. J. Weber, *Class. Quant. Grav.* **22**, S509-S519 (2005)
14. “Measuring the LISA Test Mass Magnetic Properties with a Torsion Pendulum,” M. Hueller, M. Armano, L. Carbone, A. Cavalleri, R. Dolesi, C. D. Hoyle, S. Vitale, and W. J. Weber, *Class. Quant. Grav.* **22**, S521-S526 (2005)
15. “Sub-millimeter tests of the gravitational inverse-square law,” C.D. Hoyle, D.J. Kapner, B.R. Heckel, E.G. Adelberger, J.H. Gundlach, U. Schmidt, and H.E. Swanson, *Phys. Rev. D* **70**, 042004 (2004) **(principal author, SPIRES topcite 100+)**
16. “Upper limits on stray force noise for LISA,” L. Carbone, A. Cavalleri, R. Dolesi, C.D. Hoyle, M. Hueller, S. Vitale, and W.J. Weber, *Class. Quant. Grav.* **21**, S611-S620 (2004)
17. “Measuring random force noise for LISA aboard the LISA Pathfinder mission,” D. Bortoluzzi, L. Carbone, A. Cavalleri, M. Da Lio, R. Dolesi, C.D. Hoyle, M. Hueller, S. Vitale, and W.J. Weber, *Class. Quant. Grav.* **21**, S573-S579 (2004)

18. "Current Error Estimates for LISA Spurious Accelerations," R.T. Stebbins, P.L. Bender, J. Hanson, C.D. Hoyle, B.L. Schumaker, and S. Vitale, *Class. Quant. Grav.* **21**, S653-S660 (2004)
19. "Achieving Geodetic Motion for LISA Test Masses: Ground Testing Results," L. Carbone, A. Cavalleri, R. Dolesi, C.D. Hoyle, M. Hueller, S. Vitale, and W.J. Weber, *Phys. Rev. Lett.* **91**, 151101 (2003) 4 pages
20. "Possibilities for Measurement and Compensation of Stray DC Electric Fields Acting on Drag-Free Test Masses," W.J. Weber, L. Carbone, A. Cavalleri, R. Dolesi, C.D. Hoyle, M. Hueller, and S. Vitale, *Advances in Space Research* (2002)
21. "Gravitational Sensor for LISA and its Technology Demonstration Mission," R. Dolesi, D. Bortoluzzi, P. Bosetti, L. Carbone, A. Cavalleri, I. Cristofolini, M. Da Lio, G. Fontana, V. Fontanari, B. Foulon, C.D. Hoyle, M. Hueller, F. Nappo, P. Sarra, D.N.A. Shaul, T. Sumner, W.J. Weber, and S. Vitale, *Class. Quant. Grav.* **20**, S99-S108 (2003)
22. "Testing LISA Drag-Free Control with the LISA Technology Package Flight Experiment," D. Bortoluzzi, P. Bosetti, L. Carbone, A. Cavalleri, A. Ciccolella, M. Da Lio, K. Danzmann, R. Dolesi, A. Gianolio, G. Heinzl, D. Hoyland, C.D. Hoyle, M. Hueller, F. Nappo, M. Sallusti, P. Sarra, M. Te Plate, C. Tirabassi, S. Vitale, and W.J. Weber, *Class. Quant. Grav.* **20**, S89-S97 (2003)
23. "Design and Ground Testing of Position Sensors for LISA Drag-Free Control," W.J. Weber, D. Bortoluzzi, A. Cavalleri, L. Carbone, M. Da Lio, R. Dolesi, G. Fontana, C.D. Hoyle, M. Hueller, and S. Vitale, *Proc. SPIE* **4856-4**, (Gravitational Wave Detection) (2002)
24. "Sub-millimeter test of the gravitational inverse-square law: A search for 'large' extra dimensions," C.D. Hoyle, U. Schmidt, B.R. Heckel, E.G. Adelberger, J.H. Gundlach, D.J. Kapner, and H.E. Swanson, *Phys. Rev. Lett.* **86**, 1418-1421 (2001) (**principal author, SPIRES topcite 250+**)
25. "Results on the strong equivalence principle, dark matter, and new forces," B.R. Heckel, E. Adelberger, S. Bäsler, J. Gundlach, M. Harris, C.D. Hoyle, A. Sharp, G. Smith, and E. Swanson, *Advances in Space Research* **25**, 1225-1230 (2000)
26. "Short-range Tests of the Equivalence Principle," G.L. Smith, C.D. Hoyle, J.H. Gundlach, E.G. Adelberger, B.R. Heckel, and H.E. Swanson, *Phys. Rev. D* **61**, 022001 (2000) 38 pages
27. "Searches for New Long-range Forces: Equivalence Principle Violation and Planck-scale Physics", E.G. Adelberger, S. Bäsler, J.H. Gundlach, B.R. Heckel, C.D. Hoyle, S.M. Merkowitz, G.L. Smith and H.E. Swanson, *Physics Beyond the Standard Model*, eds. P. Herczeg, C.M. Hoffman, and H.V. Klapdor-Kleingrothaus, World Scientific (Singapore) 717-737 (1999)

Other Publications:

1. "The 'dark side' of gravitational experiments," C.D. Hoyle, Fourth Award in the 2006 Essay Competition of the Gravity Research Foundation, appears in *General Relativity and Gravitation*, **38**, 1553-1558 (2006) and in the *International Journal of Modern Physics D*, **15** 1-7(2006)
2. "The Experimental Search for Large Extra Dimensions," C.D. Hoyle, *Proceedings of the Gunnar Nordström Symposium on Theoretical Physics*, eds. C. Cronström and C. Montonen, *Commentationes Physico-Mathematicae* 166/2004, 141 (2004)

Popular Publications:

1. "Testing the Gravitational Inverse-Square Law," Eric Adelberger, Blayne Heckel and C.D. Hoyle, *Physics World* **18**, 41-45 (April, 2005)
2. "The Weight of Expectation," C.D. Hoyle, "News and Views" article, *Nature* **421**, 899-900 (2003)