

Curriculum Vitae

Paul D. Beale

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SPOUSE Erika A. Gulyas

EDUCATION Ph.D., Cornell University, 1982 (Physics)
 B.S. (with highest honors), University of North Carolina
 at Chapel Hill, 1977 (Physics)

PRESENT POSITION Professor, Department of Physics
 Director, Buffalo Bicycle Classic
 University of Colorado Boulder

Employment History

1997-present Professor, Department of Physics, University of Colorado Boulder
1991-1997 Associate Professor, Department of Physics, University of Colorado Boulder
1984-1991 Assistant Professor, Department of Physics, University of Colorado Boulder
1982-1984 Postdoctoral Research Associate, Department of Theoretical Physics, Oxford University
1977-1982 Graduate teaching and research assistant, Department of Physics, Cornell University
1976-1977 Undergraduate research assistant, Department of Physics, University of
 North Carolina at Chapel Hill

Research Interests

Theoretical physics, statistical mechanics, phase transitions, critical and multicritical phenomena, renormalization group, phenomenological finite-size scaling, commensurate-incommensurate phase transitions, switching and fatigue in thin-film ferroelectrics, failure modes in random materials, exact solutions of the two-dimensional Ising model, solid-liquid transitions in systems of small molecules, thermodynamic integration methods and their applications to equilibrium solids and grain boundary kinetics, liquid crystal phase transitions, phase transitions in systems of molecular dipoles, scalable parallel pseudorandom number generators, use of quantum randomness in cryptographically secure pseudorandom number generators.

Honors Thesis: *Experimental Study of the Kondo Effect in $Au_xAg_{1-x}(Mn)$* , (earned highest honors). Thesis Advisor: Professor Louis D. Roberts.

Ph.D. Thesis: *Theory of Structural Phase Transitions*, Thesis Advisor: Professor James A. Krumhansl.

Honors and Awards

2004 Boulder Faculty Assembly Excellence in Teaching Award

2004 CU-Boulder Residence Life Academic Teaching Award

2004 President's Teaching with Technology Award: Boulder Campus nominee (with Steven Pollock and Michael Dubson)

Books published and under contract

Statistical Mechanics, Third Edition, R.K. Pathria and Paul D. Beale, (Academic, Boston, 2011).

Statistical Mechanics, Third Edition, second printing, R.K. Pathria and Paul D. Beale, (Academic, Boston, 2015).

Instructor's Manual to Statistical Mechanics, Third Edition, R. K. Pathria and Paul D. Beale, (Academic, Boston, 2011).

Statistical Mechanics, Fourth Edition, R.K. Pathria and Paul D. Beale (Academic, Boston, 2021).

Instructor's Manual to Statistical Mechanics, Fourth Edition, R. K. Pathria and Paul D. Beale, (Academic, Boston, 2021).

The Two-Dimensional Ising Model, Paul D. Beale, (under contract with World Scientific).

Research Publications

1. Paul D. Beale, S. Sarker and J.A. Krumhansl, "Renormalization-group study of crossover in structural phase transitions," *Physical Review B* 24, 266 (1981).
2. Paul D. Beale, "Critical and crossover behavior of the two-dimensional ϕ^4 model on a lattice," *Physical Review B* 24, 6711 (1981).
3. G.A. Baker, Jr., A.R. Bishop, K. Fesser, Paul D. Beale and J.A. Krumhansl, "Critical and crossover behavior of the double gaussian model," *Physical Review B* 26, 2596 (1982).
4. C.J. Lambert, Paul D. Beale and M.F. Thorpe, "Phase correlations and metastability in a one-dimensional solid," *Physical Review B* 27, 5860 (1983).
5. Paul D. Beale, "Probability density function of the double gaussian model," *Physical Review B* 27, 5804 (1983).
6. Paul D. Beale, "Criticality and crossover in structural phase transitions," in *Multicritical Phenomena* : eds. R. Pynn and A. Skjeltorp, (Plenum, New York, 1984).
7. P.M. Duxbury, J. Yeomans and Paul D. Beale, "Wavevector scaling and the phase diagram of the chiral clock model," *Journal of Physics A* 17, L179 (1984).
8. Paul D. Beale, "Finite-size scaling at an Ising tricritical point," *Journal of Physics A* 17, L335 (1984).
9. Paul D. Beale, P.M. Duxbury and J.M. Yeomans, "Finite-size scaling of the two-dimensional axial next-nearest neighbor Ising model," *Physical Review B* 31, 7166 (1985).
10. Paul D. Beale, "Finite-size scaling of the two dimensional Blume-Capel model," *Physical Review B* 33, 1717 (1986).
11. Y. Tang, Paul D. Beale, R.C. Mockler and W.J. O'Sullivan, "Observation of a correlation-length finite-size effect in Rayleigh scattering from thin critical fluid films," *Physical Review Letters* 56, 480 (1986).
12. G.N. Hassold, J.F. Dreitlein, Paul D. Beale and J.F. Scott, "Dynamics of the two-dimensional axial third-nearest-neighbor Ising model: entrainment and diffusivity," *Physical Review B* 33, 3581 (1986).
13. P.M. Duxbury, Paul D. Beale and P.L. Leath, "Size effects of breakdown in quenched random media," *Physical Review Letters* 57, 1052 (1986).

14. P.M. Duxbury, P.L. Leath and Paul D. Beale, "The breakdown properties of quenched random systems - the random fuse network," *Physical Review B* 36, 367-380 (1987).

15. Paul D. Beale, "Two-dimensional models of commensurate-incommensurate phase transitions," in *Incommensurate Crystals, Liquid Crystals and Quasi-crystals*, eds. J.F. Scott and N.A. Clark, pp. 55-61 (Plenum, New York, 1987).

16. Paul D. Beale and P.M. Duxbury, "Theory of dielectric breakdown in metal-loaded dielectrics," in *Time- Dependent Effects in Disordered Materials*, eds. R. Pynn and T. Riste, pp. 103-106 (Plenum, New York, 1987).

17. Paul D. Beale and P.M. Duxbury, "Dielectric breakdown in metal-loaded dielectrics," *Physical Review B* 37, 2785-2791 (1988).

18. Paul D. Beale and D.J. Srolovitz, "Elastic fracture in random materials," *Physical Review B* 37, 5500-5507 (1988).

19. Paul D. Beale, J.F. Scott, M.-S. Zhang, Z. Chen, G. Hu, X. Jin, H. Shao, G. Wang and J. Zhao, "Raman Spectroscopic Study of High-Tc Superconductors $\text{YBa}_2\text{Cu}_{1-x}\text{Sn}_x\text{O}_{7-y}$," *Solid State Communications* 65, 1145-1147 (1988).

20. D.J. Srolovitz and Paul D. Beale, "A computer simulation of failure in an elastic model with randomly distributed defects," *Journal of the American Ceramics Society* 71, 362-369 (1988).

21. J.F. Scott, H.M. Duiker, Paul D. Beale, B. Pouligny, K. Dimmler, M. Parris, D. Butler and S. Eaton, "Properties of ceramic KNO_3 thin film memories," *Physica B* 150, 160-167 (1988).

22. Paul D. Beale, "Noise-induced escape from attractors in one-dimensional maps," *Physical Review A* 40, 3998-4003 (1989).

23. Mark F. Gyure and Paul D. Beale, "Dielectric breakdown in a random array of conducting cylinders," *Physical Review B* 40, 9533-9540 (1989).

24. H.M. Duiker and Paul D. Beale, "Grain-size effects in ferroelectric switching," *Physical Review B* 41, 490-495 (1990).

25. Matthew A. Glaser, Noel A. Clark, Allen J. Armstrong and Paul D. Beale, "Geometrical Quasiparticle Condensation Model of Melting in Two Dimensions," in the Proceedings of the 4th Nishinomiya-Yukawa Memorial Symposium "Dynamics and Patterns in Complex Fluids: New Aspects of the Physics-Chemistry Interface" (1990).

26. Mark F. Gyure and Paul D. Beale, "Modeling of Dielectric Breakdown in Metal- Loaded Dielectrics: Theory" in the proceedings of the Joint Army, Navy, NASA, Air Force (JANNAF) Propulsion Systems Hazards Subcommittee Meeting at the Johns Hopkins Applied Physics Laboratory in Laurel, Maryland, April 3-5. 1990.

27. Paul D. Beale and Mark F. Gyure, "Modeling of Dielectric Breakdown in Metal- Loaded Dielectrics: Applications," in the proceedings of the Joint Army, Navy, NASA, Air Force (JANNAF) Propulsion Systems Hazards Subcommittee Meeting at the Johns Hopkins Applied Physics Laboratory in Laurel, Maryland, April 3-5. (1990).

28. P.M. Duxbury, Paul D. Beale, H. Bak and P.A. Schroeder, "Capacitance and Dielectric Breakdown of Metal-Loaded Dielectrics," *Journal of Physics D, Applied Physics* 23, 1546-1553 (1990).

29. H.M. Duiker, Paul D. Beale, J.F. Scott, C.A. Paz de Araujo, B.M. Melnick, J.D. Cuchiaro, and L.D. McMillan, "Fatigue and Switching in Ferroelectric Memories: Theory and Experiment," *Journal of Applied Physics* **68**, 5783 (1990).
30. Paul D. Beale and H.M. Duiker, "Grain-size effects in ferroelectric switching," in the conference proceedings of the First USA-USSR Seminar on Ferroelectricity, *Ferroelectrics* **117**, 165-170 (1991).
31. Paul D. Beale and H.M. Duiker, "Microscopic Modeling of Thin-Film Ferroelectrics: Fatigue," *Ferroelectrics* **116**, 111-116 (1991).
32. Shou-Jong Sheih, Paul D. Beale, Ting Chen and J.F. Scott, "Thermal Focusing in Ferroelectrics Near T_c : Effect of Conjugate Electric Fields," *Ferroelectrics* **123**, 1-10 (1991).
33. Mark F. Gyure and Paul D. Beale, "Dielectric Breakdown in Continuous Models of Metal-Loaded Dielectrics," *Physical Review B* **46**, 3736-3746 (1992).
34. D.C. Parks, N.A. Clark, D.M. Walba, and Paul D. Beale, "Scanning Tunneling Microscopy of Coexisting 2D Crystalline and 1D Stacking-Disordered Phases at the Chiral- Liquid-Crystal-Graphite Interface," *Physical Review Letters*, **70**, 607-610 (1993).
35. Paul D. Beale, "Comparison of Classical Nucleation Theories with Monte Carlo Simulations of Ising Models," *Integrated Ferroelectrics* **4**, 107-111 (1994).
36. P.M. Duxbury, Paul D. Beale and C. Moukarzel, "Breakdown of Two-Phase Random Resistor Networks," *Physical Review B* **51**, 3476-3488 (1995).
37. Valeriy V. Ginsburg, Paul D. Beale, and Noel A. Clark, "Scaling Theory of Particle Annihilation in Systems with a Long-Range Interaction," *Physical Rev E* **52**, 2583 (1995).
38. Paul D. Beale, "Exact Distribution of Energies in the Two-Dimensional Ising Model," *Physical Review Letters* **76**, 78-81 (1996).
39. L.S. Kirschenbaum, C.T. Rogers, Paul D. Beale, S.E. Russek, and S.C. Sanders, "Bias current dependent resistance peaks in NiFe/Ag giant magnetoresistance multilayers," *Applied Physics Letters* **68**, 3099 (1996).
40. L.S. Kirschenbaum, C.T. Rogers, Paul D. Beale, S.E. Russek, and S.C. Sanders, "High current density self-field effects and low frequency noise in NiFe/Ag GMR multilayers," *IEEE Transactions on Magnetism* **32**, 4684-4686 (1996).
41. C.T. Rogers, L.S. Kirschenbaum, Paul D. Beale, S.E. Russek, and S.C. Sanders, "Observation of a fluctuation-enhanced magneto-resistance in $\text{Ni}_{81}\text{Fe}_{19}/\text{Ag}$ multilayers at high current density," *Physical Review B Rapid Communications* **56** R8503-8506 (1997).
42. Jon T. Moore, Paul D. Beale, Thomas A. Winningham, and Kenneth Douglas, "Controlled Morphology of Biologically Derived Metal Nanopatterns" *Applied Physics Letters*, **71**, 1264-1266 (1997).
43. Uwe B. Sleytr, et. al. (23 authors including Paul D. Beale, Noel A. Clark, Kenneth Douglas, Jon T. Moore and Thomas A. Winningham from CU), "Applications of S-Layers," *FEMS (Federation of European Microbiological Societies) Microbiology Reviews* **20** 151-175 (1997).
44. J.T. Moore, Paul D. Beale, T.A. Winningham, and K. Douglas, "Creation of Nanometer Scale Patterns With Selected Metal Films," *Applied Physics Letters* **72**, 1840 (1998).
45. S. C. Gay, P. D. Beale, J. C. Rainwater, "Solid-Liquid Equilibrium of Dipolar Heteronuclear Hard

Dumbbells in a Generalized van der Waals Theory: Application to Methyl Chloride,” *Journal of Chemical Physics*, 109, 6820-6827 (1998).

46. S. C. Gay, P. D. Beale, J. C. Rainwater, “Solid-Fluid Phase Coexistence of Hard Heteronuclear Dumbbells via Cell Theory and Monte Carlo Simulation,” *International Journal of Thermophysics*, 19 1535-1544 (1998).

47. S. C. Gay, P. D. Beale, J. C. Rainwater, “Thermodynamic perturbation theory applied to the dipolar heteronuclear dumbbell fluid,” *Molecular Physics*, 96, 301-308 (1999).

48. S. C. Gay, J. C. Rainwater, Paul D. Beale, “Two Dimensional Hard Dumbbells.; I. Fluctuating Cell Model,” *Journal of Chemical Physics*, 112, 9841-9848 (2000).

49. S. C. Gay, J. C. Rainwater, Paul D. Beale, “Two Dimensional Hard Dumbbells.; II. Pressure in terms of Free Volumes and Surfaces.,” *Journal of Chemical Physics*, 112, 9849-9859 (2000).

50. Paul D Beale, “Acoustic Crystal Thermodynamic Integration Method,” *Physical Review E* 66, 036132-036139 (2002).

51. Steven A. Kadlec, Paul D. Beale and James Rainwater, “Three-Dimensional Hard Dumbbell Solid Free Energy Calculation Via the Fluctuating Cell Model,” *Proceedings of the Fifteenth Symposium on Thermophysical Properties*, published in the *International Journal of Thermophysics*, 25 1415-1427 (2004).

52. Mark T. Lusk and Paul D. Beale, “Grain Boundary Free Energy in an Assembly of Elastic Disks,” *Physical Review E*, 69, 026117-026727 (2004).

53. Mark T. Lusk, Michael R. Fellingner and Paul D. Beale, “Grain boundary free energy of hard disk assemblies under constant volume via thermodynamic integration,” *Journal of Chemical Physics*, 124 064707-064716 (2006).

54. Merrill Lessley and Paul D. Beale, “Projecting Mathematical Curves with Laser Light,” *Bridges Leeuwarden Mathematical Connections in Art, Music, and Science*, *Proceedings* 483-484 (2008).

55. Steve Goldhaber, Steven J. Pollock, Michael Dubson, Paul D. Beale and Katherine K. Perkins, “Transforming Upper-Division Quantum Mechanics: Learning Goals and Their Assessment” *Proceedings of the Physics Education Research Conference*, AIP Conference Proceedings Volume 1179, Eds: Mel Sabella, Charles Henderson, Chandralekha Singh (2009)

56. Stephanie V. Chasteen, Katherine K. Perkins, Paul D. Beale, Steven J. Pollock, Carl E. Wieman, “A Thoughtful Approach to Instruction: Course transformation for the rest of us,” *Journal of College Science Teaching*, vol 40, no. 4, 24-30 (2011).

57. Zachary V. Kost-Smith, Paul D. Beale, Noel A. Clark, and Matthew A. Glaser, “Microscopic origins of first-order Sm-A–Sm-C phase behavior in de Vries smectic liquid crystals,” *Phys. Rev. E* 87, 050502(R)-050507(R) (2013).

58. Paul D. Beale, <http://oeis.org/A211395>, “Number of Sophie Germain primes between 2^n and $2^{(n+1)}$ ” *The On-Line Encyclopedia of Integer Sequences*, added terms a(29)-a(36), (2014)

59. Paul D. Beale, <http://oeis.org/A211397>, “Number of Sophie Germain primes less than 2^n ” *On-Line Encyclopedia of Integer Sequences*, added terms a(30)-a(37), (2014).

60. Paul D. Beale, “A new class of scalable parallel pseudorandom number generators based on Pohlig-Hellman exponentiation ciphers,” (2016) <http://arxiv.org/abs/1411.2484>

61. Jirí Kaleta, Guillaume Bastien, Martin Dravínský, Edward Tortorici, Jin Wen, Ivana Císaková, Paul D. Beale, Charles T. Rogers, and Josef Michl, "Bulk Inclusions of Double Pyridazine Molecular Rotors in Hexagonal Tris(o-phenylene) cyclotriphosphazene (TPP)", J. Organic Chem.. 84 (13) 8449-8467 (2019).

62. Jetanat Datephanyawat and Paul D. Beale, "Class of scalable parallel and vectorizable pseudorandom number generators based on non-cryptographic RSA exponentiation ciphers," under review at Physical Review E, <https://arxiv.org/abs/1811.11629> (2021).

Papers with 20 or more citations (Google Scholar) (2021)

Paper Number	Times Cited	Paper Number	Times Cited	Paper Number	Times Cited
29	584	22	73	33	21
14	333	7	52	28	21
13	302	9	50	45	20
38	245	55	48	42	20
21	215	33	47	44	20
18	212	36	41		
24	193	20	36		
17	140	1	33		
10	115	23	28		
56	91	34	23		

Total Citations: 3,155 h-index: 21

Other Published Work

1. R.W. Larson, Paul D. Beale, J.D. Curry, F. Eriksen, M.F. Frisoni, and M.F. Gyure, "Microstructural Modeling of Electrical Breakdown in Solid Fuel Propellants," ELECTRO MAGNETIC APPLICATIONS Inc., Final Report ADA263466 (1993).

Current Contracts and Grants

"Professional Research Experience Program (PREP)," PI John P. Cumalat, co-PI Paul D. Beale. Five-year grant from the Department of Commerce with a total budget of \$75,876,832. The new PREP partnership between NIST on the NIST Boulder Campus and the University of Colorado Boulder (UCB), funds CU undergraduate and graduate students, NIST postdocs, and post-bachelor technicians. The period of grant is 2/1/2018-1/31/2023, with a Year 1 budget of \$14,002,281.

Pending Contracts and Grants

Previous Contracts and Grants

"A quantum randomness beacon," PI Krister Shalm, co-PI's Katherine Stange and Paul D. Beale, seed grant from RIO Quantum Explorations in Science & Technology (QuEST) Research. Budget: \$71,817 for graduate student and computer hardware. (2018-2020)

"Dipolar Molecular Rotors in Surface and Bulk Inclusion Compounds," PI's Charles T. Rogers and Paul D. Beale. Funded: \$380,127 total, \$17,899 to Beale, for the period September 1, 2014 through August 31, 2017.

"Professional Research Experience Program (PREP)," PI John P. Cumalat, co-PI Paul D. Beale. The PREP partnership between NIST on the NIST Boulder Campus and the University of Colorado Boulder (UCB), and funds CU graduate students and NIST postdocs. PREP is a five-year grant from the Department of

Commerce (11/1/2012 – 1/31/2018) with an annual budget of \$12M, John Cumalat took over as PI, and Paul Beale as co-PI in 2017.

“Developing research-based Tutorials in Upper-division Electricity and Magnetism,” PI - Steven J. Pollock, co-PIs - Katherine K. Perkins, Michael A. Dubson, Paul D. Beale. Funded: \$530,906 for the period September 15, 2010 through August 31, 2013.

“Using a Research-based Approach to Reform Upper-division Laboratory Courses,” PI: Heather J. Lewandowski, co-PIs: Katherine K. Perkins, Noah D. Finkelstein, and Paul D. Beale. Funded: \$199,747 for the period May 1, 2011 through April 30, 2013.

“Theoretical and Experimental Studies of Ferroelectric Thin Films,” Principal Investigators: J.F. Scott and Paul D. Beale, Funded: \$90,000 per year for the period 11/15/1986-7/14/1993.

“Effects of Noise on Dynamical Systems,” Principal Investigators Paul D. Beale and Colin J. Lambert, NATO research collaborative travel grant, funded for the period November 1992 - October 1994.

“Dielectric Breakdown and Electrostatic Discharge in Solid Fuel Rocket Propellants,” funded at \$120,000 per year by the Army Research Office for the period 8/15/1987 - 8/14/1990 to Electromagnetic Applications (EMA), a Denver based consulting firm. I was one the primary authors of the proposal.

“Elastic Fracture Mechanics of Elastomeric Composites”, Principal Investigator: Paul D. Beale, a seed grant of \$5000 for the period 4/1/89-3/30/90 funded by the Advanced Materials Institute at Colorado School of Mines.

“Statics and Dynamics of Modulated Bulk and Surface Structures,” Principal Investigators, Paul D. Beale, P.M. Duxbury and J.M. Yeomans, NATO research collaborative travel grant, funded for the period 1/1/1987-12/31/1988.

Teaching since 2000

Date	Course	Enrollment	FCQ (Course/ Instructor)
Spring 2000	PHYS-1110-100 General Physics 1	202	B/B+
	PHYS-1110-200 General Physics 1	226	B/B+
Fall 2001	PHYS-1110-100 General Physics 1	237	B/B+
	PHYS-1110-200 General Physics 1	235	B/B+
Spring 2002	PHYS 7440 Solid State Theory	13	A+/A+
Summer 2002	PHYS-1120 General Physics 2	52	B+/A
Fall 2002	PHYS-1120-100 General Physics 2	211	B/B+
	PHYS-1120-200 General Physics 2	161	B/B+
Spring 2003	PHYS 7230 Statistical Mechanics	45	B/B+
Summer 2003	PHYS-1120 General Physics 2	66	B/B+
Fall 2003	PHYS 2010-100 – General Physics 1	311	B/B+
	PHYS 2010-200 – General Physics 1	197	B/A
	HONR-2500 – Honors Modern Physics for Nonscientists	16	A/A+
Spring 2004	PHYS 7230 Statistical Mechanics	38	B+/B+
Fall 2004	PHYS 2010-100 – General Physics 1	311	B/B+
	PHYS 2010-200 – General Physics 1	147	B+/A
Spring 2005	PHYS 2020-100 – General Physics 2	232	B+/A-
	PHYS 2020-100 – General Physics 2	190	B/A-
Fall 2005	HONR 2500-880-Honors Modern Physics for Nonscientists	12	5.1/6.0 5.6/6.0

Spring 2006	PHYS 4320-001 Thermodynamics and Statistical Mechanics	13	5.2/6.0 5.7/6.0
Spring 2007	PHYS 7230-001 Statistical Mechanics	29	5.5/6.0 5.8/6.0
Spring 2008	PHYS 7230-001 Statistical Mechanics	24	5.4/6.0 5.6/6.0
Fall 2008	HONR 1001-887 PHYS110 honors co-seminar	13	4.7/6.0 5.1/6.0
Fall 2009	PHYS 4610/4620/4630 Honors Thesis	22	5.5/6.0 5.7/6.0
Spring 2010	PHYS 1120-800: Honors General Physics 2	16	5.8/6.0 5.9/6.0
Spring 2011	PHYS 1120-800: Honors General Physics 2	18	5.6/6.0 5.9/6.0
Fall 2011	PHYS 3320: Electricity and Magnetism 2	30	
Spring 2012	PHYS 7230: Statistical Mechanics	36	5.1/6.0 5.6/6.0
Spring 2013	PHYS 4610/4620/4630: Honors Seminar		
Fall 2013	PHYS 1110 Honors	22	4.3/6.0 4.4/6.0
Spring 2014	PHYS 1120 Honors	13	5.5/6.0 5.8/6.0
Spring 2015	PHYS 1120 Honors	20	5.9/6.0 5.7/6.0
Spring 2016	PHYS 1120 Honors	19	5.7/6.0 5.9/6.0
Fall 2016	PHYS 3320 Electricity and Magnetism 2	42	5.4/6.0 5.7/6.0
Spring 2017	PHYS 2020 General Physics 2	170	
Summer 2017	PHYS 2010 General Physics 1	69	4.4/6.0 5.1/6.0
Spring 2018	PHYS 1125 General Physics 2: Electricity and Magnetism for majors	130	(backup role for Eric Cornell so no FCQs)
Spring 2019	PHYS 1125 General Physics 2: Electricity and Magnetism for majors	125	(backup role for Meredith Betterton so no FCQs)
Fall 2019	PHYS 1120	300	4.15/4.98
Spring 2020	PHYS 7230	30	(no summary scores due to COVID)
Spring 2021	PHYS 1125	78	(lead lecturer)
Spring 2022	PHYS 1125	86	(backup lecturer and mentor for Shuo Sun)

Ph.D. Students

H. Matt Duiker, “Statics and Dynamics of Thin-Film Ferroelectrics,” Graduated 1989. Co-founder Renegade Geophysics, Boulder, CO.

Mark Gyure, “Dielectric Breakdown in Random Materials”. Graduated 1990. Senior staff scientist at Hughes Research in Malibu, CA.

Brad Johnson, titular advisor, “Surface effects in magnetic superlattices “ Advisor: Robert Camley, Department of Physics UCCS, Graduated 1991. Professor of Physics at Western Washington University, Bellingham, WA.

Shawn Gay, “Solid-Fluid Equilibrium of Fused Hard Sphere Systems: Free Volume Theories and Simulation,” Graduated 1999. Staff scientist Metatech Corp., Albuquerque, NM, (co-advised by Jim Rainwater at NIST).

Steven Kadlec, “Phase Equilibrium in Various Systems of Hard and Soft Core Particles” 2004. Neva Ridge Technologies, Boulder, CO, (co-advised by Jim Rainwater at NIST).

Carly Donahue, titular advisor. “Investigation of wetted particle collisions theoretically and experimentally

using a pendulum apparatus,”Advisor: Prof Christine Hrenya, Department of Chemical and Biological Engineering, 2011.

Department and College Administrative Positions

2020-2021: Interim Director of the Honors Program., College of Arts and Sciences: Oversee Honors Program and Honors Residential Academic Program including all curriculum, faculty, staff, honors events, and the Latin Honors Thesis process.

2017-present: Director, Buffalo Bicycle Classic: The Buffalo Bicycle Classic (BBC) is the largest scholarship fundraising event in Colorado. The BBC is an annual bicycle ride that raises approximately \$200K per year for scholarships to support top Colorado high school graduates with large unmet financial need. About 1400 participants ride courses that range from 12 to 100 miles. The riders’ entry fees, donors and sponsors support fund scholarships for forty students per year. The BBC was created in 2003, and has raised over \$3.9M, including \$210K from the ride this year, plus \$100K from two generous donors for the BBC endowment.

2017-present: PREP Supervisor: I am the supervisor for over 100 CU employees hired under the Professional Research Experience Program (PREP). PREP is partnership between NIST on the NIST Boulder Campus and the University of Colorado Boulder (UCB). PREP funds CU undergraduate and graduate students, postdocs, and post-bachelor technicians to conduct research at NIST-Boulder with NIST advisors. John Cumalat is the PI and I am co-PI and PREP employee supervisor. The period of grant is 2/1/2018-1/31/2023 with an annual budget of about \$15M and a total budget of \$75,876,832.

2008-2016: Chair, Department of Physics: Responsibilities included oversight of recruiting, hiring, supporting, and promoting all faculty and staff in the department, overseeing the undergraduate and graduate degree programs, promoting and supporting all research programs, overseeing all aspects of the department’s general fund, auxiliary, gift and research budgets, interaction with the Associate Dean, Dean and Provost, as well as chairs, directors, deans, vice chancellors, and the Chancellor on academic and budgetary matters, fund raising, and promotion of the Department with campus public relations officials and the press.

2006-2008: Director of the Honors Program, College of Arts and Sciences: Responsibilities included overseeing the honors curriculum and Latin Honors thesis process for all undergraduate students at the University of Colorado at Boulder. I expanded the size and scope of the program, and integrated honors into the campus undergraduate merit scholarship and recruiting process.

1999-2008: Faculty Advisor for the Individually Structured Major (ISM): I wrote the proposal to the Arts and Sciences Curriculum Committee to transition the ISM from a free-standing major to a track in Distributed Studies. Responsibilities included advising the students on curricular issues, assuring consistency with Arts and Sciences minimum major requirements and certifying graduation requirements.

2000: Acting Associate Dean for the Social Sciences, College of Arts and Sciences

2000: Acting Associate Dean for the Natural Sciences, College of Arts and Sciences

1997-1999: Associate Dean for the Natural Sciences, College of Arts and Sciences: Responsibilities included oversight of 16 departments and programs in the Division of Natural Sciences. I had the

opportunity to work with physics, astrophysical and planetary sciences, atmospheric and oceanic sciences, geological sciences, chemistry and biochemistry, molecular, cellular and developmental biology, integrative physiology (then kinesiology), ecology and evolutionary biology (then EPOB), psychology and neuroscience (then psychology), geography, political science, mathematics, applied mathematics, Baker RAP, University Writing Program, and honors. I was the primary contact on all budgetary and faculty personnel actions including hiring, reappointment, tenure, and promotion. I also oversaw all instructional fees and instructional computing projects in the college.

1996: Associate Dean for Faculty Affairs, College of Arts and Sciences: Responsibilities included oversight of all faculty hiring, and reappointment, tenure, and promotion cases for all departments in the college. I also served as the space coordinator including serving on the design team for the Eaton Humanities Building.

1996: Arts and Sciences Dean of Summer Session: Responsibilities included oversight of all curriculum and budget for the Arts and Sciences summer session.

1996: Acting Chair of the Department of Fine Arts: I served as the interim chair of fine arts for six weeks after the chair resigned suddenly.

1994-1996: Faculty Associate for Curricular Affairs, College of Arts and Sciences: Responsibilities included oversight for all interdisciplinary programs in the college including honors, the RAPs, FallFEST, instructional computing, and course fees.

Departmental Service

- Evaluation committee (2019-present), (Chair 2019/20)
- Departmental Alumni Relations and Fundraising (2016-present) including publishing the CU Physics Calendar
- Physics Department Evaluation Panel (member fall 2018, Chair Spring 2019)
- Physics Science Education Initiative Director (2007-2010)
- Theoretical Physics Search Committee co-chair (with Tom DeGrand) (2004-2005) (selected Oliver DeWolfe)
- Physics Department Evaluation Panel (chair) (2003-2004)
- Teaching Evaluation Committee (chair) (2002-2003)
- Condensed matter theory search committee (2002-2003)
- Physics Department Evaluation Panel (2002-2003)
- Condensed matter theory search committee (2002-2003)
- Instructor Search Committee: Noah Finkelstein was eventually hired as a tenure-track Assistant Professor. (2003)
- Department of Physics 100th Anniversary Celebration Committee (Chair). Organized two-day program to celebrate the 100th anniversary of the first graduate degree in Physics. (2002-2003)
- Director, Condensed Matter Laboratory (1999-2001)

- Teaching Evaluation Committee (chair) Spring (2000)
- Physics Program Review Committee (chair) (1999-2000)
- Instructor search committee (chair) (1994) (selected Michael Dubson)
- Course fees coordinator (1993-1994)
- Associate chair for graduate studies, Department of Physics (1989-1992)

College, Campus and University Service

- Director of the Buffalo Bicycle Classic (2017-present)
- George Gamow Memorial Lecture Committee, Chair (2010-present)
- Honors Council (2000-present)
- Boulder Campus Planning Commission (1994-1996, 2014-2017)
- CU Boulder National Council: National Council is CU-Boulder' nonresident undergraduate recruiting team. Faculty, administrators and admissions staff visit major metropolitan areas around the country to recruit students to CU. I visit two or three cities each year (2002-2017)
- Buffalo Bicycle Classic Organizing Committee (2015-2017)
- Arts and Sciences Budget Committee (2009-2015), Chair (2015-2017)
- Arts and Sciences Council Executive Committee (2015-2017)
- ASSET Instructional Grant Committee (2014-2015)
- Boulder Campus Planning Commission (2012-2015)
- Arts and Sciences Dean's Advisory Committee (2011-2015)
- CU-Boulder Research Cabinet (2011-2015)
- CU-Boulder Information Technology Executive Committee (2011-2015)
- CU-Boulder, Provost Search Committee (2009-2010)
- CU-Boulder Re-accreditation Committee (2009-2010)
- Astronaut Scholarship Selection Committee (2008-2010)
- CU-Boulder Chief Information Officer Search Committee (2009)

- Undergraduate Academy Advisory Committee (2006-2008)
- LEAP Advisory Board (2007-2008)
- Committee on Research and Creative Work (2006-2008)
- Academic Affairs Budget Advisory Committee (2005-2008)
- Flagship 2030 Implementation Committee: Co-chair (with Ric Porecca) of Budget Committee (2008)
- Flagship 2030 Strategic Planning Committee, Co-chair (with Brenda Schick) of Research, Scholarship, and Creative Work Committee (2007)
- Truman Scholar Nomination Committee (2007)
- Vice Chancellor's Advisory Committee: (2004-2006)
- Faculty Council Committee on Educational Policy and University Standards (EPUS) (2002-2003)
- Leeds School of Business Frasca Teaching Excellence Award Selection Committee (2003)
- University Libraries Blue Ribbon Panel: This committee appointed by the Provost was charged with reviewing the Libraries' Strategic Plan as part of the Program Review process. (1999-2000)
- Academic Committee on Rules and Procedures (1994-2000)
- Humanities Building Design Team (1998-1999)
- Council of Associate Deans (1994-1999)
- Instructional Computing Working Group (1994-1999)
- Executive Committee of the Colorado Center for Chaos and Complexity (1997-1999)
- Norlin Scholars Program Advisory Committee (1998)
- Information Technology (IT) Strategic Plan Faculty Review Committee (1998)
- Facilities Master Plan Task Force (1997)
- Arts and Sciences Curriculum Committee (1992-1994)

Community Service and Outreach

- Regular on-air appearances on KHOW and KOA Radio answering science questions and discussing physics on the Ross Kaminsky Show (2018-present)
- "The Big Bang, The Universe: past, present, and future" presented online (due to COVID) as part of the Honors Program SciTalks Lecture Series (2021).

- CU Wizards Program: Founding member of the CU Wizards in 1994 after John Taylor stepped down as the Wizard. The CU Wizards consists of about twenty science faculty members who give large public shows each month for elementary school students and their parents to introduce them to the fun of science (1994-present)
- CU Wizards Program: “Much Ado about Absolute Zero” (2018)
- CU Wizards Program: “Much Ado about Absolute Zero” (2016)
- CU Wizards Program: “Much Ado about Absolute Zero” (2015)
- CU Wizards Program: “Time flies like an arrow, fruit flies like a banana” (2013)
- CU PAC12 Video, “Degree of Difficulty: Flips and Physics at CU-Boulder.” Runs on the PAC12 Sports Network and was posted on the CU web page and YouTube (2013)
- CU Wizards Program: “Time Flies” (2011)
- On-camera expert for a Korean television documentary about George Gamow "The Milestones of Scientific Civilization" (2011)
- On-camera expert for an episode of “Stan Lee’s Superhumans,” a History Channel documentary about people with extraordinary abilities (2010)
- CU Wizards Program: "Much Ado About Absolute Zero" (2009)
- CU Wizards Program: "Much Ado About Absolute Zero" (2007)
- Saturday Physics Series: "Much Ado About Absolute Zero" (2006)
- CU Wizards Program: "Much Ado About Absolute Zero" (2005)
- CU Wizards Program: "Heat, Temperature and Absolute Zero" (2003)
- CU Wizards Program “Heat, Temperature and Absolute Zero" (2002)
- CU Wizards Program: “The Physics of Flight” (1998)
- Two CU Wizard shows at Boulder Valley Schools (1997)
- CU Wizards Program: “Time and Clocks” (1996)
- CU Wizards Program: “The Four Fundamental Forces of Nature” (1996)
- CU Wizards Program: “Time and Clocks” (1995)