Curriculum Vitae – Edmund Richard Nowak

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Professional Preparation

Illinois Institute of Technology, B.S., *Summa Cum Laude*	Physics	1986
University of Minnesota, Ph.D.	Physics	1994
The University of Chicago, Postdoctoral Fellow	Physics	1994–97
University of Illinois at Urbana-Champaign, Postdoctoral Fellow	Physics	1997–99

Appointments and Honors

Associate Chair, Dept. Physics & Astronomy, University of Delaware	2007-present
Associate Professor, Dept. Physics & Astronomy, University of Delaware	2005-present
Editor, Fluctuations and Noise Letters	2005-present
Visiting Scientist, Army Research Laboratory, Adelphi, MD	2005
Cottrell Scholar Award, Research Corporation	2002
Institute for Transforming Undergraduate Education Fellow, Univ. of Delaware	2000
Assistant Professor, Department of Physics and Astronomy, University of Delaware	1999-2005
Educational Outreach Coordinator, Materials Research Science and Engineering Center, The University of Chicago	1996-1997

Refereed Publications (underline denotes Delaware students, *undergraduate student)

1. "Spin-polarized transport in hybrid (Zn, Cr)Te/Al_2O_3/Co Magnetic Tunnel Junctions"; W.G. Wang, C. Ni, T. Moriyama, J. Wan, E.R. Nowak, and J.Q. Xiao; *Applied Physics Letters* **88**, 202501 (2006).
2. "Magnetic Field Dependence of the Noise in a Magnetoresistive Sensor having MEMS Flux Concentrators"; A. Ozbay, E.R. Nowak, A.S. Edelstein, G.A. Fischer, C.A. Nordman, and Shu Fan Cheng, *IEEE Transactions on Magnetism* 42, 3306 (2006).
3. "1/*f* Noise in Magnetic Tunnel Junctions with MgO Tunnel Barriers"; Aisha Gokce, E.R. Nowak, See-Hun Yang, and S.S.P. Parkin, *Journal of Applied Physics* **99**, 08A906 (2006).
4. "Progress Toward a Thousand-fold Reduction in 1/*f* Noise in Magnetic Sensors using an AC MEMS Flux Concentrator"; A.S. Edelstein, G.A. Fischer, M. Pedersen, E.R. Nowak, Shu Fan Cheng, and C.A. Nordman, *Journal of Applied Physics* **99**, 08B317 (2006). Also published in the *Virtual Journal of Nanoscale Science & Technology* by the American Institute of Physics, May 15, 2006.
5. "Vortex-Flow Voltage Noise and Normal-State Resistance Fluctuations in Epitaxial (Dy,Y)$Ba_2Cu_3O_7$ Thin Films"; E.R. Nowak, *Physica C: Superconductivity* **421**, 15 (2005).
6. "Magnetoresistance and Electrical Noise in the Silver Chalcogenide Ag_2Te"; L. Jiang and E.R. Nowak, *Fluctuations and Noise Letters* **4**, L465, (2004).
7. "Low Frequency Magnetic and Resistance Noise in Magnetic Tunnel Junctions"; L. Jiang, E.R. Nowak, P.E. Scott, J. Johnson*, J.M. Slaughter, J. Sun, and R.W. Dave, *Physical Review B* **69**, 054407 (2004).

8. *"What a Drag!"*; E.R. Nowak, *Problem-based Learning On-line Clearinghouse* (www.udel.edu/pblc/); published December 15, 2003.
9. *"The Sweet Spot"*; E.R. Nowak, *Problem-based Learning On-line Clearinghouse* (www.udel.edu/pblc/); published April 7, 2003.
10. "Electrical Noise in n-type and p-type Ag_2Te"; L. Jiang and E.R. Nowak, *Applied Physics Letters* **83,** 503 (2003).
11. "Compaction and Noise in Vibrated Granular Media"; A. C. B. Barnum*, A. Ozbay, and E. R. Nowak, *Advances in Complex Systems* **4**, 389 (2001).
12. "Density-Noise Power Fluctuations in Vibrated Granular Media"; E. R. Nowak, A. Grushin*, A. C. B. Barnum*, and M. B. Weissman, *Physical Review E (Rapid Communication)* **63**, 020301R (2001).
13. "Electron Tunneling and Noise Studies in Ferromagnetic Junctions"; E. R. Nowak, P. Spradling*, M. B. Weissman, and S. S. P. Parkin, *Thin Solid Films* **377-378**, 699 (2000).
14. "Mesoscopic Thermodynamics of an Inhomogeneous Colossal-Magnetoresistive Phase"; R. D. Merithew, M. B. Weissman, F. M. Hess, P. Spradling*, E. R. Nowak, J. O'Donnell, J. Eckstein, Y. Tokura, and Y. Tomioka, *Physical Review Letters* **84**, 3442 (2000).
15. "Electrical Noise in Hysteretic Ferromagnet-Insulator-Ferromagnet Tunnel Junctions"; E. R. Nowak, M. B. Weissman, and S. S. P. Parkin, *Applied Physics Letters* **74**, 600 (1999).
16. "Glassy Behavior of the Parking Lot Model"; A. J. Kolan, E. R. Nowak, and A. Tkachenko, *Physical Review E* **59**, 3094 (1999).
17. "Noise Properties of Ferromagnetic Tunnel Junctions"; E. R. Nowak, R. D. Merithew, M. B. Weissman, I. Bloom, and S. S. P. Parkin, *Journal of Applied Physics* **84**, 6195 (1998).
18. "Slow Relaxation in Granular Compaction"; E. Ben-Naim, J. B. Knight, E. R. Nowak, H. M. Jaeger, and S. R. Nagel, *Physica D* **123**, 380 (1998).
19. "Density Fluctuations in Vibrated Granular Materials"; E. R. Nowak, J. B. Knight, H. M. Jaeger, and S. R. Nagel, *Physical Review E* **57**, 1971 (1998).
20. "Low-Temperature Magnetic Relaxation in $HgBa_2Ca_2Cu_3O_{8+\delta}$ Single Crystals with Columnar Defects"; E. R. Nowak, J. M. Fabijanic*, S. Anders, and H. M. Jaeger, *Physical Review B* **58**, 5825 (1998).
21. "Reversibility and Irreversibility in the Packing of Vibrated Granular Material"; E. R. Nowak, J. B. Knight, M. L. Povinelli, H. M. Jaeger, and S. R. Nagel, *Powder Technology* **94**, 79 (1997).
22. "Studies of Granular Compaction"; E. R. Nowak, M. L. Povinelli, H. M. Jaeger, S. R. Nagel, J. B. Knight, and E. Ben-Naim, *Powders & Grains*, eds. Behringer and Jenkins, (A.A. Balkema, Rotterdam, 1997) p. 377.
23. "Magnetic Flux Instabilities in Niobium Rings: Tuning the Avalanche Behavior"; E. R. Nowak, O. W. Taylor*, L. Liu, H. M. Jaeger, and T. I. Selinder, *Physical Review B* **55**, 11702 (1997).
24. "Vortex Localization in Single Crystals of $Tl_2Ba_2CuO_{6+\delta}$ with Columnar Defects"; E. R. Nowak, S. Anders, H. M. Jaeger, J. A. Fendrich, W. K. Kwok, R. Mogilevsky, and D. G. Hinks, *Physical Review B* (Rapid Communication) **54**, 12725 (1996).
25. "Slow Relaxation in Granular Compaction"; E. Ben-Naim, J. B. Knight, and E. R. Nowak, Report No. cond-mat/9603150 (1996).
26. "High-Angle Grain-Boundary Junctions in $YBa_2Cu_3O_7$: Normal-State Resistance and 1/*f* Noise"; L. Liu, E. R. Nowak, H. M. Jaeger, B. V. Vuchic, K. L. Merkle, D. B. Buchholz, and R. P. H. Chang, *Physical Review B* **51**, 16164 (1995).
27. "Magnetofingerprints of Superconducting Films: Vortex Dynamics and Mesoscopic-Scale Disorder"; E. R. Nowak, N. E. Israeloff, and A. M. Goldman, *Physical Review B* (Rapid Communication) **49**, 10047 (1994).

28. "Probing Vortex Kinetics in High-T_c Y(Dy)$Ba_2Cu_3O_7$ Thin Films with Noise"; E. R. Nowak, N. E. Israeloff, V. S. Achutharaman, and A. M. Goldman, *Physica B* 194-195, 2303 (1994).
29. "Coulomb Blockade on Imaged Mesoscopic Lead Grains"; J-C Wan, K. A. McGreer, N. Anand, E. R. Nowak, and A. M. Goldman, *Physical Review B* **42**, 5604 (1990).
30. "Onset of Hysteresis Measured by Scanning Tunneling Microscopy"; T. Erber, K. A. McGreer, E. R. Nowak, J-C Wan, and H. Weinstock, *Journal of Applied Physics* **68**, 1370 (1990).

Conference Proceedings

31. "The MEMS Flux Concentrator: Potential Low-cost, High-sensitivity Magnetometer"; A.S. Edelstein, G.A. Fischer, W. Benard, E.R. Nowak, and S.F. Cheng; Proceedings of the 25th Army Science Conference (November 27-30, 2006).
32. "Operation of the MEMS Flux Concentrator", Proceedings of the Battlespace Acoustic & Seismic Sensing – Military Sensors Symposium 2006 Meeting; published by the Military Sensing Information Analysis Center (SENSIAC), a Department of Defense chartered Information Analysis Center (not for public release).
33. "Minimizing 1/f Noise in Magnetic Sensors using an AC MEMS Flux Concentrator"; A.S. Edelstein, G.A. Fischer, M. Pedersen, E.R. Nowak, Shu Fan Cheng, and C.A. Nordman; Materials Research Society Fall 2005 Meeting (invited paper).
34. "Development of a MEMS Flux Concentrator Magnetometer"; A.S. Edelstein, G. Fischer, M. Pedersen, and Shu Fan Cheng, and E.R.Nowak; in Proceedings of the Military Sensing Symposia; edited by J. Eicke and A.S. Edelstein, SENSIAC 2005 (invited paper).
35. "Noise Sources and Magnetic Field Detectivities of Magnetoresistive Sensors"; E.R. Nowak, Aisha Gokce, and A.S. Edelstein; in Proceedings of the Military Sensing Symposia; edited by J. Eicke and A.S. Edelstein, SENSIAC 2005 (invited paper).
36. "Zigzag-Shaped AMR Magnetic Sensors: Transfer Characteristics and Noise"; L. Jiang, Aisha Gokce, F.C.S. da Silva, E.R. Nowak, and D.P. Pappas, in Proceedings of SPIE, Vol. **5846**, *Nanoelectronics, Sensors, and Standards III*, edited by Janos A. Bergou, Janusz M. Smulko, Mark I. Dykman, and Lijun Wang; (SPIE, Bellingham, WA, 2005), p. 156-168.
37. "Low Frequency Magnetic and Resistance Noise in Magnetoresistive Tunnel Junctions"; L. Jiang, J.F. Skovholt, E.R. Nowak, and J.M. Slaughter, in Proceedings of SPIE, Vol. **5469**, *Fluctuations and Noise in Materials*, edited by D. Popovic, M.B. Weissman, and Z. Racz (SPIE, Bellingham, WA, 2004), p. 13-27.
38. "Magnetoresistance and Electrical Noise in the Silver Chalcogenide Ag_2Te"; L. Jiang and E.R. Nowak in Proceedings of SPIE, Vol. **5112**, *Noise as a Tool for Studying Materials*, edited by M.B. Weissman, N.E. Israeloff, A.S. Kogan, (SPIE, Bellingham, WA, 2003), p. 206-13.

Grants and Contracts

1. **Department of Energy** (07/01/07 – 06/30/10)
   "Center for Spintronics and Biodetection", **E.R. Nowak**, **co-P.I.**; Yi Ji, co-P.I.; J.S. Kolodzey, co-P.I.; B. Nikolic, co-P.I.; J.Q. Xiao, co-P.I.; S. Sun, co-P.I. – Brown U.
2. **Office of Naval Research** (04/27/07 – 04/25/09)
   "Spin-Precession Magnetic Sensor", **E.R. Nowak, co-I**, S. Krishnamurthy, P.I. – SRI International; Z-G. Yu, co-I – SRI International; H.E. Katz, co-I – Johns Hopkins U.
3. **Office of Naval Research – STTR Phase II** (02/01/07 – 09/30/08)
   "Novel Materials for Ultra-Sensitive Low-Frequency Magnetometers", **E.R. Nowak, co-P.I.**, C.A. Nordman – NVE Corp., co-P.I.

4. **Defense Advanced Research Projects Agency (DARPA)** (10/01/06 – 09/15/07)
   "Spin-Precession Magnetometer", E.R. Nowak, consultant for SRI International funded as a subcontract from a DARPA program.
5. **Office of Naval Research – STTR Phase I & Bridge** (09/01/05 – 05/31/06)
   "Novel Materials for Ultra-Sensitive Low-Frequency Magnetometers", **E.R. Nowak, co-P.I.**, C.A. Nordman – NVE Corp., co-P.I.
6. **US Army Research Laboratory** (06/01/05 – 12/31/05)
   "Noise in Soft Ferromagnets", **E.R. Nowak, P.I.**
7. **Petroleum Research Foundation, American Chemical Society** (1/01/05 – 08/31/07)
   "Noise Spectroscopy of Spin-Based and Semiconductor-Based Magnetoresistive Systems", **E.R. Nowak, P.I.**
8. **National Science Foundation** (07/01/04 – 06/30/07)
   "Spin Polarized Transport Properties in Tunnel Structures", J.Q. Xiao P.I., **E.R. Nowak, co-I**.
9. **National Science Foundation** (08/01/02 – 07/31/03)
   "Acquisition of a Physical Properties Measurement Facility for Materials Research and Education", **E.R. Nowak, P.I.**, I. Shah, K.H. Theopold, K.M. Unruh, and J.Q. Xiao, co-Is.
10. **Research Corporation – Cottrell Scholar Award** (06/01/02 – 05/31/07)
    "Experimental Studies of Dense Granular Media: Towards a Thermodynamics of Powders", **E.R. Nowak, P.I.**
11. **Petroleum Research Foundation, American Chemical Society** (08/01/00 – 07/31/02)
    "Role of Stoichiometry on the Electrical and Galvanomagnetic Properties of Silver Chalcogenides", **E.R. Nowak, P.I.**
12. **National Science Foundation,** (06/01/01 – 05/31/02)
    "Research Experience for Undergraduates", **E.R. Nowak, P.I.**, J.Q. Xiao, co-I.
13. **National Science Foundation** (05/01/01 – 04/30/05)
    "Problem-Based Learning and Physics: Developing Problem Solving Skills in All Students", G.H. Watson, P.I., B. Duch, **E.R. Nowak**, and B. Williams, co-Is.
14. **Seagate Technology, Inc.** (08/01/00 – 05/31/02)
    "Novel Electronic Devices Based on Magnetic Nanostructures: Magnetic Tunnel Junctions for Modern Recording Heads", J.Q. Xiao, P.I., **E.R. Nowak, co-I.**
15. **National Science Foundation** (07/01/00 – 06/30/03)
    "Interface Effects in Magnetic Tunnel Junctions", J.Q. Xiao, P.I., **E.R. Nowak, co-I.**

Other Awards

16. **Petroleum Research Foundation, American Chemical Society – Supplement Award for Underrepresented Minority Minority Research** (6/01/07 – 05/31/08)
    "Noise Spectroscopy of Spin-Based and Semiconductor-Based Magnetoresistive Systems", **E.R. Nowak, P.I.**
17. **SPIE – The International Society for Optical Engineering** (05/23/05 – 05/26/05)
    Student Travel Grant, **E.R. Nowak**, SPIE's International Symposium on Fluctuations and Noise, Austin, TX.
18. **Center for International Studies, University of Delaware** (02/01/04 – 05/31/04)
    International Travel Award, **E.R. Nowak**, Gran Canaria, Spain.

19. **Institute for Transforming Undergraduate Education, U. Delaware** (05/1/03 – 08/31/03)
"What a Drag!: A Problem-Based Learning Activity", **E.R. Nowak, P.I.**
20. **UNIDEL Foundation, University of Delaware** (04/01/01 – 03/31/02)
"Introductory Physics Laboratory Redevelopment", N. Mulders, P.I., T. Mitchell, **E.R. Nowak**, and B.C. Walker, co-Is.
21. **Center for Teaching Effectiveness, University of Delaware** (03/01/00 – 02/28/01)
"On-line Physics Lecture Demonstration Index for Improved Delivery and Student Access", **E.R. Nowak, P.I.**
22. **University of Delaware Research Foundation** (06/01/00 – 05/31/01)
"Anomalous Magnetoresistance in the Silver Chalcogenides", **E.R. Nowak, P.I.**

Teaching

Graduate Courses: Kinetic Theory and Thermodynamics (PHYS 616), Electronics for Scientists (PHYS 645), Instrumentation for Scientists (PHYS 646), Introduction to Basic Vacuum Technology (PHYS 667), Solid State Seminar (PHYS 862).

Undergraduate Course: Physical Science (SCEN 102), Fundamentals of Physics I (PHYS 207 and PHYS 207 Honors), Fundamentals of Physics II (PHYS 208 Honors), Introduction to Electricity and Electronics (Phys245), Independent Study (PHYS 266 and PHYS 366), Introduction to Research (PHYS 449).

Professional Service Activities

Editor of Fluctuations and Noise Letters, subjects include magnetism and superconductivity (2005-2007).

Executive Committee, Magnetic Interfaces & Nanostructures Division of the American Vacuum Society (elected term 2005-2007).

Program Committee, Conference on Fluctuations and Noise in Materials, SPIE's International Symposium on Fluctuations and Noise, Santa Fe, NM (June 1-4, 2003), Gran Canaria, Spain (May 26-28, 2004), Austin, TX (May 24-26, 2005).

Conference Session Chair for: American Physical Society Meetings, International Symposia on Fluctuations and Noise, American Vacuum Society Meetings, International Magnetics Conferences, Problem Based Learning 2002.

Referee for Physical Review Letters, Fluctuations and Noise Letters, EuroPhysics Letters, Physical Review B, Physical Review E, Applied Physics Letters, Journal of Applied Physics, Physics Essays, IEEE Transactions on Magnetics, IEEE Sensors, Problem-Based Learning Clearinghouse (http://www.udel.edu/pblc).

Reviewer for National Science Foundation, Department of Energy, Research Corporation, Petroleum Research Foundation.

Synergistic and Outreach Activities

1. **Conference Workshops:** Tutorial: Introduction to Noise and Measurement Techniques at the International Magnetics Conference (May 8-12, 2006 – San Diego, CA); Tutorial: Noise Mechanisms in AMR, GMR, and TMR Sensors at the 49th Magnetism and Magnetic Materials Conference (Nov. 7-11, 2004 – Jacksonville, FL); Physics PBL Writing Clinic at

the PBL Workshop: From Ideas to Solutions through Communication (Jan. 24. 2004 – University of Delaware).

2. **On-line Problem-Based Learning Clearinghouse:** member of a 4 person team for the development of a Problem-Based Learning program for reforming undergraduate physics teaching at UDelaware. Goals include: development of a database of problems, instructional models, evaluation tools, and web-based resources made accessible to faculty worldwide through an online clearinghouse; see http://www.udel.edu/pbl/ for details. (2000-present).
3. **Director** of the Physics & Astronomy Department's Outreach Speakers Program for colleges and small universities in the mid-Atlantic and northeastern states. (2002 – 2004).
4. **Laboratory tours** with hands-on demonstrations for local high school students, home schooled students, and prospective university science majors.

Selected Departmental and University Service Activities

Associate Chair (2007-present)
Mentor for new tenure track faculty hire (2006-present)
Executive Committee (2006-2009, **Convener** 2006-2007)
Condensed Matter Experimentalist Search (**Chair**, 2005-2006; member, 2004-2005)
Condensed Matter Seminar (Member, 2004-2005, 2001-2002; **Chair**, 2002-2004)
Graduate Recruitment (**Chair**, 2001 – 2004)
Academic Program Review, Graduate Program (**co-Chair**, 2003-2004)
Graduate Admissions (**Chair**, 2006-2008; member, 2005-2006, 2001-2002)
Computer and Information Technology Assistant III Search (member, 2002-2003)
Condensed Matter Theory Search (member, 2001-2002)
Department of Physics and Astronomy Chair Search (member, 2001-2002)
12 Thesis M.S. and Ph.D. Defense Committees
Arts & Sciences Senate Respresentative (2000-2005)

Invited Talks (presenter is the first author or is underlined; Delaware students who are co-authors are denoted by a double-underlined, * denotes undergraduate student)

1. "Signal and Intrinsic Noise of Magnetic Field Sensors"; E.R. Nowak; DARPA-MTO Low Frequency Magnetic Sensors Workshop, Arlington, VA (Aug. 25, 2006).
2. "The MEMS Flux Concentrator"; A.S. Edelstein, G. Fischer, M. Pedersen, E.R. Nowak, W. Benard, S-F. Chang, K. Oliver, and C.A. Nordman, Military Sensing Symposia 2006, Laurel, MD (Aug. 22-24, 2006).
3. "Introduction to Noise and Measurement Techniques"; E.R. Nowak, Tutorial on Noise Mechanisms in Magnetic Devices at the IEEE International Magnetics Conference, San Diego, CA (May 8-12, 2006).
4. "Progress Toward a Thousand-fold Reduction in 1/f Noise in Magnetic Sensors using an AC MEMS Flux Concentrator"; A.S. Edelstein, G.A. Fischer, M. Pedersen, E.R. Nowak, Shu Fan Cheng, and C.A. Nordman, Materials Research Society Meeting, Boston, MA (Nov. 28 – Dec. 2, 2005).
5. "Progress Toward a Thousand-fold Reduction in 1/f Noise in Magnetic Sensors using an AC MEMS Flux Concentrator"; A.S. Edelstein, G.A. Fischer, M. Pedersen, E.R. Nowak, Shu Fan Cheng, and C.A. Nordman, Magnetism and Magnetic Materials Conference, San Jose, CA (Oct. 31 – Nov. 3, 2005).

6. "Development of a MEMS Flux Concentrator Magnetometer"; A.S. Edelstein, G. Fischer, M. Pedersen, and Shu Fan Cheng, and E.R.Nowak; Military Sensing Symposia 2005, Laurel, MD (Aug. 22-25, 2005).
7. "Noise Sources and Magnetic Field Detectivities of Magnetoresistive Materials"; E.R. Nowak, Aisha Gokce, A.S. Edelstein; Military Sensing Symposia 2005, Laurel, MD (Aug. 22-25, 2005).
8. "Zigzag-shape AMR Magnetic Sensors"; L. Jiang, Aisha Gokce, F.C.S. da Silva, E.R. Nowak, and D.P. Pappas; SPIE's Third International Symposium on Fluctuations and Noise, Austin, TX (May 24-26, 2005).
9. "Noise Spectroscopy of Modern Magnetoresistive Materials"; E.R. Nowak; Seminar, Army Research Laboratory, Adelphi, MD (April 19, 2005).
10. "Noise Mechanism in AMR, GMR, and TMR Sensors"; E.R. Nowak, Tutorial on Magnetic Sensors, 49th Magnetism and Magnetic Materials Conference, Jacksonville, FL (November 7-11, 2004).
11. "Noise Mechanisms in TMR Structures and AMR Zig-Zag Sensors"; E.R. Nowak; Seminar, Colorado Center for Information Storage and IEEE Magnetics Society (Denver Chapter), University of Colorado, Boulder, CO (July 23, 2004).
12. "Noise Mechanisms in Magnetoresistive Tunnel Structures"; E.R. Nowak; Seminar, Nonvolatile Electronics, Bloomington, MN (July 22, 2004).
13. "Compaction and Glassy Dynamics of a Model Granular Material"; Aisha Gokce and E.R. Nowak, International Fine Particle Research Institute Annual General Meeting, Newark, DE (June 23, 2004).
14. "Noise Spectroscopy of Magnetoresistive Tunneling Structures"; L. Jiang, J.F. Skovholt, and E.R. Nowak, and J. Slaughter, SPIE's Second International Symposium on Fluctuations and Noise, Gran Canaria, Spain (June 2 – 4, 2004).
15. "Noise Spectroscopy of Magnetoresistive Tunneling Structures"; E.R. Nowak, Condensed Matter Atomic Molecular Physics Seminar, Dept. of Physics and Astronomy, Pennsylvania State University, (April 6, 2004).
16. "Noise Spectroscopy of Magnetoresistive Tunneling Structures"; E.R. Nowak, Seminar, National Institute of Standards and Technology, Gaithersburg, MD and simulcast in Boulder, CO (March 10, 2004).
17. "Problem-Based-Learning and Physics: Developing Problem Solving Skills in All Students" B. Duch, E.R. Nowak, and G.H. Watson, Cottrell Scholar Conference, Tucson, AZ (July 11–12, 2003).
18. "Quasi-Equilibrium Magnetic Noise in Micron-Scale Magnetic Tunnel Junctions"; E.R. Nowak, Seminar, Motorola Labs, Microelectronics and Physical Sciences Laboratory, Tempe, AZ (July 9, 2003).
19. "Shake, Rattle, and Roll: Investigations Inspired by Sand"; E.R. Nowak, Department of Physics Colloquium, Lehigh University, PA (April 24, 2003).
20. "Shake, Rattle, and Roll: Investigations Inspired by Sand"; E.R. Nowak, Department of Physics Colloquium, Juniata College, Huntingdon, PA (March 14, 2003).
21. "Dynamics of Complex Systems: From Sandpiles to Superconductors"; E.R. Nowak, Department of Physics and Astronomy Colloquium, State University of New York - Brockport (February 26, 2002).
22. "Shake, Rattle, and Roll: Investigations Inspired by Sand"; E.R. Nowak, Public Talk at the Sigma Xi Induction Ceremony, Rochester Institute of Technology, NY (February 12, 2002).
23. "Dynamics of Complex Systems: From Sandpiles to Superconductors"; E.R. Nowak, Department of Physics and Astronomy Colloquium, Rochester Institute of Technology, NY (February 12, 2002).
24. "Dynamics of Complex Systems: From Sandpiles to Superconductors"; E.R. Nowak, Department of Physics and Astronomy Colloquium, Rowan University, NJ (January 28, 2002).

25. "Cooperativity and Memory Effects in Vibrated Granular Material"; E.R. Nowak, A.C.B. Barnum*, A. Grushin*, M.B. Weissman, H.M. Jaeger, and S.R. Nagel, ICTP workshop on Challenges in Granular Physics, Trieste, Italy (August 7-11, 2001).
26. "Granular Dynamics"; E.R. Nowak, Delaware Valley Particle Symposium - International Fine Particle Research Institute Annual General Meeting, Newark, DE (March 1, 2001).
27. "Electron Tunneling and Noise in Ferromagnetic Tunnel Junctions"; E.R. Nowak, Condensed Matter Seminar, Physics Department, University of Delaware (October 3, 2000).
28. "Electron Tunneling and Noise studies in Ferromagnetic Junctions"; E.R. Nowak, M.B. Weissman, and S.S.P. Parkin, International Conference on Metallurgical Coatings and Thin Films, San Diego, CA (April 13, 2000).
29. University of Delaware; Physics and Astronomy Colloquium (April, 1999).
30. University of Illinois at Chicago; Physics Colloquium (April, 1999).
31. Seagate Technologies, Minneapolis, MN; Seminar (April, 1999).
32. Naval Research Laboratory, Washington, DC; Seminar (March, 1999).
33. George Washington University, Washington, DC; Physics Colloquium (March, 1999).
34. Syracuse University; Physics Colloquium (March, 1999).
35. American Physical Society Meeting, Los Angeles, CA (March, 1998).
36. Jamming and Rheology Conference, Institute of Theoretical Physics, University of California – Santa Barbara (October 13, 1997).
37. Powders & Grains International Conference, Duke University (May 15, 1997).
38. University of Michigan, Condensed Matter Physics Seminar (Jan. 28, 1997).
39. American Physical Society Meeting, Pittsburgh, PA (March, 1994).

Selected Contributed Talks

1. "Temperature and Field Dependence of the Low Frequency Magnetic Noise in Spin Valves"; A. Ozbay, E.R. Nowak, A. Edelstein, G. Fischer, and C. Nordman; 10th Joint MMM/Intermag Conference (January 7-11, 2007).
2. "Current and Resistance Noise Mechanisms in High-TMR Mgo-based Magnetic Tunnel Junctions"; Aisha Gokce, E.R. Nowak, and A. Gupta; 10th Joint MMM/Intermag Conference (January 7-11, 2007).
3. "What a Drag!"; E.R. Nowak, M. Natu, and P. Hyde, Faculty Teaching, Learning, and Technology Institute, University of Delaware, (January 7, 2004).
4. "A New Method to Measure Viscosity in Food Using a Flaxseed Meal Model System"; Adaora Ikwuagwu*, C. Davies, A. Shine, and E.R. Nowak, 2003 Annual Biomedical Research Conference for Minority Students, San Diego, CA (October 15–18, 2003).
5. "Problem-Based Learning for Introductory Physics Laboratories"; E.R. Nowak, T. Mitchell, N. Mulders, and B.C. Walker, PBL 2002 – A Pathway to Better Learning, Baltimore, MD (June 16–20, 2002).

Recent Collaborators (past 5 years)

(i) External collaborators

Dr. Alan S. Edelstein, Army Research Laboratory, *MEMS based magnetic field sensor*

Dr. William Egelhoff, National Institute of Standards and Technology, Gaithersburg, MD – *Magnetoresistance in silver chalcogenide thin films*

Professor Arun Gupta, Center for Materials for Information Technology, University of Alabama, Tuscaloosa, AL – *Magnetic tunnel junctions*

Dr. Cathy A. Nordman, NVE Corp, Eden Prairie, MN – *Novel materials for magnetic sensors*

Dr. David P. Pappas, National Institute for Standards and Technology, Boulder, CO – *Zigzag shaped AMR sensors*

Dr. Stuart S. P. Parkin, IBM Almaden Research Center – *Spin polarized tunnel structures*

Dr. Jon Slaughter, Freescale Semiconductor, Inc., AZ – *Magnetic tunnel junctions*

Professor Michael B. Weissman, University of Illinois at Urbana-Champaign – *Granular compaction*

(ii) University of Delaware collaborators

Dr. Robert W. Birkmire, Institute for Energy Conversion - *Magnetoresistance in silver chalcogenide thin films*

Professor Catherine Davies, Animal and Food Sciences – *Food and batter rheology*

Professor Annette Shine, Chemical Engineering – *Magnetostrictive sensors for viscometry*

Professor John Q. Xiao, Physics and Astronomy – *Spin polarized tunneling*

Current Graduate Students

Gokce Cehreli, BS in Physics (2002), Ph.D. Physics Program

Arif Ozbay, BS in Physics (2000), Ph.D. Physics Program

Current Undergraduate Students

Mohamed A. Bah, (Chemical Engineering major, Physics minor)

Former Affiliates

Graduate advisor: Allen M. Goldman – University of Minnesota
Postdoctoral advisor: Heinrich M. Jaeger – The University of Chicago
Postdoctoral advisor: Michael B. Weissman – University of Illinois at Urbana-Champaign

External:

Professor Thomas F. Rosenbaum, The University of Chicago
Dr. David Scott, DuPont Central Research and Development, DE
Dr. Marie-Louise Saboungi, Argonne National Laboratory

Graduate Students:

Dr. Lai Jiang, Ph.D in Physics (2006)
Jonathon Skovholt, MS in Physics (2005)
Paul E. Scott, MS in Physics (2002)

Undergraduate Students:

Alexander Grushin (Computer Science major, Winter 2000, granular compaction), **Tim Miyashiro** (Physics major, summer 2000, Winter 2001, instructional development related to on-line lecture demonstration index), **Andrew Barnum** (Physics major, June, 2000 – December 2001, granular compaction), **Greg Abendroth** (Chemical Engineering major, Summer 2001, redevelopment of PHYS 207 and PHYS 207 Honors laboratories), **Jeremy Johnson** (Computer Science & Electrical Engineering major, Summer - Fall 2001, Winter and Summer 2002, magnetic tunnel junctions and granular materials), **Eric Fine** (joint with A.D. Shine, Chemical Engineering major, Fall 2001 – Spring 2002, magnetostrictive glucose sensor), **Pravine Viswa** (joint with A.D. Shine, Chemical Engineering major, Summer 2002 – Spring 2003, magnetostrictive glucose sensor), **Adaora Ikwuagwu** (joint with A.D. Shine, Biology major, Summer 2003, food rheology using a magnetostrictive sensor), **Maxim Baldytchev** (Physics major, Summer 2003, diffusive motion of vibrated granular materials), **Frank Fader** (B.A. History, Summer 2003 – Winter 2004, Magnetostrictive glucose sensor), **Raul Jackson** (joint with A.D. Shine, Chemical Engineering major, Winter 2004, magnetostrictive viscometer), **James Healy** (Physics major, Fall 2005 – Spring 2006, spin-valve sensors), and **Mohamed Bah** (Chemical Engineering major & Physics minor, Summer 2006-present, spin-electronics), **Thomas Flanagen** (Physics major, Summer 2007-present, spin-electronics & organic semiconductors).

Note: Alexander Grushin, Andrew Barnum, and Jeremy Johnson are co-authors on papers with me as noted in a previous section.

High School Students:

Howard Wang (Summer 2002 and part of following academic year**,** convection and diffusion in a two-dimensional granular assembly) and **Arjun Gopalratnam (**Summer 2004**,** granular relaxation visualized by capacitance tomography).

This CV is current as of 08/31/2007

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Signature Date