

Dr. William Ratcliff II, Physicist

Contact Information

NIST 100 Bureau Drive Mailstop 6102 Bldg 235, Room E151 Gaithersburg, MD 20899

Date of Birth: 1976

Phone: 301-975-4316

Fax: 301-921-9847

Education

- 2003 (October):** Rutgers University, New Brunswick, Ph.D. Physics, Thesis Advisor: Professor Sang W. Cheong
- 1997 (May):** University of Michigan, Ann Arbor, BSE in Engineering Physics

Technical skills

- Operating Systems: Unix/Linux, Windows, MacOS
- Computer Languages&Frameworks: C, IDL, Matlab, Maple, Python, html, javascript, django
- Familiarity: C++, Fortran, Mathematica
- Project Management: Svn, Git

Neutron Scattering

- Expertise: Single crystal and powder diffraction for solution of magnetic and crystallographic structures, inelastic neutron scattering (Triple-axis)
- Familiarity: Small Angle Neutron Scattering and Reflectivity

Research Experience

- Fall 05-Present: Staff scientist at the NIST Center for Neutron Scattering at NIST.
- Fall03-2005: National Research Council Postdoc at the NIST Center for Neutron Research at NIST. Primary work concerned neutron scattering experiments on geometrically frustrated magnets and magnetoelectric systems. Also participated in x-ray experiments at Brookhaven and APS. Also developed a GUI application for visualization of the resolution ellipsoid for inclusion in the DAVE project at NIST.
- Sum97-Fall 03: Worked with Sang W. Cheong in materials physics research including materials synthesis and characterization of novel magnetic systems.
- Sum 95-97: Worked with Fred Adams & Patricia Knezek on the search for an Initial Mass Function. Work involved reduction of infrared CCD data using the IRAF package. (University of Michigan)
- Sum 94: Worked with Tony Tyson in the making of gravitational lensing simulations for use in scientific visualization. The project included the making of a video. (Bell Labs)
- Wint/Spring 94: Worked with Herbert Winful in simulating the propagation of light through a fiber (untwisted) (University of Michigan)

Workshops Organized

- Workshop on Representational Analysis and Magnetic Structure Determination Dec. (2012) BARC, Mumbai, India
- The NIST/Georgetown 2nd School on Representational Analysis and Magnetic Structures Aug1-5 (2011) Georgetown, Washington, D.C.
- The NIST Workshop on Representational Analysis of Complex Magnetic Structures July 23-26 (2007) Gaithersburg, MD
- Program Committee 2010 MMM Meeting, Atlanta, GA

Publications

2013

"Electric-field-controlled antiferromagnetic domains in epitaxial BiFeO₃ thin films probed by neutron diffraction" W. Ratcliff II, Zahra Yamani, V. Anbusathaiah, T.R. Gao, P.A. Kienzle, H. Cao, I. Takeuchi, Phys. Rev. B. 87, 140405 (2013).

"Dimensional Crossover in the Low Dimensional Magnetic, ZnMn₂O₄", W. Ratcliff, Y.Chen, S. Yeo, G. Gasparovic, A. Schultz, P. Piccoli, Q. Huang, Y. Qiu, S-W. Cheong (in preparation for PRB)

"Percolation and Clusters within SrCo_xTi_{1-x}O₃" W. Ratcliff II, Y. Horibe, P.A. Sharma, S. Guha, S-W. Cheong (in preparation)

2012

"Double Focusing Thermal Triple-Axis Spectrometer at the NCNR" Lynn, J.W., Chen, Y., Chang, S., Zhao, Y., Chi, S., W. Ratcliff, II, Ueland, B.G., Erwin, R.W., Journal of Research of the National Institute of Standards and Technology 117, 61 (2012).

2011

"Local Weak ferromagnetism in single-crystalline ferroelectric BiFeO₃", M. Ramazanoglu, M. Laver, W. Ratcliff II, S.M. Watson, W.C. Chen, A. Jackson, K. Kothapalli, Seongsu Lee, S-W. Cheong, V. Kiryukhin, Phys. Rev. Lett. 107, 207206 (2011)

"Antiferromagnetic order and superlattice structure in nonsuperconducting and superconducting Rb(y)Fe(1.6+x)Se₂, Phys. Rev. B 84, 094504 (2011).

"Giant Effect of Uniaxial Pressure on Magnetic Domain Populations in Multiferroic Bismuth Ferrite" M. Ramazanoglu, W. Ratcliff, H.T. Yi, A.A. Sirenko, SW Cheong, V. Kiryukhin, Phys. Rev. Lett. 107, 067203 (2011).

"Temperature-dependent properties of the magnetic order in single-crystal BiFeO₃" M. Ramazanoglu, W. Ratcliff II, Y.J. Choi, Seongsu Lee, S-W. Cheong, V. Kiryukhin, Phys. Rev. B. 83, 174434 (2011)

"Giant Effect of Uniaxial Pressure on Magnetic Domain Populations in Multiferroic Bismuth Ferrite," Ramazanoglu, M., Ratcliff, II, W., Yi, H.T., Sirenko, A.A., Cheong, S.W., Kiryukhin, V., Physical Review Letters 107(6), 067203-1 (2011).

"Mechanism of exchange-striction of ferroelectricity in multiferroic orthorhombic HoMnO₃ single crystals" N. Lee, Y.J. Choi, M. Ramazanoglu, W. Ratcliff II, V. Kiryukhin, and S-W. Cheong, Phys. Rev. B 84, 020101 (2011)

"Neutron Diffraction Investigations of Magnetism in BiFeO₃ Epitaxial Films" William Ratcliff II, Daisuke Kan, Wangchun Chen, Shannon Watson, Songxue Chi, Ross Erwin, Garry J. McIntyre, Sylvia C. Capelli, Ichiro Takeuchi, Advanced Functional Materials 21, 1567 (2011)

"Antiferromagnetic Order and Superlattice Structure in Nonsuperconducting and Superconducting $\text{RbFe}_{1.6+x}\text{Se}_2$ " Wang, M., Wang, M., Li, G.N., Huang, Q., Li, C.H., Tan, G.T., Zhang, C.L., Cao, H., Tian, W., Zhao, Y., Chen, Y.C., Lu, X.Y., Sheng, B., Luo, H.Q., Li, S.L., Fang, M.H., Zarestky, J.L., Ratcliff, W.D., Lumsden, M.D., Lynn, J.W., Dai, P., Physical Review B 84, 094504-1 (2011).

"Nitrogen contamination in elastic neutron scattering" Songxue Chi, Jeffrey W. Lynn, Ying Chen, William Ratcliff II, Benjamin G. Ueland, Nicholas P. Butch, Shanta R. Saha, Kevin Kirshenbaum, Johnpierre Paglione, Measurement Science and Technology 22, 047001 (2011)

"Incommensurate Magnetism in FeAs Strips: Neutron Scattering from CaFe_4As_3 " Yusuke Nambu, Liang L. hao, Emilia Morosan, Kyoo Kim, Gabriel Kotliar, Pawel Zajdel, Mark A. Green, William Ratcliff, Jose A. Rodriguez-Ruvera, Collin Broholm, Phys. Rev. Lett 106, 037201 (2011).

2010

"Interplay of Fe and Nd magnetism in NdFeAsO single crystals" W. Tian, W. Ratcliff II, M. G. Kim, J.-Q. Yan, P.A. Kienzie, Q. Huang, B. Jensen, K.W. Dennis, R.W. McCallum, T.A. Lograsso, R.J. McQueeney, A.I. Goldman, J.W. Lynn, A. Kreyssig, Phys. Rev. B 82, 060514 (2010).

"Cd Doping Effects in the heavy-fermion compounds Ce_2Mn_8 ($\text{M}=\text{Rh}$ and Ir)" C. Adriano, C. Giles, E.M. Bittar, L.N. Coelho, F. De Bergevin, C. Mazzoli, L. Paolasini, W. Ratcliff, R. Bindel, J.W. Lynn, Z. Fisk, P.G. Pagliuso, Phys. Rev. B 81, 245115 (2010).

"Magnetic form factor of SrFe_2As_2 : Neutron diffraction measurements" W. Ratcliff II, P.A. Kienzie, Jeffrey W. Lynn, Shiliang Li, Pengcheng Dai, G.F. Chen, N.L. Wang, Phys. Rev. B. 81, 140502 (2010).

2009

"Evolution of the bulk properties, structure, magnetic order, and superconductivity with Ni doping in $\text{CaFe}_{(2-x)}\text{Ni}_x\text{As}_2$ " N. Kumar, SX Chi, Y. Chen, KG Rana, AK Nigam, A. Thamizhavel, W. Ratcliff, SK Dar, JW Lynn Phys. Rev. B 80, 144524 (2009).

"Crossover from incommensurate to commensurate magnetic orderings in CoCr_2O_4 " LJ Chang, DJ Huang, WH Li, SW Cheong, W. Ratcliff, JW Lynn J. Phys. Cond. Matt. 21, 456008 (2009).

"Short Range Incommensurate magnetic order near the superconducting phase boundary in $\text{Fe}_{(1+\delta)}\text{Te}_{(1-x)}\text{Se}_x$ " J.S. Wen, GY Xu, ZJ Xu, ZW Lin, Q. Li, W. Ratcliff, G. Gu, JM Tranquada Phys. Rev. B 80, 104506 (2009).

"Spin-Lattice Order in Frustrated ZnCr_2O_4 " S. Ji, SH Lee, C. Broholm, TY Koo, W. Ratcliff, SW Cheong, P. Zschack Phys. Rev. Lett 103, 037201 (2009).

"The Magnetic ground state of CaMn_2Sb_2 " W. Ratcliff II, ALL Sharma, AM Gomes, JL Gonzalez, Q. Huang, J Singleton J Mag. Mag. Materials 321, 2612 (2009).

"Order by Static Disorder in the Ising Chain Magnet $\text{Ca}_3\text{Co}_2\text{-xMn}_x\text{O}_6$ " V. Kiryukhin, S. Lee, W. Ratcliff II, Q. Huang, HT Yi, YJ Choi, SW Cheong Phys Rev. Lett. 102, 187202 (2009).

"3:1 magnetization plateau and suppression of ferroelectric polarization in an Ising chain multiferroic" YJ Jo, S. Lee, ES Choi, HT Yi, W. Ratcliff II, YJ Choi, V. Kiryukhin, SW Cheong, L. Balicas Phys. Rev. B 79, 012407 (2009).

2008

"Low energy spin waves and magnetic interactions in SrFe_2As_2 " Jun Zhao, Dao Xin Yao, Shiliang Li, Tao Hong, Y. Chen, S. Chang, W. Ratcliff II, J. W. Lynn, H. A. Mook, G. F. Chen, J. L. Luo, N. L. Wang, E. W. Carlson, Jiangping Hu, and Pengcheng Dai Phys. Rev. Lett 101, 167203 (2008).

"Spin and Lattice Structure of Single Crystal SrFe_2As_2 " Jun Zhao, W. Ratcliff II, J-W. Lynn, G.F. Chen, J.L. Luo, N.L. Wang, Jiangping Hu, Pengcheng Dai Phys. Rev. B 78, 140504 (2008).

"Magnetic order close to superconductivity in the iron-based layered $\text{LaO}_{1-x}\text{F}_x\text{FeAs}$ systems" C. dela Cruz, Q. Huang, JW Lynn, JY Li, W. Ratcliff, JL Zarestky, HA Mook, GF Chen, JL Luo, NL Wang, PC Dai

Nature 453, 899 (2008).

"Neel to Spin-Glass-Like Transition Versus Dilution in Geometrically Frustrated $\text{ZnCr}_2\text{-}2\text{xGa}_2\text{xO}_4$ " S-H. Lee, W. Ratcliff, Q. Huang, T.H. Kim, S-W. Cheong PRB 77, 014405 (2008)

"Formation of pancakelike ising domains and giant magnetic coercivity in ferrimagnetic LuFe_2O_4 " W. Wu, V. Kiryukhin, H.-J. Noh, K.-T. Ko, J.-H. Park, W. Ratcliff II, P. A. Sharma, N. Harrison, Y.J. Choi, Y. Horime, S. Lee, S. Park, H.T. Yi, C.L. Zhang, S-W. Cheong PRL 101, 137203 (2008)

"Electric field control of the magnetic state in BiFeO_3 single crystals" Seoungsu Lee, W. Ratcliff, SW Cheong, V. Kiryukhin APL 92, 192906 (2008)

"Single Ferroelectric and chiral magnetic domain of single-crystalline BiFeO_3 in an electric field" Seongsu Lee, Taekjib Choi, W. Ratcliff II, R. Erwin, S-W. Cheong, and V. Kiryukhin PRB RC 78, 100101 (2008)

"The pressure effect on the magnetic commensurability and ferroelectricity in multiferroic HoMn_2O_5 " CR dela Cruz, B. Lorenz, W. Ratcliff, J. Lynn, MM Gospodinov, C.W. Chu Physica B 403, 1359 (2008)

"Observation of a continuous phase transition in a shape-memory alloy" J.C. Lahshley, S.M. Shapiro, B.L. Winn, C.P. Opeil, M.E. Manley, A. Alatas, W. Ratcliff, T. Park, R.A. Fisher, B. Mihaila, P. Riseborough, E. K. H. Salje, J.L. Smith Phys. Rev. Lett 101, 135703 (2008)

2007

"Crystal distortions in geometrically frustrated ACr_2O_4 ($A=\text{Zn}, \text{Cd}$)", S.-H. Lee, G. Gasparovic, C. Broholm, M. Matsuda, J-H Chung, YJ Kim, H. Ueda, G. Xu, P Zschack, K. Kakurai, H. Takagi, W. Ratcliff, T-H. Kim, S-W Cheong Journal of Physics Condensed Matter 19, 145259 (2007).

"Evidence for strong spin-lattice coupling in multiferroic RMn_2O_5 ($R=\text{Tb}, \text{Dy}, \text{Ho}$) via thermal expansion anomalies", CR dela Cruz, F. Yen, B. Lorenz, S. Park, SW Cheong, MM Gospodinov, W. Ratcliff, JW Lynn, CW Chu Journal of Applied Physics 99 08R2103, 2006.

"Structural Anomalies at the magnetic and ferroelectric transitions in RMn_2O_5 ($R=\text{Tb}, \text{Dy}, \text{Ho}$)", CR dela Cruz, F. Yen, B. Lorenz, MM Gospodinov, CW Chu, W. Ratcliff, JUW Lynn, S. Park, S-W Cheong, Phys. Rev. B 73, 100406, 2006.

"Conformation of the HIV-1 Gag protein in solution", SAK Datta, JE Curtis, W.Ratcliff, PK Clark, RM Crist, J Lebowitz, S. Krueger, A. Rein, Journal of Molecular Biology 365, 812, 2007.

2006

"Structural anomalies at the magnetic and ferroelastic transitions in RMn_2O_5 ($R=\text{Tb}, \text{Dy}, \text{Ho}$)" C.R. dela Cruz, F. Yen, B. Lorenz, M.M. Gospodinov, C.W. Chu, W. Ratcliff, J.W. Lynn, S. Park, and S-W.Cheong. Phys. Rev. B 73, 100406 (2006).

2005

"Pressure-dependent magnetic properties of geometrically frustrated ZnCr_2O_4 " Y. Jo, JG Park, HC Kim, W. Ratcliff, S-W. Cheong, Phys. Rev. B. 72, 184421 (2005).

"Magnetic Phase Diagram of the Colossal Magneoelectric, DyMn_2O_5 " W. Ratcliff II, V. Kiryukhin, M.A. Kenzelmann, S-H. Lee, J. Schefer, R. Erwin, N. Hur, S. Park, and S-W. Cheong. Phys Rev. B. (R) 72, 060407, (2005).

"Effects of spin-phonon coupling in the magnetic transition in strongly frustrated ZnCr_2O_4 " A. B. Sushkov, H. D. Drew, O. Tchernyshyov, W. Ratcliff, S.W. Cheong, Phys. Rev. Lett. 94, 137202 (2005).

2004

"Spin Singlet formation in MgTi_2O_4 : evidence of a chiral dimerization pattern" M. Schmidt, W. Ratcliff II, P.G. Radaelli, K. Refson, N.M. Harrison, S.W. Cheong, Phys. Rev. Lett. 92, 056402 (2004).

"First-Order nature of the ferromagnetic phase transition in (La-Ca)MnO₃ near optimal doping." C.P. Adams, J.W. Lynn, V.N. Smolyaninova, A. Biswas, R.L. Green, W. Ratcliff II, S.-W. Cheong, Y.M. Mukovskii, D.A. Shulyatev, Phys. Rev. B. 70, 134414 (2004).

2002

"Emergent excitations in a geometrically frustrated magnet" S.-H. Lee, C. Broholm, W. Ratcliff, G. Gasparovic, Q. Huang, T.H. Kim and S-W. Cheong. Nature 418, 856-858 (2002).

"Fluctuations and Freezing of Spin-Correlated Nanoclusters in a Geometrically Frustrated Magnet" W. Ratcliff II, S.-H. Lee, C. Broholm, S-W. Cheong, Q. Huang Physical Review B: Rapid Communications 65, 220406/1-220406/4 (2002).

2001

"Magnetic properties of the frustrated antiferromagnetic spinel ZnCr₂O₄ and the spin glass Zn_{1-x}Cd_xCr₂O₄ (x=0.05,0.10)" H Martinho, NO Moreno,JA Sanjurjo,C Rettori, AJ Garcia-Adeva, DL Huber,SB Oseroff,W Ratcliff,SW Cheong,PG Pagliuso,JL Sarrao,GB Martins Phys. Rev. B. 64, 024408/1-024408/6 (2001).

"Studies of the three-dimensional frustrated antiferromagnetic ZnCr₂O₄" H Martinho, NO Moreno, JA Sanjurjo,C Rettori,AJ Garcia-Adeva, DL Huber,SB Oseroff,W Ratcliff,SW Cheong,PG Pagliuso,JL Sarrao,GB Martins Journal of Applied Physics 89, 7050-7052 (2001).

"Muon spin relaxation study of La_{1-x}Ca_xMnO₃" RH Heffner, JE Sonier, DE MacLaughlin, GJ Nieuwenhuys, GM Luke, YJ Uemura, W Ratcliff, SW Cheong, G Balakrishnan Phys. Rev. B. 63, 094408/1-094408/14 (2001).

2000

"Local spin resonance and spin-Peierls-like phase transition in a geometrically frustrated antiferromagnet" SH Lee, C Broholm, TH Kim, W Ratcliff, SW Cheong Phys. Rev. Lett. 84, 3718-3721 (2000).

1999

"Intergrain magnetoresistance via second-order tunneling in perovskite manganites" S Lee, HY Hwang, BI Shraiman, WD Ratcliff, SW Cheong Phys. Rev. Lett. 82, 4508-4511 (1999).

Conference Talks/Posters

2013

"Evolution of the magnetic structure in (Sm,Bi)FeO₃ Thin Films" March Meeting of the American Physical Society 2013 (Baltimore)

"Neutron Diffraction Investigations of Electric-Field Control of Antiferromagnetic Domains in Epitaxial BiFeO₃ Thin Films" Fundamental Physics of Ferroelectrics and Related Materials, Ames, IA (2013)

2012

Invited Lecturer Magnetic Structure Determination from Neutron Data Oak Ridge National Lab, Oakridge, TN (2012)

"Neutron Diffraction Investigations of Magnetism in BiFeO₃ Epitaxial Films" American Conference on Neutron Scattering 2012 (invited)

"Investigation of Electric Field Control Antiferromagnetic Domains in Epitaxial BiFeO₃ Thin Films Using Neutron Diffraction" March Meeting of the American Physical Society 2012

"Neutron Diffraction Investigations of Magnetism in BiFeO₃ Epitaxial Films" DAE Solid State Physics Symposium (2012) (invited), IIT Bombay

2011

"Neutron Diffraction Investigations of Magnetism in BiFeO₃ Epitaxial Films" MMM 2011, Desert Ridge, Arizona (invited)

"Neutron diffraction investigations of the BiFeO₃ thin films" European Spallation Source, Lund, Sweden 2011 (invited)

"The Renaissance of Multiferroics" Missouri University Science Technology, Sep. 2011 (invited).

"The Renaissance of Multiferroics" Howard University, April 2011 (invited).

"The Magnetic Form factor of SrFe₂As₂" March Meeting of the American Physical Society 2011 (Dallas, Texas) (talk was presented by Pengcheng Dai due to budgetary constraints)

2010

"The Magnetic Form Factor in SrFe₂As₂" MMM 2010 (Atlanta, Georgia)

"Neutron investigations of BiFeO₃ Films" March Meeting of the American Physical Society 2010 (Portland, Oregon)

"Introduction to SPINAL (Spinwave Analyzer), A program for Calculating and Analyzing Spinwaves" American Conference on Neutron Scattering 2010 (Ottawa, Canada)

"BiFeO₃" Flipper, International Workshop on Single Crystal Diffraction with Polarized Neutrons, 2010 (Grenoble, France)

"BiFeO₃" Aspen Winter Conference on Fundamental Physics of Ferroelectrics, 2010 (Aspen, Colorado)

2009

"Neutron Scattering Studies of the Fe-Based Superconductors" National Conference of Black Physicists, 2009 (Nashville) W. Ratcliff II, Jun Zhao, J.W. Lynn, G.F. Chen, J.L. Luo, N.L. Wang, Jiangping Hu, Pengcheng Dai (Invited Talk)

2008

"Dimensional Crossover in ZnMn₂O₄" William Ratcliff, Ying Chen, Goran Gasparovic, Yiming Qiu, Qing Huang, Jeffrey Lynn, Sunmug Yeo, Sang Cheong, Paula Piccoli, Arthur Schultz. March Meeting of the American Physical Society 2008 (New Orleans, Louisiana).

Dimensional Crossover in ZnMn₂O₄ William Davis Ratcliff, Ying Chen, Yiming Qiu, S. Yeo, G. Gasparovic, Q. Huang, J. Lynn, Sang Cheong, Paula Piccoli, and Arthur Schultz ACNS 2008 (Santa Fe, New Mexico)

"BiFeO₃" PNCMI, 2008 (Mito, Japan). W. Ratcliff, Y. Chen, S. Yeo, G. Gasparovic, A. Schultz, P. Piccoli, Q. Huang, Y. Qiu, S-W. Cheong (Invited Talk)

2007

"Elucidation on the effects of hydrostatic pressure on multiferroic, HoMn₂O₅", William Ratcliff, C.R. dela Cruz, B. Lorenz, Q. Huang, S. Park, S-W. Cheong. March Meeting of the American Physical Society 2007 (Denver).

"A New Magnet, ZnMn₂O₄" National Conference of Black Physicists, 2007 (Boston). (Invited Talk)

2006

"The low dimensional magnet, ZnMn_2O_4 " Contributed talk, March Meeting 2006 of the American Physical Society (APS), Baltimore, Maryland

2005

"The Giant Magnetoelectric, DyMn_2O_5 " Contributed talk, March Meeting 2005 of the American Physical Society (APS), Los Angeles, California

2004

"The Giant Magnetoelectric, DyMn_2O_5 " Contributed talk, American Conference on Neutron Scattering (ACNS), June 2004 College Park, Maryland

"The Magnetic Structure of ZnCr_2O_4 " Contributed talk, March Meeting 2004 of the American Physical Society (APS), Montreal, Canada

2003

"Frustration in Flatland Revisited" Poster, Boulder Summer School for Condensed Matter Physics, July 2003, Boulder Colorado

2002

"Magnetism of $\text{Sr}(\text{Ti},\text{Co})\text{O}_3$ " Poster, Gordon Research Conference on Strongly Correlated Electrons, June 2002, Maine.

"Magnetism of $\text{Sr}(\text{Ti},\text{Co})\text{O}_3$ " Contributed talk, March Meeting 2002 of the American Physical Society (APS), Indianapolis, Indiana

2001

"Site-vs-Bond disorder in the geometrically frustrated magnet, ZnCr_2O_4 " Poster, SCES2001, August 2001, University of Michigan, Ann Arbor

"Site-vs-Bond disorder in the geometrically frustrated magnet, ZnCr_2O_4 " Contributed talk, March Meeting 2001 of the APS, March 12-16, Seattle, Washington

2000

"The geometrically frustrated magnet, ZnCr_2O_4 " Poster, Gordon Research Conference Strongly Correlated Electrons, June 2000. New Hampshire.

Honors and Memberships

- GMAG Member at Large (2013-present)
- APS-IUSSTF U.S.-India Exchange Program
- NIST Bronze Medal (highest honorary recognition given by the institute, 2012)
- Minority in Research Science Trailblazer award (24th annual BEYA STEM, 2010)
- NRC Postdoctoral Fellowship
- NSF GK-12 Fellowship
- GAANN Fellowship
- Grants in Aid of Research Award (Sigma Xi)

- Sigma Pi Sigma (Physics Honor Society)
- Eta Kappa Nu (Electrical Engineering and Computer Engineering Honor Soc.)
- Golden Key National Honor Society
- Sigma Xi
- American Physical Society

Instruction Experience

- Conducted numerous summer schools at the NCNR
- SHIP mentor for high school students
- SURF mentor for undergraduate students
- Outreach through Adventures in Science
- Part time lecturer Physics 205 Employer Rutgers Inclusive Dates 6/1/2003-7/1/2003
- Curriculum development and teaching of 6th and 9th graders in 6th grade math and earth science at South Brunswick Upper Elementary School and 9th grade physical science at East Brunswick Churchill Middle School through the NSF GK-12 fellowship Inclusive dates 8/99-6/01
- Part time lecturer Physics 203 Employer Rutgers Inclusive Dates 6/1/99 - 7/1/99
- Part time lecturer Physics of Sound Employer Rutgers Inclusive Dates 1/1/99 - 6/1/99
- Part time lecturer, Physics 204 Employer Rutgers Inclusive Dates 1/1/99 - 6/1/99
- Part time lecturer Honors Modern Physics Employer Rutgers Inclusive Dates 9/1/98 - 1/1/99
- Part time lecturer Physics 204 Employer Rutgers Inclusive Dates 6/1/98-7/1/98
- Part time lecturer Physics 203 Employer Rutgers Inclusive Dates 7/1/98-8/1/98