

STEVEN T. RUGGIERO

Department of Physics
University of Notre Dame
Notre Dame, IN 46556
Ruggiero.1@nd.edu
(219) 631-7463

1. Higher Education:

1975 B.S. Physics, Rensselaer Polytechnic Institute (Cum Laude)
1977 M.S. Applied Physics, Stanford University
1981 Ph.D. Applied Physics, Stanford University
Thesis Title: "Layered Superconducting Composites"

2. Professional Experience:

1975-1981 Research Assistant, Stanford University, Department of Applied Physics
1981-1983 Postdoctoral Research Associate, Yale University, Department of Applied
Physics
1983-1988 Assistant Prof. of Physics, University of Notre Dame
1988-2004 Associate Prof. of Physics, University of Notre Dame
2004-pres. Professor of Physics, University of Notre Dame
1989-1991 On Leave as Scientific Consultant, Superconductor Technologies, Inc., Santa
Barbara, CA
2001-2003 On Sabbatical Leave, National Institute of Standards and Technology, Boulder,
CO
2003-2004 Visiting Researcher, NIST Boulder
2005-pres Prof. of Physics, University of Notre Dame

Other Professional Experience:

NSF review panel, January 2003, "Nanodevices"
NSF review panel, August 2003, "Spintronics"

3. Honors and Awards:

Kaneb Teaching Award (2000)

4. Professional and Honorary Societies:

Sigma Pi Sigma (1974)
Member, American Physical Society
Member, Materials Research Society

5. Books and Monographs

“Superconducting Devices,” (Book) S.T. Ruggiero and D.A. Rudman, Eds. (Academic, New York, 1990).

“Synthetically Modulated Structures,” (Book Chapter) S.T. Ruggiero and M.R. Beasley, in Synthetic Modulated Structures, L.L. Chang and W.C. Giessen, Eds. (Academic Press, New York, 1985), p.365.

“Artificial Tunnel Barriers,” (Book Chapter) S.T. Ruggiero, in Superconducting Devices, S.T. Ruggiero and D.A. Rudman Eds. (Academic, New York, 1990).

“Tunneling and Josephson Junctions,” (Book Chapter) S.T. Ruggiero, in *Encyclopedia of Electrical and Electronics Engineering* (Wiley, New York, 2000) pp. 734-48.

6. Refereed Publications

“Dimensional Crossover in Layered Superconducting Composites,” S.T. Ruggiero, T.W. Barbee, Jr., and M.R. Beasley, Phys. Rev. Lett. **45**, 1299 (1980).

“Superconducting Properties of Layered Nb/Ge Metal Semiconducting Multilayers,” S.T. Ruggiero, T.W. Barbee, Jr., and M.R. Beasley, Phys. Rev. B **26**, 4894 (1982).

“Ion-Beam Deposition of Nb and Ta Refractory Superconductor Films,” D.W. Face, S.T. Ruggiero, and D.E. Prober, J. Vac. Sci. Technol. **A1**, 326 (1983).

“Ion-Beam-Deposited Films for Refractory-Metal Tunnel Junctions,” S.T. Ruggiero, D.W. Face, and D.E. Prober, IEEE Trans. Magn. **MAG-19**, 960 (1983) (refereed conference paper).

“Tunneling in Tantalum Surface Layers on Niobium,” S.T. Ruggiero, E. Track, G.B. Arnold, D.E. Prober, in Proceedings of the 17th Int. Conf. on Low Temp. Phys. (LT-17), 847 (1984) (refereed conference paper).

“Critical Current Behavior and Oxide Barrier Properties of Ta Surface Layers on Nb,” S.T. Ruggiero, G.B. Arnold, E. Track and D.E. Prober, IEEE Trans. Magn. **MAG-21**, 850 (1984) (refereed conference paper).

“Review of Synthetic Metal Multilayers,” S.T. Ruggiero, Superlattices and Microstructures **1**, 441, (1985).

“Electron Tunneling in Tantalum Surface Layers on Niobium,” S.T. Ruggiero, E.K. Track, D.E. Prober, G.B. Arnold, and M.J. DeWeert, Phys. Rev. B **34**, 217 (1986).

“Low-Noise AC/DC Current Source With Continuous Zero Crossing,” S. Schwarzbek, R.E. Howard, E. Track, and S.T. Ruggiero, Rev. Sci. Instrum. **57**, 1444 (1986).

- “The Effect of Fringing Fields on the Resistance of a Conducting Film,” S.M. Schwarzbeek and S.T. Ruggiero, IEEE Transactions on Microwave Devices, Vol. **MTT-34**, 977 (1986).
- “RF Sputter-Deposited Aluminum-Oxide Films as High Quality Artificial Tunnel Barriers,” J.B. Barner and S.T. Ruggiero, IEEE Trans. Mag. 1986, **MAG-23**, 854 (1987) (refereed conference paper).
- “Observation of the Incremental Charging of Ag Particles by Single Electrons,” J.B. Barner and S.T. Ruggiero, Phys. Rev. Lett. **59**, 807 (1987).
- “Multi-gap Tunneling Structure Observed for the High- T_c Superconductors: Charging Effects as Possible Cause,” S.T. Ruggiero, J.B. Barner, Phys. Rev. B **36**, 8870 (1987).
- “Low-Noise ac/dc Voltage Source with Continuous Zero Crossing,” Rev. Sci. Instrum. **58** (12) 2334 (1987).
- “Transport Properties of Anisotropic Systems,” S.T. Ruggiero, J.B. Barner, and S.M. Schwarzbeek in Metallic Multilayers & Epitaxy, ed. M. Hong, W. Wolf and D.C. Gubser (The Metallurgical Society, Warrendale, PA, 1988), p.135.
- “Magnetic-field dependence of nonresonant microwave power dissipation in $YBa_2Cu_3O_{7-x}$,” W.J. Tomasch, H.A. Blackstead, P.J. McGinn, S.T. Ruggiero, K. Shen, J.W. Weber, J.R. Clem, and D. Boyne, Phys. Rev. B **37**, 9864 (1988).
- “Charging effects in coupled superconducting tunnel junctions and their implications for tunneling measurements of high T_c superconductors,” K. Mullen, E. Ben Jacob and S. Ruggiero, Phys. Rev. B **38**, 5150 (1988).
- “Single-Electron Charging Effects and Implications for Tunneling Measurements of the High- T_c Superconductors,” J.B. Barner, K. Mullen, M.J. Honkanen, S.T. Ruggiero, E. Ben-Jacob and A.R. Pelton, IEEE Trans. Magn. **MAG-25**, 2542 (1989) (refereed conference paper).
- “Tunneling in artificial Al_2O_3 Tunnel Barriers and Al_2O_3 /Metal Multilayers,” J.B. Barner and S.T. Ruggiero, Phys. Rev. B **39**, 2060 (1989).
- “Artificial Tunnel Barriers,” S.T. Ruggiero in Superconducting Devices, S.T. Ruggiero and D.A. Rudman, eds., Academic Press, Boston, 373-396 (1990).
- “Perpendicular Resistance of Thin NiG Metal Films,” S.M. Schwarzbeek and S.T. Ruggiero in Proceedings of the 37th Midwest Solid State Conference (1991) (refereed conference paper).
- “Mixing in $TlCaBaCuO$ Superconducting Films at 61GHz,” S.T. Ruggiero, A. Cardona, and H.R. Fetterman, IEEE Trans. Mag., **MAG-27**, 3070-3072 (1991) (refereed conference paper).
- “Particle-size effects in single-electron tunnel systems,” S.T. Ruggiero and J.B. Barner, Zeit. fur Phys. B - Condensed Matter **35**, 335-337 (1991).

- “Grain Boundary Junctions from anisotropic etching of LaAlO₃ substrates,” S.T. Ruggiero, A.H. Cardona, and L.C. Bourne, *Physica C* **185-189**, 2605 (1991).
- “YBCO Film Growth on Ultra-thin Ag Layers,” C. Zhong, S.T. Ruggiero, R. Fletcher, and E. Moser *J. Mat. Res.* **9**, 2761-2763 (1994).
- “Transport Properties of YBCO Films on Ultra-Thin Ag Layers,” C. Zhong, S.T. Ruggiero, R. Fletcher, and E. Moser, *IEEE Transactions on Applied Superconductivity* **5**, 1529-1532 (1995) (refereed conference paper).
- “Tunnel barrier properties of oxidized bismuth droplets on Al₂O₃,” T.B. Ekkens, S. Nolen, and S.T. Ruggiero, *J. Appl. Phys.* **79**, 7392-7394 (1996).
- “Response of YBCO devices to mid-infrared radiation,” S.T. Ruggiero, C. Zhong, K.J. Rennert, L.R. Vale, and D.A. Rudman, *IEEE Trans. Appl. Superconductivity* **7**, 2374-2377 (1997) (refereed conference paper).
- “Tunneling in multilayer fullerene/Al₂O₃ and fullerene/Ge systems,” S. Nolen and S.T. Ruggiero, *Phys. Rev. B* **58**, 10942-10947 (1998).
- “Tunneling Spectroscopy of Fullerene/Ge Multilayer Systems,” S. Nolen and S.T. Ruggiero, *Chem. Phys. Lett.* **300**, 656-660 (1999).
- “Wavelength Dependent Photoresponse in YBCO Thin-Film Systems,” S.T. Ruggiero, M.P. Mischke, C.E. Tanner, A.J. Wilson, L.R. Vale, and D.A. Rudman, *IEEE Trans. Appl. Superconductivity* **9**, 3182-3185 (1999) (refereed conference paper).
- “Single-electron tunneling in few-atom systems: size of single atoms and geometry of few-atom clusters,” S.T. Ruggiero and T.B. Ekkens, *J. Phys. C* **13**, 1819-1826 (2001).
- “Diode lasers for fast-beam laser experiments,” V. Gerginov, B. Laughman, D. DiBerardino, R.J. Rafac, S.T. Ruggiero, and C.E. Tanner, *Optics Commun.* **187**, 219-230 (2001).
- “Single-electron tunneling in metal droplets in the high conductance regime,” S.T. Ruggiero, T.B. Ekkens, and Sh. Farhangfar, *Phys. Rev. B* **63**, 195405 (2001).
- “T_c Suppression in Superconducting Films for use in Transition Edge Sensors,” Steven W. Deiker, Gene C. Hilton, Kent D. Irwin, William H. Rippard, Steven T. Ruggiero, Leila R. Vale, and Betty A. Young, *IEEE Trans. on Appl. Superconductivity* **13**, 661-663 (2003) (refereed conference paper).
- “Magneto-optic Effects in Spin-injection Devices,” S.T. Ruggiero, T. Williams, C.E. Tanner, S. Potashnik J. Moreland, and W.H. Rippard, *Appl. Phys. Lett.* **82**, 4599-601 (2003).
- “Periodic Tunnel-Current Oscillations in Metal Droplets,” S.T. Ruggiero, G.B. Arnold, and T. Ekkens, *J. Appl. Phys.* **94**, 3660 (2003).
- “Dilute Al-Mn Alloys for Superconductor Device Applications,” S.T. Ruggiero, A.

Williams, W. H. Rippard, A. M. Clark, S. W. Deiker, B.A. Young, L. R. Vale, and J. N. Ullom, *Nucl. Instr. and Meth. A* **520**, (2004) 274-276 (refereed conference paper).

“Using ion implantation to adjust the transition temperature of superconducting films,” B.A. Young, J.R. Williams, S.W. Deiker, S.T. Ruggiero, B. Cabrera, *Nucl. Instr. and Meth. A* **520**, 307-10 (2004). (refereed conference paper).

“Dilute Al-Mn Alloys for Low-Temperature Device Applications,” S.T. Ruggiero, A. Williams, W. H. Rippard, A. Clark, S.W. Deiker, L.R. Vale, and J.N. Ullom, *J. Low Temp. Phys.* **134**, 973-984 (2004).

“Practical Tunneling refrigerator,” A. M. Clark, A. Williams, S. T. Ruggiero, M. L. van den Berg, J. N. Ullom *Appl. Phys. Lett.* **84**, 625-7 (2004). (This is the cover article for the Jan. 26 edition of Applied Physics Letters.)

“Transition Edge Sensor Using Dilute AlMn Alloys,” S. W. Deiker, W. Doriese, G. C. Hilton, K. D. Irwin, W. H. Rippard, J. N. Ullom, L. R. Vale, S. T. Ruggiero, A. Williams, and B. A. Young, *Appl. Phys. Lett.* **85**, 2137 (2004).

“Cooling of bulk material by electron-tunneling refrigerators,” A. M. Clark, N. A. Miller, A. Williams, S. T. Ruggiero, G. C. Hilton, L. R. Vale, J. A. Beall, K. D. Irwin, and J. N. Ullom, *Appl. Phys. Lett.* **86**, 173508 (2005). (This is the cover article for the April 25 edition of Applied Physics Letters).

"Measurement and Modeling of Phonon Cooling by Electron-Tunneling Refrigerators," N.A. Miller, A.M. Clark, A. Williams, S.T. Ruggiero, G.C. Hilton, J.A. Beal, K.D. Irwin, L.R. Vale, and J.N. Ullom, *IEEE Trans. Appl. Supercond.* **15**, 556-9 (2005).

" Dilute Al-Mn Alloys for Superconductor Tunneling and Other Devices," S.T. Ruggiero, G.B. Arnold, A. Williams, A.M. Clark, N.A. Miller, and J.N. Ullom, *IEEE Trans. Appl. Supercond.* **15**, 125-8 (2005).

“Magneto-optic effects in ferromagnetic films: Implications for spin devices,” C.E. Tanner, T. Williams, S. Schwall, S.T. Ruggiero, P. Shaklee, S. Potashnik, J.M. Shaw, and C.M. Falco, *Optics Commun.* **259**, 704-709 (2006).

“Observation of Nonmagnetic Resonant Scattering Effects by Tunneling in Dilute Al-Mn Alloys Superconductors,” G. O’Neil, D. Schmidt, N. A. Miller, J. N. Ullom, A. Williams, G. B. Arnold, and S.T. Ruggiero, *Phys. Rev. Lett.* **100**, 056804 1-3.

“Progress in Density of States Measurements of Al Lightly Doped with Mn,” G. O’Neil, D. Schmidt, N. A. Miller, K.D. Irwin, J. N. Ullom, A. Williams, G. B. Arnold, and S.T. Ruggiero, *J. Low Temp. Phys.* **151**, 70-75 (2008).

7. Unrefereed Publications:

“Properties of Co-planar YBCO Devices,” S.T. Ruggiero, K.J. Rennert, L.R. Vale, and D.A. Rudman, HTSED '97 Workshop, Matsuyana, Japan, May 1997 (extended abstract).

8. Other Publications:

- “Flux Pinning in Layered 'Niobium Tin' Composites,” R.E. Howard, T.P. Orlando, S.T. Ruggiero, and M.R. Beasley, *Bull. Am. Phys. Soc.* **22**, 425 (1977).
- “Layered Superconducting Composites,” S.T. Ruggiero, T.W. Barbee, Jr. and M.R. Beasley, *Bull. Am. Phys. Soc.* **24**, 357 (1979).
- “Dimensional Crossover in Layered Superconducting Composites,” S.T. Ruggiero, T.W. Barbee, Jr., and M.R. Beasley, *Bull. Am. Phys. Soc.* **25**, 236 (1980).
- “Physical Properties of Layered Nb/Ge Superconducting Composites,” S.T. Ruggiero, T.W. Barbee, Jr., and M.R. Beasley, *Bull. Am. Phys. Soc.* **26**, 433 (1981).
- “Ion-Beam Deposition of Niobium,” S.T. Ruggiero, D.W. Face, and D.E. Prober, *Bull. Am. Phys. Soc.* **27**, 196 (1982).
- “Tunneling Properties of Ta Surface Layers on Nb,” S.T. Ruggiero, D.W. Face, and D.E. Prober, *Bull. Am. Phys. Soc.* **28**, 423 (1983).
- “Tunneling in Ta Surface Layers on Nb,” S.T. Ruggiero, E. Track and D.E. Prober, *Bull. Am. Phys. Soc.* **29**, 407 (1984).
- “Technique for Perpendicular Transport Measurements in Thin-Film Systems,” *Bull. Am. Phys. Soc.* **30**, 403 (1985)
- “Artificial Tunnel Barriers of Sputter-Deposited Aluminum Oxide,” J.B. Barner, S.M. Schwarzbek, and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **31**, 437 (1986).
- “Measurement of the Perpendicular Thin-Film Electron Transport Properties: The Effect of Field Spreading on the Resistance Between Circular Contacts,” S.M. Schwarzbek, J.B. Barner, S.T. Ruggiero, *Bull. Am. Phys.* **31**, 595 (1986).
- “Tunneling Through Cu/Aluminum-Oxide Multilayers,” J.B. Barner and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **32**, 693 (1987).
- “Perpendicular Resistance of Thin Metallic Films,” S.M. Schwarzbek and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **32**, 921 (1987).
- “Observation of the Coulomb Staircase: Tunneling into Small Particles,” J.B. Barner, A.R. Pelton, and S.T. Ruggiero, *Fifth Annual Review of Materials Research*, Argonne, IL (1987).
- “The dynamics of serially coupled mesoscopic junctions and their implications for tunneling measurements on high T_c superconductors,” S.T. Ruggiero, K. Mullen, E. Ben-Jacob, R. Wilkins, *Bull. Am. Phys. Soc.* **33**, 489 (1988).

“Tunneling into Ultra-Small Metal Particles,” J.B. Barner and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **33**, 366 (1988).

“Perpendicular Transport in Thin Metal Films,” S.M. Schwarzbeek, J.B. Barner, and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **33**, 496 (1988).

“Magnetic Field Dependence of Nonresonant Microwave Absorption in $R_1\text{Ba}_2\text{Cu}_3\text{O}_7$ ($R=\text{Y, Gd, Dy}$) Superconductors,” W.J. Tomasch, H.A. Blackstead, P. McGinn, S.T. Ruggiero, J.R. Clem, J.B. Barner, S.M. Schwarzbeek, *Bull. Am. Phys. Soc.* **33**, 774 (1988).

“Single-Electron Charging Effects and Implications for Tunneling Measurements of the High- T_c Superconductors,” J.B. Barner, K. Mullen, S.T. Ruggiero, E. Ben-Jacob, and A.R. Pelton, presented at the 1988 Applied Superconductivity Conference, San Francisco, CA, August 1988.

“Single-Electron Tunneling Systematics of Metal/ Al_2O_3 /Droplets/ Al_2O_3 /Metal Junctions,” J.B. Barner and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **34**, 502 (1989).

“Perpendicular Resistance of Thin NiCr Metal Films,” S.M. Schwarzbeek and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **34**, 1020 (1989).

Anodization Spectroscopy of Nb/Al/Nb Tri-layers to Form Small-Area Structures,” M.J. Honkannen, S.M. Schwarzbeek and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **34**, 502 (1989).

“Single-Electron Charging Effects,” N.M. Jisrawi, J.B. Barner, S.T. Ruggiero, *Bull. Am. Phys. Soc.* **35**, 218 (1990).

“Perpendicular Resistance of Thin Al Metal Films,” M. J. Honkannen, S.M. Schwarzbeek, S.T. Ruggiero, *Bull. Am. Phys. Soc.* **35**, 830 (1990).

“Perpendicular Resistance of Thin Al Metal Films,” M.J. Honkannen, S.M. Schwarzbeek and S.T. Ruggiero, *Bull. Amer. Phys. Soc.* **35**, 830 (1990).

“Single-Electron Charging Effects,” M. Jisrawi, J.B. Barner and S.T. Ruggiero, *Bull. Amer. Phys. Soc.* **35**, 218 (1990).

“Microwave Studies of Single Electron Charging Effects,” N.M. Jisrawi, S.J. Koester, Q. Lu, M. J. Honkannen, W. Porod, G. Bernstein, and S.T. Ruggiero, *Bull. Am. Phys. Soc.* **36**, 872 (1991)

“Scanning Tunneling Microscopy in Ag, Rb, and Other Soft Metals: Application to Single Electron Tunneling,” T.B. Ekkens, M.J. Honkannen, S.T. Ruggiero, *Bull. Am. Phys. Soc.* **37**, 167 (1992).

“Surface Morphology of DyBaCuO and YBCO Thin Films,” J. Bae, P. Seshadri, T. Ekkens, M. Honkannen, C. Zhong, S.T. Ruggiero and C. Choudhary, *Bull. Am. Phys. Soc.* **37**, 333 (1992).

“Critical Currents of High-Tc Superconductor Thin Films of YBCO,” The Enhancement of Pinning Effects by Silver Particles,” C. Zhong, T.B. Ekkens, S. Nolen, S. Ruggiero, Bull. Am. Phys. Soc. **38**, 213 (1993).

“STM Spectroscopy of Silver Particle Samples: Strong Quasi-Periodic Negative Differential Resistance,” T.B. Ekkens, C. Zhong, S. Nolen, S. Ruggiero, Bull. Am. Phys. Soc. **38**, 596 (1993).

“Coulomb-Staircase Behavior with Gold and Silver Droplets,” T.B. Ekkens, G.B. Arnold, and S.T. Ruggiero, Bull. Am. Phys. Soc. **39**, 734 (1994).

“YBCO Film Growth on Ultra-Thin Ag Layers,” C. Zhong and S.T. Ruggiero, 1994 Applied Superconductivity Conference, Boston, MA, October 1994.

“Growth and Transport Properties of YBCO Films on Ultra-Thin Ag Layers,” C. Zhang and S.T. Ruggiero, Bull. Am. Phys. Soc. **40**, 14 (1995).

“Coulomb-Staircase Behavior and Negative Differential Resistance with Lead and Silver Triple-Barrier Systems,” Bull. Am. Phys. Soc. **40**, 318 (1995).

“Response of YBCO devices to mid-infrared radiation,” S.T. Ruggiero, C. Zhong, K.J. Rennert, L.R. Vale, and D.A. Rudman, Applied Superconductivity Conference, August 1996.

“Tunneling Spectroscopy of Fullerene/Dielectric Multilayers,” S. Nolen and S.T. Ruggiero, 45th Midwest Solid State Conference, Kansas State University, October 1997.

“Wavelength Dependent Response in YBCO Systems,” S.T. Ruggiero, C.E. Tanner, A.J. Wilson, L.R. Vale, and D.A. Rudman, Materials Research Society Meeting, December 1997.

“Properties of Co-planar YBCO Devices,” S.T. Ruggiero, K.J. Rennert, L.R. Vale, and D.A. Rudman, in Proceedings of the 5th International Workshop on High-Temperature Superconducting Electron Devices, HTSED'97 FED-97, 223 (1997).

“Tunneling in Fullerene/Dielectric Multilayers,” S. Nolen and S.T. Ruggiero, Bull. Am. Phys. Soc. **43**, 158 (1998).

“Wavelength Dependent Photoresponse in YBCO Films,” S.T. Ruggiero, C.E. Tanner, A.J. Wilson, L.A. Vale, and D.A. Rudman, 1998 Summer Meeting of the Midwest Superconductivity Consortium, Columbia, Missouri, July 29, 1998.

“Wavelength Dependent Photoresponse in YBCO Thin-Film Systems,” S.T. Ruggiero, M.P. Mischke, C.E. Tanner, A.J. Wilson, L.R. Vale, and D.A. Rudman, 1998 Applied Superconductivity Conference, Palm Springs, CA, September 14, 1998.

“Wavelength Dependent Photoresponse in YBCO Systems,” S.T. Ruggiero, M.P. Mischke, C.E. Tanner, A.J. Wilson, L.R. Vale, and D.A. Rudman, *Bull. Am. Phys. Soc.* **44** (1999).

“Single-Electron Tunneling in Ultra-small Ni Droplets,” S.T. Ruggiero and T.B. Ekkens, *Bull. Am. Phys. Soc.* **44** (1999).

“Wavelength-Dependent Photoresponse in YBCO Systems,” S.T. Ruggiero, M.P. Mischke, C.E. Tanner, A.J. Wilson, D.A. Rudman and L.R. Vale, 1999 International Workshop on Superconductivity (ISTEC/MRS), Kauai Island, Hawaii, June 28, 1999.

“Single Electron Tunneling in the Ultra-high Conductance Regime,” S.T. Ruggiero and T.B. Ekkens, *Bull. Am. Phys. Soc.* **45**, 230 (2000).

“Single-electron Tunneling in Metal Droplets in the High Conductance Regime,” S.T. Ruggiero and Sh. Farhangfar, *Bull. Am. Phys. Soc.* **46**, 767 (2001).

“Single-Electron Tunneling in Metal Clusters,” S.T. Ruggiero, G.B. Arnold, and T. Ekkens, *Bull. Am Phys. Soc.* **47**, (2002).

“Wavelength-Dependent Photoresponse in $\text{YBa}_2\text{CuO}_{7-\delta}$,” M.P. Mischke, S.T. Ruggiero, C.E. Tanner, L.R. Vale, *Bull. Am. Phys. Soc.* **47**, (2002).

“Magneto-optic Effects in Ferromagnetic-based Spin Injection Devices Films,” S.T. Ruggiero, T. Williams, C.E. Tanner, S. Potashnik, J. Moreland, and W.H. Rippard, *Bull. Am. Phys. Soc.* **48**, 313 (2003).

“Dilute Al-Mn Alloys for Superconductor Tunneling and Other Devices,” S.T. Ruggiero, G.B. Arnold, A. Williams, A.M. Clark, J.N. Ullom, N.A. Miller, Applied Superconductivity Conference, Jacksonville, FL (2004)

“Tunneling in Dilute Al-Mn Alloys: Observation of Resonant Scattering and Implications for High-Temperature Superconductors,” S.T. Ruggiero, G.B. Arnold, J. Bychowski, A. Williams, N. Sun, A. Clark, N. Miller, J. Ullom, *Bull. Am. Phys. Soc. Baltimore, MD*, March 2006

“Magnetic particle imaging with a cantilever torque magnetometer,” J. Moreland, J. Eckstein, Y. Lin, S.-H. Loiu, and S. Ruggiero, *Bull. Am. Phys. Soc. Denver, CO*, March 2007, p.180.

“Density of States measurement of AlMn alloys with tunable superconducting gaps,” G. O’Neil, D. Schmidt, N. Miller, J. Ullom, A. Williams, G. Arnold, and S. Ruggiero, *Bull. Am. Phys. Soc. Denver, CO*, March 2007, p. 452.

“Superconducting Properties of Al-Eu Alloys,” J.P. Bychowski, *Bull. Am. Phys. Soc. New Orleans, LA*, March 2008.

“Studies of Au/SAMs/PEDOT-PSS/Au tunnel junctions,” N. Sun, M. Lieberman, and S.T. Ruggiero, Bull. Am. Phys. Soc. New Orleans, LA, March 2008.

9. Invited Lectures and Seminars

“Layered Superconducting Composites,” IBM Watson Research Labs., Yorktown Heights, NY (Sept. 1980).

“Layered Superconducting Composites,” Bell Telephone Laboratories, Murray Hill, NJ, (Sept. 1980).

“Layered Superconducting Composites,” Yale University, New Haven, CT, (Oct. 1980).

“Layered Superconductors,” Hunter College, New York, NY (Dec.1981).

“Layered Superconductors,” Illinois Institute of Technology (Nov. 1982).

“Layered Superconductors,” University of Notre Dame, Notre Dame, IN (Dec. 1982).

“Synthetic Layered Superconductors,” First International Conference on Superlattices and Microstructures, University of Illinois at Urbana-Champaign, Champaign, IL (Aug, 1984).

“Synthetic Layered Superconductors,” University of Illinois at Urbana-Champaign (Phys. Dept.), Champaign, IL (Oct. 1985).

“Synthetic Layered Superconductors,” Michigan State University, East Lansing, MI (Nov. 1985).

“RF Sputter-Deposited Aluminum-Oxide Films as High Quality Artificial Tunnel Barriers,” (International) 1986 Applied Superconductivity Conference, Baltimore, MD. (Oct. 2, 1986).

“Transport Properties of Anisotropic Systems,” invited talk presented at the 1987 Annual (International) Meeting of the American Metallurgical Society, February 24, 1987.

“Single-Electron Charging Effects,” 1987 Workshop on Superconductive Electronics, Coto-de-Caza, CA, October 1987.

“Single-Electron Charging Effects,” 35th Midwest Solid-State Conference, South Bend, IN, October 1987.

“Single-Electron Charging Effects,” University of Michigan, Ann Arbor, MI, January 1988.

“Single-Electron Charging Effects,” Michigan State University, E. Lansing, MI, February 1, 1988.

“Single-Electron Charging Effects,” Illinois Institute of Technology, Chicago, IL, May 4, 1988.

“Single-Electron Charging Effects,” Purdue University, West Lafayette, IN, September 23, 1988.

“Electron tunneling in ultra-small capacitance particles and high-temperature superconductors,” Superconductor Technologies, Inc., Santa Barbara, CA, October 13, 1988.

“Electron tunneling in ultra-small capacitance particles,” Indiana University, Bloomington, IN, October 21, 1988.

“Single-Electron Charging Effects,” invited talk, March Meeting of the American Physical Society, 1989.

“Mixing in TlBaCaCuO Films,” Materials and Mechanisms of Superconductivity, Kanazawa, Japan, July 24, 1991.

“Charging Effects in Single Particle Systems,” Nordita Workshop on Nanometer Structures and Mesoscopic Physics, Trondheim, Norway, June 21, 1992.

“Far-Infrared Superconducting Devices Collaboration,” National Institute of Standards and Technology, Boulder, CO, August 5, 1994.

“High-Field Effects in Single-Electron Systems,” 100 Tesla Workshop, Los Alamos, NM, January 19, 1995.

“Photoresponse of YBCO Narrow-Line Systems,” Jet Propulsion Laboratory, Pasadena, CA, October 22, 1997.

“Electron Tunneling in Ultra-small Clusters,” Colloquium, Central Michigan University, Mount Pleasant, MI, April 9, 1998.

“Single Electron Tunneling in the High Conductance Regime,” invited talk at the National Institute of Standards and Technology, Boulder, Colorado, November 16, 2000.

“Single-electron tunneling in metal nanoclusters,” Seminar, University of Colorado, Boulder, CO, May 10, 2002.

“Spin Tunneling in Co/GaAs,” Seminar, National Institute of Standards and Technology, Boulder, CO, July 29, 2002.

“Dilute Al-Mn Alloys for Superconductor Device Applications,” Jet Propulsion Laboratory, Pasadena, CA, July 29, 2003.

“Dilute Al-Mn Alloys for Low-Temperature Device Applications” at the 10th International Conference on Low-Temperature Detectors, Genoa, Italy, July 2003.

“Dilute Al-Mn Alloys for Low-Temperature Device Applications,” Yale University, Aug 2004.

10. Masters Students Directed

Alexandra Anastapolis
Shunling Zhou
Anthony Williams

11. Doctoral Students Directed

Jeffery Barner
Steven Schwarzbek
Thomas Ekkens
Shalva Nolen
Matthew Mischke

12. Other Notable Contributions

Eight summer students advised under the NSF Research for Undergraduate students program.

Post-docs advised: M. Jisrawi