

Duane L. Deardorff

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EDUCATION

Ph.D., Physics, North Carolina State University, December 2001
Thesis: *Introductory Physics Students' Treatment of Measurement Uncertainty*
M.S., Physics, North Carolina State University, December 1998.
B.A., Physics (*magna cum laude*), Manchester College, May 1991.

PROFESSIONAL EXPERIENCE

Director of Undergraduate Laboratories; Teaching Associate Professor

Dept. of Physics and Astronomy, University of North Carolina at Chapel Hill.

Coordinate undergraduate physics teaching laboratories for ~3000 students each year. Develop and implement instructional resources for labs. Evaluate and improve laboratory instruction. Hire, train and supervise approximately 40 graduate and 20 undergraduate student teaching assistants each semester (~\$750k/yr in human resources). Supervise Lab Manager and several undergraduate Lab Assistants. Teach one or two introductory physics courses each year using interactive-engagement methods and instructional technology. Coordinate oversight of Physics Tutorial Center and Supplemental Instruction. Serve on several department and university committees. (2000 – present)

TA Orientation and Training. Lead week-long training session each August before classes begin to prepare new graduate student Teaching Assistants for their work in the department of Physics and Astronomy at UNC-CH. Assist with TA seminar (PHYS 510) on physics pedagogy. (2000 – present)

Research Advisor for students at North Carolina School of Science and Math. Served as mentor for 6 high school students during their summer research program. (2021)

Physics Demonstration Programs. Present or assist with educational outreach presentations at local schools, museums, and libraries (1995 – present)

SCALE-UP development and instruction. Facilitated creation and implementation of interactive learning classroom and curriculum that combines lecture, lab, and recitation activities for introductory physics courses at UNC-CH. Assisted with development of this innovative program under direction of Robert Beichner at North Carolina State Univ. with over \$1 million from NSF, FIPSE, and NCSU. <http://scaleup.ncsu.edu> (Fall 1997 – 2000)

Teaching Assistant for Senior Physics Labs. Advised student research projects in fiber optic experiments, thin-film deposition, scanning tunneling microscopy, scintillation detectors, holography, quantum conductance, and measurement instrumentation. Ordered and set up \$20k of lab equipment and supplies, graded assignments. (Fall 1998 – Summer 1999)

Teaching Assistant for General Physics Labs. Taught full range of physics lab courses at NCSU: calculus and algebra-based introductory physics lab courses and conceptual physics labs. (Fall 1993 – Spring 1997)

Physics Tutor at NCSU Physics Tutorial Center. Provided individual guidance to introductory physics students on homework problems and test preparation. (1997)

Instructor for Duke University Physics Department. Instructor and evaluator for introductory physics labs implementing curriculum based on *University of Washington Tutorials in Physics*. (Fall 1998)

Physics Laboratory Instructor. James Madison University, Harrisonburg, VA.
Taught 2 algebra-based general physics lab sections. Replacement for textbook author Ray Serway. (Fall 1992, Spring 1993)

Private Tutor. Tutored high school students in physics and mathematics. (1996 – 2000)

TEACHING EXPERIENCE

Instructor for introductory physics courses at UNC-CH. Utilize interactive-engagement methods of instruction that have been demonstrated to be effective based on Physics Education Research (PER). Instruction typically includes classroom demonstrations, online homework using WebAssign or MasteringPhysics, in-class questions using a class response system, and original real-world problems that encourage critical thinking. Sample course information and instructional materials can be found at: www.physics.unc.edu/~deardorf (Fall 2000 – present)

Courses taught at UNC-CH:

Physics 100 How Things Work: Sp. 2009, Sp. 2010
Physics 101 Conceptual Physics: Sp. 2007, Sp. 2008
Physics 104 General Physics I: Fall 2000, 2001; Sp. 2003, 2004; Sum. '02, '07, '08, '09, '11
Labs for Physics 104 (Sp. 2013, 2014)
Physics 105 General Physics II: Sp.2005, Sum. 2005, Sp. 2006, Sum. 2006
Labs for Physics 105 (Sp. 2013)
Physics 114 Physics for Life Science Students: Sp.2017, Summer 2016, 2017, 2019
Physics 115 Physics for Life Science Students: Fall '19, '21, Sp.'20,'21,'22, Sum.'21
Physics 116 Mechanics: Fall, 2010, Sum. 2012
Labs for Physics 116 (Sp. 2001, 2009)
Physics 117 Electromagnetism and Optics: Sp.2011, Sp. 2012
Labs for Physics 27 (Sp. 2001)
Physics 118 Mechanics and Relativity: Studio: Sp. 2016, Fall 2020
Coordinator: Fall 2016, Fall 2020
Physics 281L Experimental Techniques: Fall 2015, Spring 2016
Physics 295 Independent Study: Spring 2018, 2021

Details for courses taught recently at UNC-CH:

Spring 2022: Course coordinator and instructor for PHYS 115 (425 students)
Fall 2021: Lead instructor (lecture and studio) for PHYS 115 (250 students)
Summer 2021: Co-instructor (lecture and studio) for PHYS 115 (140 students)
Spring 2021: Course coordinator and instructor for PHYS 115 (400 students)
Fall 2020: Course coordinator and instructor for PHYS 118 (270 students)
Spring 2020: Course coordinator and instructor for PHYS 115 (360 students)

Fall 2019: Lecture and studio instructor for PHYS 115 (220 students)
Summer 2019: Lead instructor (lecture and studio) for PHYS 114 (100 students)
Spring 2019: Lead instructor (lecture and studio) for PHYS 118 (250 students)
Fall 2018: Lead instructor (lecture and studio) for PHYS 118 (260 students)
Spring 2018: Lecture and studio instructor for PHYS 114 (220 students)
Fall 2017: Lecture instructor for PHYS 118 (260 students)
Summer 2017: Lead instructor (lecture and studio) for PHYS 114 (90 students)
Spring 2017: Lead instructor for PHYS 114 (200 students)
Fall 2016: Studio Coordinator for PHYS 118 (260 students)
Summer 2016: Lead instructor (lecture and studio) for PHYS 114 (90 students)
Spring 2016: Studio instructor for PHYS 118-501 (41 students)
Spring 2016: Lecture instructor for PHYS 281L (15 students)
Fall 2015: Lead instructor (lecture and lab) for PHYS 281L (31 students)
Spring 2015: Studio instructor for PHYS 115-501 (37 students)
Fall 2014: Studio Coordinator for PHYS 114 (315 students)
Spring 2014: Lab instructor for PHYS 104-414 (20 students)
Fall 2013: Secondary instructor for PHYS 116 (282 students)
Spring 2013: Lab instructor for PHYS 104-420 (21 students) and 105-412 (20 students)

RESEARCH EXPERIENCE

Laboratory Performance Assessment. Developed and evaluated laboratory exam for introductory physics courses to assess students' ability to make accurate measurements with typical physics lab instruments, analyze and interpret empirical data, apply fundamental physics principles, design simple experiments, evaluate results, analyze measurement errors, and communicate findings clearly and concisely. (2000 – present)

Dissertation Research. "Assessing introductory physics students' understanding of measurement uncertainty." Examining student difficulties with measurement errors, particularly focusing on differences between expert and novice treatments of uncertainty. Advisor: Dr. Robert Beichner. (1996 – 2001)

Homework Grading Study: Human versus Computer. Analyzed and compared written exam problem solutions from students who submitted homework answers on-line via WebAssign versus group with traditional human grading and feedback. Research directed by Dr. Scott Bonham. (Summer 1999)

International Research and Grant Writing. Independently planned and was awarded a \$7,375 NSF Dissertation Enhancement Grant for Collaborative Research in Japan and Korea: "Comparative analysis between Japanese and American students' understanding of measurement uncertainty." (Summer 1998)

Cognition Study. Examined 1000+ questions from students of a conceptual physics course and correlated the cognitive level of the questions to each student's course performance. (Summer 1994)

Research Assistant in Surface Physics. Basic experience with ellipsometry, reflection difference spectroscopy (RDS), and metal-organic chemical vapor deposition (MOCVD). Research directed by Dr. David Aspnes. (Summer 1993, 1994)

Evaporative Thin Film Deposition and Optical Characterization. Research directed by Dr. Hans Hallen. (Spring 1995)

PUBLICATIONS

DISSERTATION

Introductory Physics Students' Treatment of Measurement Uncertainty. NCSU, 2001. 192 pp.

BOOK CHAPTERS

D. K. Deardorff & D. L. Deardorff. "Assessing Intercultural Outcomes in Engineering Programs." Book Chapter in *Teaching and Training for Global Engineering: Perspectives on Culture and Professional Communication Practices*. Wiley-IEEE PCS Professional Engineering Communication Series (2016).

Ch. 6: "An Overview of the Basic Methods of Outcomes Assessment" by Darla K. Deardorff and Duane L. Deardorff. Published in *A Guide to Outcomes Assessment in Education Abroad*, edited by Mell C. Bolen. The Forum on Education Abroad, 2007.

Contributing author for *Student Solutions Manual and Study Guide to Accompany Volume 1 Physics for Scientists and Engineers, 5th ed. by Serway and Beichner*, Saunders College Publ., 2000. 479 pp.

Contributing author for *Student Solutions Manual and Study Guide to Accompany Volume 2 Physics for Scientists and Engineers, 5th ed. by Serway and Beichner*, Saunders College Publ., 2000. 502 pp.

Contributing author for *Instructor's Manual to Accompany Volume 1 Physics for Scientists and Engineers, 5th ed. by Serway and Beichner*, Saunders College Publishing, 2000.

Contributing author for *Instructor's Manual to Accompany Volume 2 Physics for Scientists and Engineers, 5th ed. by Serway and Beichner*, Saunders College Publishing, 2000.

Contributing editor of laboratory manual for NCSU general physics courses: *Fundamental Experiments in Physics* by R. A. Egler. (1994, 1998), 214 pp.

Contributing editor of *Physics 131 Laboratory Manual* for NCSU conceptual physics course. (1995, 1996) 31 pp.

REFEREED JOURNAL ARTICLES

Smith, David P., Laurie E. McNeil, David T. Guynn, Alice D. Churukian, Duane L. Deardorff, and Colin S. Wallace, "Transforming the content, pedagogy and structure of an introductory physics course for life sciences majors," *American Journal of Physics*, 86 (11), 862-869 (2018).
<https://doi.org/10.1119/1.5058685>

R. J. Beichner, J. M. Saul, D. S. Abbott, J. J. Morse, D. L. Deardorff, R. J. Allain, S. W. Bonham, M. H. Dancy, and J. S. Risley. "The Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) project." Published on PER-Central. Vol. 1, Issue 1, p. 1-42. (March 2007).
http://per-central.org/per_reviews/volume1.cfm

R. Allain, D. Abbott, D. Deardorff. "Peer ranking to enhance student writing." *Physics Education*, IOP, Vol. 41 (3). 2006, p. 255-258.

Scott W. Bonham, Duane L. Deardorff, Robert J. Beichner. "Comparison of student performance using web and paper-based homework in college-level physics," *J. of Research in Science Teaching*, Vol. 40, issue 10 (Dec. 2003), p.1050-1071.

S. Bonham, R. Beichner, D. Deardorff. "Online Homework: Does it Make a Difference?" *The Physics Teacher*, Vol.39, No.5, May 2001, p. 293-297.

BOOK and CURRICULUM REVIEWS

Reviewed AP Physics 1 and 2 learning objectives and scoring criteria. (2015)

Coordinated focus group to get student feedback on Physics textbook by James Walker, Prentice Hall Publishing. (2003)

D. Deardorff, "Book on a Diskette!: A review of *Connecting Research in Physics Education with Teacher Education*, Edited by Andree Tiberghien, E. Leonard Jossem, and Jorge Barojas", an ICPE Book, 1998. *The Physics Teacher*, Vol.39, No.4, April 2001, p. 255.

Reviewed textbook manuscript: *The Analysis of Experimental Evidence* by Gustave Nelson, Saunders Publishing. (1998) 118 pp.

Reviewed *Core Concepts in Physics* CD ROM for Archipelago Productions and Saunders College Publishing. (1997)

PUBLISHED NOTES OR ABSTRACTS

Kozminski et al. "AAPT Recommendations for the Undergraduate Physics Laboratory Curriculum." 2014. https://www.aapt.org/Resources/upload/LabGuidelinesDocument_EBendorsed_nov10.pdf

Physics Inside Out: SCALE-UP Redesigning the traditional classroom space. Article written by Don Evans for series titled "Learning 2.0" in Carolina Arts & Sciences magazine, Spring 2013.

R. Beichner, J. Saul, R. Allain, D. Deardorff, D. Abbott, "Introduction to SCALE-UP: Student Centered Activities for Large Enrollment University Physics." *Proceedings of the 2000 Annual meeting of the American Society for Engineering Education*, 2000.

J. Saul, D. Abbott, R. Allain, D. Deardorff, and R. Beichner, "Evaluating introductory physics classes in light of the ABET criteria: An example from the SCALE-UP project." Submitted to the *Proceedings of the 2000 Annual meeting of the American Society for Engineering Education*, 2000.

R. Beichner, J. Saul, D. Deardorff, D. Abbott, and R. Allain, "Promoting collaborative groups in large enrollment courses." Submitted to the *Proceedings of the 2000 Annual meeting of the American Society for Engineering Education*, 2000.

Contributing author for NCSU student learning website: www.ncsu.edu/learn (1998-1999)

ACADEMIC PRESENTATIONS

M. Polimera, D. Deardorff, S. Washburn. “Improving teaching methodology for an electronics lab course” Presented at the online summer AAPT meeting (July 2021).

B. Levy, M. Sankaran, S. Brogan, R. Janssens, D. Deardorff. “Less is more: At-home interferometry in an undergraduate laboratory course.” Presented at the online summer AAPT meeting (July 2021).

D. Deardorff. “Success or failure in intro physics: which factors matter most?” Poster presented at the summer meeting (virtual) of the American Association of Physics Teachers (July 2020).

A. Churukian, D. Deardorff, L. McNeil, C. Wallace, D. Young. “A New IPLS Course: Five Years Later.” Invited talk at the summer meeting of the American Association of Physics Teachers, virtual meeting (July 2020).

D. Deardorff. “Analyzing Students’ Ability to Make and Report Accurate Measurements.” Contributed talk presented at the winter meeting of the American Association of Physics Teachers, Orlando, FL (January 2020).

D. Deardorff, J. Weinberg-Wolf. “Using Google Sheets for Shared Data Collection in Student Labs.” Contributed talk presented at the summer meeting of the American Association of Physics Teachers, Provo, UT (July 2019).

D. Deardorff, A. Churukian, C. Wallace, L. McNeil, D. Smith. “Physics Activities for the Life Sciences (PALS)” workshop presented at AAPT summer meetings (2017, 2018, 2019)

D. Deardorff, L. McNeil, A. Churukian, C. Wallace, D. Young. “Design, Implementation and Assessment of a New IPLS Course at UNC-CH.” Invited talk presented at the winter meeting of the American Association of Physics Teachers, Houston, TX (January 2019).

D. Deardorff, J. Weinberg-Wolf. Presentation on “Using Shared Data Collection in Large Classes” at CFE Faculty Showcase on Teaching, UNC-CH, Nov. 2, 2018.

A. Churukian, R. Henning, S. Jeglinski, D. Deardorff. “Special Relativity as Part of the First-Year Introductory Physics Course.” Poster presented at the summer meeting of the American Association of Physics Teachers, Washington, DC (July 2018).

M. Danis, D. Deardorff. “Students’ Understanding of ‘Instantaneous’ Acceleration.” Poster presented at the summer meeting of the American Association of Physics Teachers, Washington, DC (July 2018).

D. Deardorff, A. Churukian, C. Wallace, L. McNeil, D. Smith. “Setting the Academic Bar for IPLS Students.” Contributed talk presented at the summer meeting of the American Association of Physics Teachers, Cincinnati, OH (July 2017).

D. Deardorff. “Engaging Introductory Physics Students in Active Learning at UNC-CH” Invited talk to the science faculty at Thammasat University, Bangkok, Thailand (July 2017).

D. Deardorff, A. Churukian, L. McNeil. Panel discussion on “Coordinating Courses with Multiple Sections” at 6th annual CFE Faculty Showcase on Teaching, UNC-CH, March 24, 2017.

D. Deardorff. “Assessing Students’ Laboratory Skills in Introductory and Intermediate Physics Courses.” Contributed talk presented at the summer meeting of the American Association of Physics Teachers, Sacramento, CA (July 2016).

A. Churukian, D. Deardorff, D. Smith, C. Wallace, L. McNeil. “A New IPLS Course: From Design to Dissemination.” Contributed talk presented at the summer meeting of the American Association of Physics Teachers, Sacramento, CA (July 2016).

D. Deardorff, A. Churukian, D. Smith, C. Wallace, L. McNeil. “A New IPLS Course at UNC – Mechanics, Energy, Thermodynamics.” Poster presented at the summer meeting of the American Association of Physics Teachers, Sacramento, CA (July 2016).

A. Churukian, D. Deardorff, D. Smith, C. Wallace, L. McNeil. “A New IPLS Course at UNC – Fluids, E&M, Optics, Nuclear.” Poster presented at the summer meeting of the American Association of Physics Teachers, Sacramento, CA (July 2016).

D. Deardorff. “Engaging students in the classroom.” Invited talk to the physics faculty at Nelson Mandela Metropolitan University, Port Elizabeth, South Africa (August 2015).

D. Deardorff. “Increasing student learning of physics through interactive-engagement activities.” Invited talk at Fudan University, Shanghai, China (June 2015).

D. Deardorff. “Reforming physics teaching lab courses to improve student learning.” Invited talk at Shanghai Jiao Tong University, Shanghai, China (June 2015).

D. Deardorff. “Physics Laboratory Performance Assessment at UNC-CH.” Contributed talk presented at the winter meeting of the American Association of Physics Teachers, San Diego, CA (January 2015).

D. Deardorff. “Estimating Uncertainties Using Upper-Lower Bounds.” Contributed talk presented at the summer meeting of the American Association of Physics Teachers, Minneapolis, MN (July 2014).

D. Deardorff. “A Common ‘Cents’ Lab.” Invited talk at the summer meeting of the American Association of Physics Teachers, Portland, OR (July 2013).

D. Deardorff. “A Common ‘Cents’ Lab.” Contributed talk presented at the winter meeting of the American Association of Physics Teachers, New Orleans, LA (January 2013).

D. Deardorff & A. Churukian. “Implementing SCALE-UP in physics at UNC-CH” Poster presentation at the summer meeting of the American Association of Physics Teachers, Philadelphia, PA (July 2012).

R. Kendall & D. Deardorff. “Extreme Makeover: Carolina Classrooms Designed to Promote Active Learning.” Invited talk at UNC Faculty Showcase, Chapel Hill, NC (Nov. 2011).

D. Deardorff & A. Churukian. “Implementing SCALE-UP in physics at UNC-CH” Contributed talk presented at the spring meeting of the North Carolina Section of the American Association of Physics Teachers, Wake Tech Community College, Raleigh, NC (March 2011).

D. Deardorff. “The Art of Teaching Physics with Juggling and Balance.” Contributed talk presented at the summer meeting of the American Association of Physics Teachers, Portland, OR (July 2010).

D. Deardorff & A. Churukian. “Hands-on Physics Demonstrations” Workshop presented at the spring meeting of the North Carolina Section of the American Association of Physics Teachers, Elon Univ, NC. (April 2010).

D. Deardorff. “Climate Leadership and Energy Awareness Program at UNC-CH.” Poster presented at the spring meeting of the North Carolina Section of the American Association of Physics Teachers, Elon Univ, NC. (April 2010) – Awarded Best Pedagogical Paper.

D. Deardorff, R. Saha. “WebLabs - a way to submit lab reports online.” Poster presented at the winter meeting of the American Association of Physics Teachers, Washington, D.C (Feb. 2010).

D. Deardorff. “Climate Leadership and Energy Awareness Program at UNC-CH.” Poster presented at the summer meeting of the American Association of Physics Teachers, Ann Arbor, MI. (July 2009).

D. Deardorff., R. Henshaw. “Tablet PC Use for Online Tutoring and Other Course Activities.” Invited talk at winter meeting of the American Association of Physics Teachers, Chicago, IL. (February 2009).

R. Henshaw, D. Deardorff. “Online Office Hours and Review Sessions.” A Teaching with Technology workshop sponsored by the Center for Faculty Excellence and ITS at the University of North Carolina at Chapel Hill (Nov. 12, 2008).

D. Deardorff, R. Henshaw. “Online Tutoring Using Tablet PCs and DyKnow.” Educational technology demonstration poster presented at the summer meeting of the American Association of Physics Teachers, Edmonton, Canada (July 2008)

D. Deardorff, R. Henshaw, B. Shryock, P. Carr. “Online Tutoring for STEM disciplines.” Panel presentation at UNC-Teaching and Learning with Technology Conference, Raleigh, NC. (March 2008)

R. Beichner, J. Saul, D. Abbott, J. Morse, D. Deardorff, R. Allain, S. Bonham, M. Dancy, J. Risley. “The Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) Project.” J. Research-based Reform of University Physics (2007), Vol.1, pp. 2-39.

D. Deardorff, R. Saha. “WebLabs: a new way to submit lab reports.” Poster presented at the summer meeting of the American Association of Physics Teachers, Greensboro, NC (July 2007)

D. Deardorff, L. McNeil, L. Rowan. “Transforming Introductory Physics at a Large Research University.” Poster presented at the summer meeting of the American Association of Physics Teachers, Greensboro, NC (July 2007)

D. Deardorff. “Carolina Physics on the Road (CPR)” Poster presented at the summer meeting of the American Association of Physics Teachers, Salt Lake City, UT (July 2005)

D. Deardorff. “Low-cost Magnetic Field Gauge” Poster presented at the summer meeting of the American Association of Physics Teachers, Salt Lake City, UT (July 2005)

D. Deardorff. “Laboratory Performance Assessment.” Invited talk presented at the winter meeting of the American Association of Physics Teachers, Albuquerque, NM. (January 2005)

D. Deardorff. “Use of a Hands-on Lab Exam to Investigate How Physics Students Transfer Knowledge from Lecture to Laboratory.” Poster paper presented at the Physics Education Research Conference, Sacramento, CA. (August 2004)

D. Deardorff. "Using a physics lab exam to assess student performance." Contributed paper presented at the summer meeting of the American Association of Physics Teachers, Sacramento, CA. (August 2004)

D. Deardorff. "How accurate are the measuring devices in an introductory physics lab?" Contributed paper presented at the spring meeting of the North Carolina Section of the American Association of Physics Teachers, Raleigh, NC. (March 2004) – Awarded "Best Pedagogical Paper"

D. Deardorff. "Reporting measurement uncertainties according to the ISO GUM." Contributed paper presented at the summer meeting of the American Association of Physics Teachers, Madison, WI. (August 2003)

D. Deardorff. "Reporting measurement uncertainties according to the ISO GUM." Contributed paper presented at the fall meeting of the North Carolina Section of the American Association of Physics Teachers, Asheville, NC. (November 2002)

D. Deardorff & D. Abbott. "Laboratory Performance Assessment." Contributed paper presented at the winter meeting of the American Association of Physics Teachers, Philadelphia, PA. (January 2002)

D. Deardorff & R. Beichner. "An assessment of introductory physics students' treatment of measurement uncertainty." Contributed paper presented at the summer meeting of the American Association of Physics Teachers, Rochester, NY. (July 2001)

S. Bonham, R. Beichner, D. Deardorff. "Online homework: Does it make a difference?" *The Physics Teacher*, Vol 39, Issue 5, pp. 293. (May 2001)

R. Allain, D. Deardorff, R. Beichner. "Using Peer Evaluation to Enhance Student Writings." Contributed paper presented at the winter meeting of the American Association of Physics Teachers, Orlando, FL. (July 2001)

D. Deardorff. "Conceptual Difficulties with Measurement" Invited speaker at Physics Education Research Seminar, University of Maryland, November 2, 2000.

S. Bonham, D. Deardorff. "Man vs. machine: homework and feedback in introductory physics." Contributed paper presented at the Southeastern Section of the American Physical Society, Chapel Hill, NC. (November 1999)

D. Deardorff & R. Beichner. "How much do students really learn from physics labs?" Contributed paper presented at the fall meeting of the North Carolina Section of the American Association of Physics Teachers, Boone, NC. (October 1999)

D. Deardorff & R. Beichner. "An assessment of introductory physics students' understanding of measurement uncertainty." Contributed paper presented at the summer meeting of the American Association of Physics Teachers, San Antonio, TX. (August 1999)

S. Bonham & D. Deardorff. "A comparison of computer-based and paper-based homework." Contributed paper presented at the summer meeting of the American Association of Physics Teachers, San Antonio, TX. (August 1999)

J. Saul, D. Abbott, R. Allain, M. Dancy, D. Deardorff. "Evaluation of PER-based group activities in large lecture classes: lessons from the SCALE-UP project." Contributed paper presented at the summer meeting of the American Association of Physics Teachers, San Antonio, TX. (August 1999)

D. Deardorff & R. Beichner. "Differences among experts regarding the expression of measurement uncertainty." Contributed paper presented at the spring meeting of the North Carolina Section of the American Association of Physics Teachers, Winston-Salem, NC. (April 1999). Awarded best graduate student paper presentation.

D. Deardorff & R. Beichner. "Differences among experts regarding the expression of measurement uncertainty." Contributed paper presented at the Centennial American Physical Society meeting, Atlanta, GA. (March 1999)

D. Deardorff & R. Beichner. "Assessing students' understanding of measurement uncertainty and error analysis: A comparison between Japanese and American students." Contributed paper presented at the winter meeting of the American Association of Physics Teachers, Anaheim, CA. (January 1999)

D. Deardorff. "Insights into Japanese students' conceptions about measurement uncertainty." Presented to the NCSU Physics Education Research Group. (September, 1998)

D. Deardorff. "Interactive teaching methods in introductory physics classes at NCSU." Invited colloquium presented to Japanese professors. University of Hokkaido, Sapporo, Japan. (July 1998)

D. Deardorff & R. Beichner. "Assessing students' understanding of uncertainty and error analysis in introductory physics laboratory measurements." Contributed paper presented at the winter meeting of the American Association of Physics Teachers, New Orleans, LA. (January 1998)

R. Beichner, D. Deardorff, B. Zhang. "GOAL: a research-based problem-solving protocol." Contributed paper presented at the winter meeting of the American Association of Physics Teachers, New Orleans, LA. (January 1998)

D. Deardorff & R. Beichner. "Assessing students' understanding of uncertainty and error analysis in introductory physics laboratory measurements." Contributed paper presented at the fall meeting of the North Carolina Section of the American Association of Physics Teachers, Hickory, NC. (October 1997). Awarded best graduate student paper presentation.

D. Deardorff, R. Beichner, & B. Zhang. "GOAL-oriented problem solving," Contributed paper presented at the spring meeting of the North Carolina Section of the American Association of Physics Teachers, Wilmington, NC. (March 1997)

HONORS

World Record for Galilean Cannon – Highest launch set on March 6, 2020 with NC Science Festival at UNC-CH. (2020)

<https://www.guinnessworldrecords.com/world-records/428375-highest-launch-from-a-galilean-cannon>

UNC Student Undergraduate Teaching Award – one of 4 faculty campus wide selected entirely by undergraduate students to be recognized for "demonstrated excellence in service, dedication to undergraduate students, and in positively affecting a broad spectrum of Carolina undergraduate students." \$1000. (2009)

AAPT Apparatus Competition. Received national award for design of a Low Cost Manometer for Measuring Lung Pressure. (2003)

Hewlett Fellow – 1 of 25 NC State University graduate students selected to attend workshops and seminars to promote inquiry-guided instruction and active learning in general education courses. http://www2.ncsu.edu/unity/lockers/project/acad_proj/hewlett/index.html (1998-1999)

Preparing the Professoriate – 1 of 10 graduate students selected university-wide for a mentoring program that pairs graduate students with faculty role-models for a one-year period. This competitive program included a \$2k stipend. (1998-1999)

NCSU Outstanding Teaching Assistant Award – University-wide award granted to top 10% of graduate teaching assistants. (1995, 1998)

American Association of Physics Teachers Outstanding TA Award – National award: 1 per physics department at universities nationwide. (1995)

Best Graduate Student Paper Presentation – North Carolina Section of the American Association of Physics Teachers. (October 1997, April 1999)

GRANTS

Growth Mindset Grant – Co-PI on \$5k grant to promote and assess growth mindset in summer physics courses at UNC-CH. (2016)

NSF TUES grant for new IPLS course – Co-PI on \$500k grant to reform the UNC-CH introductory course sequence for life science majors into a Lecture/Studio format with a strong biological focus. Assisted with the development and implementation of the new curriculum. (2013 – 2017)

Carolina Physics on the Road (CPR). \$10,000 grant from the American Physical Society to develop and enhance physics outreach programs for the World Year of Physics. (2005)

UNC/IBM Instructional Technology Enhancement Grant - \$2500 award to develop and implement instructional technology in undergraduate courses at UNC-CH. (2001)

UNC/IBM General College Curriculum Technology Enhancement Grant - \$2000 award to promote effective use of technology in classes for first-year undergraduates who are required to own laptop computers as part of the Carolina Computing Initiative with IBM. (2000)

NSF Dissertation Enhancement Grant for Collaborative Research in Japan and Korea - \$7,375 award for “Comparative analysis between Japanese and American students’ understanding of measurement uncertainty.” (1998)

PROFESSIONAL SERVICE

National Leadership and Service:

Member of Advanced Placement (AP) Higher Education Advisory Committee – (2022-2025)

Member of National Laboratory Goals Committee – Contributed to document for AAPT. (2014)
https://www.aapt.org/resources/upload/labguidelinesdocument_ebendorsed_nov10.pdf

Committee on Laboratories in the American Association of Physics Teachers.

Served as elected member to this national committee. (2003 – 2006)

Service to the College of Arts and Sciences at UNC-CH:

Member of Curriculum Revision Working Group – one of 9 faculty selected to gather input and evaluate the general education curriculum for undergraduate students at UNC-CH. (2016 – 2019)
<https://college.unc.edu/2019/04/new-gen-ed-curriculum/>

Invited Member of UNC Classroom Innovation Subcommittee that advises the Classroom Policy Steering Committee. (2011 – 2021)

Mentor for Carolina Covenant Scholars program (2015 – present)

Committee Positions in the Dept. of Physics and Astronomy at UNC-CH:

Chair of Introductory Physics Oversight Committee (2021 – present, Member since 2015)

Chair of K-12 Outreach Committee (2010 – 2019, Member since 2000)

Ex Officio Member of Graduate Admissions Committee – Interview prospective international graduate student candidates to assess English language proficiency. (2002 – present)

Member of Awards Committee (2012 – present)

Member of Diversity Committee (2014 – 2017)

AAPT Liaison (2012 – 2017)

Member of Graduate Affairs and Studies Committee (2012 – 2016, 2019 - present)

Member of Graduate Recruiting Committee (2014 – 2016)

Member of Undergraduate Affairs and Studies Committee (2001 – 2015)

Member of Introductory Physics Transformation Committee (2011 – 2015)

Member of Computing Committee (2000 – 2008)

Other Leadership and Service:

Physics Tutorial Center – Created (with no additional department funds) a walk-in resource center that is freely available to introductory physics students at UNC. (2000 – present)

Supplemental Instruction (SI) - Coordinated with UNC Learning Center to provide Supplemental Instruction for Physics 100, 104, and 105. (2004 – present)

WebAssign – collaborated on implementation of online program for submission and grading of lab reports for Physics 104 and 105 labs to improve student learning and save ~\$50k/year in dept. TA support. (2011 - 2014)

Project Consultant for Morehead Planetarium and Science Center – *Science Live!* shows, special events, summer camps. (2001 – present)

Instructor and Consultant for Climate LEAP (Leadership and Energy Awareness Program) – One-week summer institute for local high school students. (2009 – present)

Initiated and facilitated use of class response systems in UNC Dept. of Physics and Astronomy

Head Teaching Assistant (TA). Managed day-to-day operation of all general NCSU undergraduate physics labs that annually service 3000 students. Trained and supervised 30 other physics lab teaching assistants. Arranged make-up labs for students. Set up, maintained, and repaired lab equipment. (August 1996 – January 1998)

TA Training Program. Voluntarily initiated and implemented a weekly training program for new physics teaching assistants at NCSU. Assessed teaching effectiveness through a video-taping project and individual evaluation materials. Inspired by Teaching Effectiveness workshops led by Dr. Richard Felder and Dr. Rebecca Brent. (1996 – 1997)

Member of Ad-hoc Lab Instruction and TA Assignment Evaluation Committee. Reviewed condition and direction of general physics lab program at NCSU. (Spring 1997)

Member of Physics Graduate Student Recruiting Committee. (Spring 1996)

President of NCSU Graduate Physics Student Association. Facilitated improvement of graduate student office and social environment: new computer network, resource library, and furnishings. Communicated with graduate students via e-mail and meetings. Helped organize and present new student orientation. (Summer 1994 – Fall 1995)

Representative of NCSU Graduate Student Association. (Summer 1994 – Fall 1995)

PROFESSIONAL MEMBERSHIP

American Association of Physics Teachers (AAPT)

American Physics Society (APS)

Sigma Pi Sigma (National Physics Honor Society)

North Carolina Section of American Association of Physics Teachers (NCS-AAPT)

OTHER WORK EXPERIENCE

Environmental Scientist. Triad Engineering, Harrisonburg, VA.

Investigated contamination from petroleum underground storage tanks, performed field testing and risk analysis, wrote reports to state Water Board. (1991– 1993)

Professional Juggler. Presented hundreds of performances and workshops for schools, libraries, civic organizations, company parties, sports events, festivals, and conferences. (1983 – present)